Nuclear Regulatory Commission
Exhibit # - NRC00003D-00-BD01
Docket # - 05200012| 05200013
Identified: 08/18/2011

Admitted: 08/18/2011 Withdrawn:
Rejected: Stricken:

NRC00003D
05/09/2011

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1937, Vol. 2

Environmental Impact Statement for Combined Licenses (COLs) for South Texas Project Electric Generating Station Units 3 and 4

Final Report

U.S. Nuclear Regulatory Commission
Office of New Reactors
Washington, DC 20555-0001

U.S. Army Corps of Engineers
U.S. Army Engineer District, Galveston
Galveston, TX 77553-1229

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Final Report

Manuscript Completed: February 2011
Date Published: February 2011

Division of Site and Environmental Review
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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Planning, Environmental and Regulatory Division
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U.S. Army Corps of Engineers
Galveston, Texas 77553-1229

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Abstract

This environmental impact statement (EIS) has been prepared in response to an application submitted to the U.S. Nuclear Regulatory Commission (NRC) by STP Nuclear Operating Company (STPNOC) for combined construction permits and operating licenses (combined licenses or COLs). The proposed actions related to the STPNOC application are (1) NRC issuance of COLs for two new nuclear power reactor units at the South Texas Project Electric Generating Station (STP) site in Matagorda County, Texas, and (2) U.S. Army Corps of Engineers (Corps) issuance of a permit to perform certain construction activities on the site. The Corps is participating in preparing this EIS as a cooperating agency and participates collaboratively on the review team.

This EIS includes the review team's analysis that considers and weighs the environmental impacts of building and operating two new nuclear units at the STP site and at alternative sites, and mitigation measures available for reducing or avoiding adverse impacts.

The EIS includes the evaluation of the proposed action's impacts to waters of the United States pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act) and Section 10 of the Rivers and Harbors Appropriation Act of 1899. The Corps will conduct a public interest review in accordance with the guidelines promulgated by the U.S. Environmental Protection Agency under authority of Section 404(b) of the Clean Water Act. The public interest review, which will be addressed in the Corps' permit decision document, will include an alternatives analysis to determine the Least Environmentally Damaging Practicable Alternative.

After considering the environmental aspects of the proposed action, the NRC staff's recommendation to the Commission is that the COLs be issued as proposed. This recommendation is based on (1) the application, including the Environmental Report (ER), submitted by STPNOC; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public comments; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and in this EIS. The Corps will issue its Record of Decision based, in part, on this EIS.

Contents

Abstract iii
Executive Summary xxix
Abbreviations/Acronyms xxxiii
1.0 Introduction 1-1
1.1 Background 1-2
1.1.1 Application and Review 1-2
1.1.1.1 NRC COL Application Review 1-3
1.1.1.2 Corps Permit Application Review 1-4
1.1.2 Preconstruction Activities 1-5
1.1.3 Cooperating Agencies 1-6
1.1.4 Concurrent NRC Reviews 1-7
1.2 The Proposed Federal Actions 1-8
1.3 The Purpose and Need for the Proposed Actions 1-9
1.4 Alternatives to the Proposed Actions 1-9
1.5 Compliance and Consultations 1-10
1.6 References 1-10
2.0 Affected Environment 2-1
2.1 Site Location 2-1
2.2 Land Use 2-1
2.2.1 The Site and Vicinity 2-1
2.2.2 Transmission Lines 2-9
2.2.3 The Region 2-9
2.3 Water 2-11
2.3.1 Hydrology 2-11
2.3.1.1 Surface-Water Hydrology 2-11
2.3.1.2 Groundwater Hydrology 2-22
2.3.2 Water Use 2-33
2.3.2.1 Surface-Water Use 2-34
2.3.2.2 Groundwater Use 2-36
2.3.3 Water Quality 2-40
2.3.3.1 Surface-Water Quality 2-40
2.3.3.2 Groundwater Quality 2-42

2.3.4 Water Monitoring 2-44
2.3.4.1 Surface-Water Monitoring 2-44
2.3.4.2 Groundwater Monitoring 2-46
2.4 Ecology 2-48
2.4.1 Terrestrial Ecology 2-48
2.4.1.1 Terrestrial Communities of the Site and Vicinity 2-48
2.4.1.2 Terrestrial Resources – Transmission Lines 2-56
2.4.1.3 Important Terrestrial Species and Habitats 2-57
2.4.1.4 Terrestrial Ecology Monitoring 2-67
2.4.2 Aquatic Ecology 2-67
2.4.2.1 Aquatic Resources of the Site and Vicinity 2-67
2.4.2.2 Aquatic Resources – Transmission Lines 2-88
2.4.2.3 Important Aquatic Species and Habitats 2-88
2.4.2.4 Aquatic Monitoring 2-108
2.5 Socioeconomics 2-109
2.5.1 Demographics 2-111
2.5.1.1 Resident Population 2-112
2.5.1.2 Transient Population 2-115
2.5.1.3 Migrant Labor 2-116
2.5.2 Community Characteristics 2-117
2.5.2.1 Economy 2-118
2.5.2.2 Taxes 2-121
2.5.2.3 Transportation 2-127
2.5.2.4 Aesthetics and Recreation 2-130
2.5.2.5 Housing 2-132
2.5.2.6 Public Services 2-134
2.6 Environmental Justice 2-146
2.6.1 Methodology 2-147
2.6.2 Scoping and Outreach 2-153
2.6.3 Subsistence and Communities with Unique Characteristics 2-153
2.6.4 Migrant Populations 2-155
2.6.5 Environmental Justice Summary 2-155
2.7 Historic and Cultural Resources 2-156
2.7.1 Cultural Background 2-156
2.7.2 Historic and Cultural Resources at the Site 2-157
2.7.3 Consultation 2-159

2.8 Geology 2-160
2.9 Meteorology and Air Quality 2-161
2.9.1 Climate 2-161
2.9.1.1 Wind 2-163
2.9.1.2 Temperature 2-163
2.9.1.3 Atmospheric Moisture 2-163
2.9.1.4 Severe Weather 2-164
2.9.1.5 Atmospheric Stability 2-164
2.9.2 Air Quality 2-165
2.9.3 Atmospheric Dispersion 2-165
2.9.3.1 Short-Term Dispersion Estimates 2-166
2.9.3.2 Long-Term Dispersion Estimates 2-167
2.9.4 Meteorological Monitoring 2-167
2.10 Nonradiological Health 2-168
2.10.1 Public and Occupational Health 2-168
2.10.1.1 Air Quality 2-168
2.10.1.2 Occupational Injuries 2-169
2.10.1.3 Etiological Agents 2-170
2.10.2 Noise 2-171
2.10.3 Transportation 2-172
2.10.4 Electromagnetic Fields 2-172
2.11 Radiological Environment 2-173
2.12 Related Federal Projects and Consultation 2-174
2.13 References 2-174
3.0 Site Layout and Plant Description 3-1
3.1 External Appearance and Plant Layout 3-1
3.2 Proposed Plant Structures, Systems, and Components 3-2
3.2.1 Reactor Power Conversion System 3-2
3.2.2 Structures, Systems, and Components with a Major Environmental Interface 3-3
3.2.2.1 Landscape and Stormwater Drainage 3-6
3.2.2.2 Cooling Water System 3-6
3.2.2.3 Other Permanent Plant-Environment Interfacing Structures, Systems, or Components 3-9
3.2.2.4 Other Temporary Plant-Environment Interfacing Structures 3-11
3.2.3 Structures with a Minor Environmental Interface 3-11

3.3 Construction and Preconstruction Activities 3-13
3.3.1 Major Activity Areas 3-13
3.3.2 Summary of Resource Commitments During Construction and Preconstruction 3-17
3.4 Operational Activities 3-17
3.4.1 Description of Operational Modes 3-18
3.4.2 Plant-Environment Interfaces During Operation 3-18
3.4.2.1 Circulating Water System – Intakes, Discharges, Cooling Towers 3-19
3.4.2.2 Landscape and Drainage 3-19
3.4.2.3 Essential Service Water System – Ultimate Heat Sink 3-19
3.4.2.4 Emergency Diesel Generators 3-20
3.4.3 Radioactive Waste-Management System 3-20
3.4.3.1 Liquid Radioactive Waste-Management System 3-21
3.4.3.2 Gaseous Waste-Management System 3-21
3.4.3.3 Solid Radioactive Waste-Management System 3-22
3.4.4 Nonradioactive Waste-Management Systems 3-23
3.4.4.1 Solid Waste Management 3-23
3.4.4.2 Liquid Waste Management 3-23
3.4.4.3 Gaseous Waste Management 3-25
3.4.4.4 Hazardous and Mixed Waste Management 3-25
3.4.5 Summary of Resource Parameters During Operation 3-25
3.5 References 3-27
4.0 Construction Impacts at the Proposed Site 4-1
4.1 Land-Use Impacts 4-4
4.1.1 The Site 4-4
4.1.2 Transmission Line Corridors and Offsite Areas 4-5
4.2 Water-Related Impacts 4-6
4.2.1 Hydrological Alterations 4-7
4.2.2 Water-Use Impacts 4-8
4.2.3 Water-Quality Impacts 4-11
4.2.3.1 Surface-Water Quality Impacts 4-12
4.2.3.2 Groundwater-Quality Impacts 4-12
4.2.4 Water Monitoring 4-14
4.3 Ecological Impacts 4-14
4.3.1 Terrestrial and Wetland Impacts 4-15

4.3.1.1 Impacts to Terrestrial Resources – Site and Vicinity 4-15
4.3.1.2 Terrestrial Resources – Transmission Line Corridors....4-18
4.3.1.3 Important Terrestrial Species and Habitats....4-20
4.3.1.4 Terrestrial Monitoring....4-24
4.3.1.5 Summary of Impacts to Terrestrial Resources....4-25
4.3.2 Aquatic Impacts....4-26
4.3.2.1 Aquatic Resources – Site and Vicinity....4-27
4.3.2.2 Aquatic Resources –Transmission Line Corridors....4-30
4.3.2.3 Important Aquatic Species and Habitats....4-31
4.3.2.4 Aquatic Monitoring....4-36
4.3.2.5 Potential Mitigation Measures for Aquatic Impacts....4-37
4.3.2.6 Summary of Impacts to Aquatic Resources....4-37
4.4 Socioeconomic Impacts....4-38
4.4.1 Physical Impacts....4-38
4.4.1.1 Workers and the Local Public....4-38
4.4.1.2 Buildings....4-39
4.4.1.3 Roads....4-39
4.4.1.4 Aesthetics....4-40
4.4.1.5 Summary of Physical Impacts....4-40
4.4.2 Demography....4-40
4.4.3 Economic Impacts to the Community....4-42
4.4.3.1 Economy....4-43
4.4.3.2 Taxes....4-44
4.4.3.3 Summary of Economic Impacts to the Community....4-46
4.4.4 Infrastructure and Community Service Impacts....4-46
4.4.4.1 Transportation....4-46
4.4.4.2 Recreation....4-49
4.4.4.3 Housing....4-49
4.4.4.4 Public Services....4-50
4.4.4.5 Education....4-53
4.4.4.6 Summary of Community Service and Infrastructure Impacts....4-53
4.4.5 Summary of Socioeconomic Impacts....4-54
4.5 Environmental Justice Impacts....4-55
4.5.1 Analytical Considerations....4-55
4.5.2 Health Impacts....4-55
4.5.3 Physical and Environmental Impacts....4-57
4.5.3.1 Soil....4-57
4.5.3.2 Water....4-57

4.5.3.3 Air 4-58
4.5.3.4 Noise 4-58
4.5.3.5 Summary of Physical and Environmental Impacts 4-58
4.5.4 Socioeconomic Impacts 4-58
4.5.5 Subsistence and Special Conditions 4-59
4.5.5.1 Subsistence 4-59
4.5.5.2 High-Density Communities 4-60
4.5.6 Summary of Environmental Justice Impacts 4-61
4.6 Historic and Cultural Resources 4-61
4.7 Meteorological and Air-Quality Impacts 4-63
4.7.1 Construction and Preconstruction Activities 4-63
4.7.2 Traffic 4-64
4.7.3 Summary 4-66
4.8 Nonradiological Health Impacts 4-65
4.8.1 Public and Occupational Health 4-66
4.8.1.1 Public Health 4-66
4.8.1.2 Construction Worker Health 4-67
4.8.1.3 Summary of Public and Construction Worker Health Impacts 4-68
4.8.2 Noise Impacts 4-68
4.8.3 Impacts of Transporting Construction Materials and Construction Personnel to the STP Site 4-69
4.8.4 Summary of Nonradiological Health Impacts 4-72
4.9 Radiological Health Impacts 4-72
4.9.1 Direct Radiation Exposures 4-72
4.9.2 Radiation Exposures from Gaseous Effluents 4-73
4.9.3 Radiation Exposures from Liquid Effluents 4-74
4.9.4 Total Dose to Construction Workers 4-74
4.9.5 Summary of Radiological Health Impacts 4-74
4.10 Nonradioactive Waste Impacts 4-75
4.10.1 Impacts to Land 4-75
4.10.2 Impacts to Water 4-76
4.10.3 Impacts to Air 4-76
4.10.4 Summary of Impacts 4-77

4.11 Measures and Controls to Limit Adverse Impacts During Construction Activities 4-77
4.12 Summary of Preconstruction and Construction Impacts 4-78
4.13 References 4-88
5.0 Operational Impacts at the Proposed Site 5-1
5.1 Land-Use Impacts 5-1
5.1.1 The Site 5-2
5.1.2 Transmission Corridors and Offsite Areas 5-2
5.2 Water-Related Impacts 5-3
5.2.1 Hydrological Alterations 5-4
5.2.2 Water-Use Impacts 5-5
5.2.2.1 Surface Water 5-6
5.2.2.2 Groundwater-Use Impacts 5-11
5.2.3 Water-Quality Impacts 5-15
5.2.3.1 Surface-Water Quality Impacts 5-15
5.2.3.2 Groundwater-Quality Impacts 5-19
5.2.4 Water Monitoring 5-21
5.3 Ecological Impacts 5-22
5.3.1 Terrestrial and Wetland Impacts 5-22
5.3.1.1 Terrestrial Resources – Site and Vicinity 5-23
5.3.1.2 Terrestrial Resources – Transmission Lines 5-25
5.3.1.3 Important Terrestrial Species and Habitats 5-27
5.3.1.4 Terrestrial Monitoring 5-31
5.3.1.5 Summary of Terrestrial Ecosystems Impacts 5-31
5.3.2 Aquatic Impacts 5-32
5.3.2.1 Aquatic Resources – Site and Vicinity 5-32
5.3.2.2 Aquatic Resources – Transmission Lines 5-44
5.3.2.3 Important Aquatic Species and Habitats 5-44
5.3.2.4 Aquatic Monitoring 5-48
5.3.2.5 Summary of Impacts to Aquatic Resources 5-48
5.4 Socioeconomic Impacts 5-49
5.4.1 Physical Impacts 5-49
5.4.1.1 Workers and the Local Public 5-50
5.4.1.2 Buildings 5-51
5.4.1.3 Roads 5-51
5.4.1.4 Aesthetics 5-51
5.4.1.5 Summary of Physical Impacts 5-51

5.4.2 Demography 5-51
5.4.3 Economic Impacts to the Community 5-52
5.4.3.1 Economy 5-53
5.4.3.2 Taxes 5-54
5.4.3.3 Summary of Economic Impacts 5-56
5.4.4 Infrastructure and Community Services 5-57
5.4.4.1 Transportation 5-57
5.4.4.2 Recreation 5-58
5.4.4.3 Housing 5-58
5.4.4.4 Public Services 5-59
5.4.4.5 Education 5-60
5.4.4.6 Summary of Infrastructure and Community Services 5-60
5.4.5 Summary of Socioeconomic Impacts 5-61
5.5 Environmental Justice 5-61
5.5.1 Health Impacts 5-61
5.5.2 Physical and Environmental Impacts 5-62
5.5.2.1 Soil 5-63
5.5.2.2 Water 5-63
5.5.2.3 Air 5-63
5.5.2.4 Summary of Physical and Environmental Impacts 5-64
5.5.3 Socioeconomic Impacts 5-64
5.5.4 Subsistence and Special Conditions 5-64
5.5.5 Summary of Environmental Justice Impacts 5-65
5.6 Historic and Cultural Resource Impacts 5-65
5.7 Meteorological and Air Quality Impacts 5-66
5.7.1 Air Quality Impacts 5-66
5.7.2 Cooling System Impacts 5-68
5.7.3 Summary 5-70
5.8 Nonradiological Health Impacts 5-70
5.8.1 Etiological Agents 5-71
5.8.2 Noise 5-73
5.8.3 Acute Effects of Electromagnetic Fields 5-74
5.8.4 Chronic Effects of Electromagnetic Fields 5-75
5.8.5 Occupational Health 5-76
5.8.6 Impacts of Transporting Operations Personnel to the Proposed Site 5-77

5.8.7 Summary of Nonradiological Health Impacts 5-78
5.9 Radiological Impacts of Normal Operations 5-79
5.9.1 Exposure Pathways 5-79
5.9.2 Radiation Doses to Members of the Public 5-83
5.9.2.1 Liquid Effluent Pathway 5-83
5.9.2.2 Gaseous Effluent Pathway 5-84
5.9.3 Impacts to Members of the Public 5-85
5.9.3.1 Maximally Exposed Individual 5-85
5.9.3.2 Population Dose 5-87
5.9.3.3 Summary of Radiological Impacts to Members of the Public 5-88
5.9.4 Occupational Doses to Workers 5-88
5.9.5 Doses to Biota Other than Humans 5-89
5.9.5.1 Liquid Effluent Pathway 5-89
5.9.5.2 Gaseous Effluent Pathway 5-90
5.9.5.3 Impact of Estimated Non-Human Biota Doses 5-90
5.9.6 Radiological Monitoring 5-91
5.10 Nonradioactive Waste Impacts 5-93
5.10.1 Impacts to Land 5-93
5.10.2 Impacts to Water 5-94
5.10.3 Impacts to Air 5-95
5.10.4 Mixed Waste Impacts 5-95
5.10.5 Summary of Waste Impacts 5-95
5.11 Environmental Impacts of Postulated Accidents 5-96
5.11.1 Design Basis Accidents 5-98
5.11.2 Severe Accidents 5-100
5.11.2.1 Air Pathway 5-101
5.11.2.2 Surface-Water Pathways 5-109
5.11.2.3 Groundwater Pathway 5-110
5.11.2.4 Summary 5-110
5.11.3 Severe Accident Mitigation Alternatives 5-111
5.11.4 Summary of Postulated Accident Impacts 5-113
5.12 Measures and Controls to Limit Adverse Impacts During Operation 5-113
5.13 Summary of Operational Impacts 5-118
5.14 References 5-120
6.0 Fuel Cycle, Transportation, and Decommissioning 6-1

6.1 Fuel Cycle Impacts and Solid Waste Management 6-1
6.1.1 Land Use 6-8
6.1.2 Water Use 6-8
6.1.3 Fossil Fuel Impacts 6-8
6.1.4 Chemical Effluents 6-9
6.1.5 Radiological Effluents 6-10
6.1.6 Radiological Wastes 6-12
6.1.7 Occupational Dose 6-15
6.1.8 Transportation 6-15
6.1.9 Conclusion 6-15
6.2 Transportation Impacts 6-16
6.2.1 Transportation of Unirradiated Fuel 6-18
6.2.1.1 Normal Conditions 6-18
6.2.1.2 Radiological Impacts of Transportation Accidents 6-24
6.2.1.3 Nonradiological Impacts of Transportation Accidents 6-24
6.2.2 Transportation of Spent Fuel 6-25
6.2.2.1 Normal Conditions 6-26
6.2.2.2 Radiological Impacts of Accidents 6-32
6.2.2.3 Nonradiological Impact of Spent Fuel Shipments 6-35
6.2.3 Transportation of Radioactive Waste 6-36
6.2.4 Conclusions 6-38
6.3 Decommissioning Impacts 6-39
6.4 References 6-40
7.0 Cumulative Impacts 7-1
7.1 Land Use 7-7
7.2 Water Use and Quality 7-8
7.2.1 Water Use Impacts 7-8
7.2.1.1 Surface Water-Use Impacts 7-10
7.2.1.2 Groundwater-Use Impacts 7-14
7.2.2 Water-Quality Impacts 7-17
7.2.2.1 Surface-Water Quality Impacts 7-17
7.2.2.2 Groundwater-Quality Impacts 7-20
7.3 Ecology 7-22
7.3.1 Terrestrial and Wetland Ecosystem Impacts 7-22
7.3.1.1 Wildlife and Plant Communities 7-23

7.3.1.2 Important Species 7-27
7.3.2 Aquatic Ecosystem Impacts 7-30
7.4 Socioeconomics and Environmental Justice 7-36
7.4.1 Socioeconomics 7-36
7.4.2 Environmental Justice 7-40
7.5 Historic and Cultural Resources 7-42
7.6 Air Quality 7-44
7.6.1 Criteria Pollutants 7-44
7.6.2 Greenhouse Gas Emissions 7-45
7.6.3 Summary 7-46
7.7 Nonradiological Health 7-47
7.8 Radiological Impacts of Normal Operation 7-49
7.9 Postulated Accidents 7-51
7.10 Fuel Cycle, Transportation, and Decommissioning 7-52
7.10.1 Fuel Cycle 7-52
7.10.2 Transportation 7-52
7.10.3 Decommissioning 7-55
7.11 Conclusions 7-55
7.12 References 7-58
8.0 Need for Power 8-1
8.1 Description of Power System 8-1
8.1.1 Description of STPNOC 8-1
8.1.2 Description of ERCOT 8-2
8.1.3 Description of the ERCOT Analytical Process 8-5
8.1.3.1 Systematic Test 8-5
8.1.3.2 Comprehensive Test 8-5
8.1.3.3 Subject to Confirmation Test 8-6
8.1.3.4 Responsive to Forecasting Uncertainty Test 8-7
8.1.3.5 Summary of ERCOT Analytical Process 8-7
8.2 Power Demand 8-8
8.3 Power Supply 8-19
8.4 Assessment of Need for Power 8-27
8.4.1 Conclusion 8-32
8.5 References 8-33

9.0 Environmental Impacts of Alternatives 9-1
9.1 No-Action Alternative 9-2
9.2 Energy Alternatives 9-3
9.2.1 Alternatives Not Requiring New Generating Capacity 9-3
9.2.2 Alternatives Requiring New Generating Capacity 9-6
9.2.2.1 Coal-Fired Generation 9-7
9.2.2.2 Natural Gas-Fired Generation 9-13
9.2.3 Other Alternatives 9-19
9.2.3.1 Oil-Fired Generation 9-20
9.2.3.2 Wind Power 9-20
9.2.3.3 Solar Power 9-23
9.2.3.4 Hydropower 9-24
9.2.3.5 Geothermal Energy 9-24
9.2.3.6 Wood Waste 9-25
9.2.3.7 Municipal Solid Waste 9-26
9.2.3.8 Other Biomass-Derived Fuels 9-26
9.2.3.9 Fuel Cells 9-27
9.2.4 Combination of Alternatives 9-28
9.2.5 Summary Comparison of Alternatives 9-30
9.3 Alternative Sites 9-33
9.3.1 Alternative Sites Selection Process 9-33
9.3.1.1 Selection of Region of Interest 9-34
9.3.1.2 Selection of Candidate Areas. 9-34
9.3.1.3 Selection of Potential Sites 9-36
9.3.1.4 Selection of Primary Sites 9-37
9.3.1.5 Selection of Candidate Sites 9-39
9.3.1.6 Evaluation of STPNOC's Site Selection Process 9-43
9.3.2 Red 2 9-45
9.3.2.1 Land Use 9-47
9.3.2.2 Water Use and Quality 9-50
9.3.2.3 Terrestrial and Wetland Resources 9-59
9.3.2.4 Aquatic Resources 9-70
9.3.2.5 Socioeconomics 9-77
9.3.2.6 Environmental Justice 9-84
9.3.2.7 Historic and Cultural Resources 9-87
9.3.2.8 Air Quality 9-89
9.3.2.9 Nonradiological Health 9-91
9.3.2.10 Radiological Impacts of Normal Operations 9-93

9.3.2.11 Postulated Accidents 9-94
9.3.3 Allens Creek 9-95
9.3.3.1 Land Use 9-98
9.3.3.2 Water Use and Quality 9-101
9.3.3.3 Terrestrial and Wetland Resources 9-108
9.3.3.4 Aquatic Resources 9-120
9.3.3.5 Socioeconomics 9-129
9.3.3.6 Environmental Justice 9-135
9.3.3.7 Historic and Cultural Resources 9-140
9.3.3.8 Air Quality 9-143
9.3.3.9 Nonradiological Health 9-144
9.3.3.10 Radiological Impacts of Normal Operations 9-146
9.3.3.11 Postulated Accidents 9-147
9.3.4 Trinity 2 9-148
9.3.4.1 Land Use 9-152
9.3.4.2 Water Use and Quality 9-155
9.3.4.3 Terrestrial and Wetland Resources 9-163
9.3.4.4 Aquatic Resources 9-175
9.3.4.5 Socioeconomics 9-183
9.3.4.6 Environmental Justice 9-190
9.3.4.7 Historic and Cultural Resources 9-194
9.3.4.8 Air Quality 9-197
9.3.4.9 Nonradiological Health 9-198
9.3.4.10 Radiological Impacts of Normal Operations 9-200
9.3.4.11 Postulated Accidents 9-201
9.3.5 Comparison of the Impacts of the Proposed Action and Alternative Sites 9-202
9.3.5.1 Comparison of Cumulative Impacts at the Proposed and Alternative Sites 9-203
9.3.5.2 Environmentally Preferable Sites 9-205
9.3.5.3 Obviously Superior Sites 9-207
9.4 System Design Alternatives 9-208
9.4.1 Heat Dissipation Systems 9-208
9.4.1.1 Plant Cooling System – Once-Through Operation 9-208
9.4.1.2 Spray Canals 9-209
9.4.1.3 Wet Mechanical Draft Cooling Towers 9-209
9.4.1.4 Wet Natural Draft Cooling Towers 9-210
9.4.1.5 Dry Cooling Towers 9-210
9.4.1.6 Combination Wet/Dry Cooling Tower System 9-211

9.4.2 Circulating Water Systems 9-211
9.4.2.1 Intake Alternatives 9-211
9.4.2.2 Discharge Alternatives 9-212
9.4.2.3 Water Supplies 9-213
9.4.2.4 Water Treatment 9-215
9.4.3 Conclusion 9-215
9.5 Corps' Onsite Alternatives Evaluation 9-215
9.5.1 Onsite Alternative 1 9-215
9.5.2 Onsite Alternative 2 9-216
9.5.3 Onsite Alternative 3 (STPNOC's Preferred Alternative) 9-216
9.6 References 9-216
10.0 Conclusions and Recommendations 10-1
10.1 Impacts of the Proposed Action 10-3
10.2 Unavoidable Adverse Environmental Impacts 10-4
10.2.1 Unavoidable Adverse Impacts During Construction and Preconstruction 10-4
10.2.2 Unavoidable Adverse Impacts During Operation 10-8
10.3 Relationship Between Short-Term Uses and Long-Term Productivity of the Human Environment 10-13
10.4 Irreversible and Irretrievable Commitments of Resources 10-14
10.4.1 Irreversible Commitments of Resources 10-14
10.4.1.1 Land Use 10-14
10.4.1.2 Water Use 10-15
10.4.1.3 Aquatic and Terrestrial Biota 10-15
10.4.1.4 Socioeconomic Resources 10-16
10.4.1.5 Air and Water 10-16
10.4.2 Irretrievable Commitments of Resources 10-16
10.5 Alternatives to the Proposed Action 10-16
10.6 Benefit-Cost Balance 10-17
10.6.1 Benefits 10-19
10.6.1.1 Societal Benefits 10-20
10.6.1.2 Regional Benefits 10-21
10.6.2 Costs 10-22
10.6.2.1 Internal Costs 10-25
10.6.2.2 External Costs 10-27
10.6.3 Summary of Benefits and Costs 10-29

10.7 Staff Conclusions and Recommendations 10-29
10.8 References 10-30
Appendix A – Contributors to the Environmental Impact Statement A-1
Appendix B – Organizations Contacted B-1
Appendix C – NRC and Corps Environmental Review Correspondence C-1
Appendix D – Scoping Comments and Responses D-1
Appendix E – Draft Environmental Impact Statement Comments and Responses E-1
Appendix F – Key Consultation Correspondence F-1
Appendix G – Supporting Documentation for Socioeconomic and Radiological Dose Assessment G-1
Appendix H – Authorizations, Permits, and Certifications H-1
Appendix I – Carbon Dioxide Footprint Estimates for a 1000 MW(e) Light Water Reactor (LWR) I-1
Appendix J – U.S. Army Corps of Engineers Cumulative Effect Resource Analysis Table J-1
Appendix K – U.S. Army Corps of Engineers Public Notice Comments K-1

Figures

2-1 STP Site and Proposed Plant Footprint 2-2
2-2 STP Site and Vicinity 2-3
2-3 Land-Use Classifications at STP Site 2-4
2-4 Landscape Features and Habitat Types of the STP Site 2-5
2-5 Land-Use Classifications in the Vicinity of the STP Site 2-6
2-6 Land-Use Classifications in STP 50-mi Region 2-10
2-7 Location of the STP Site and the Adjacent Watersheds 2-13
2-8 The Colorado River Basin 2-14
2-9 Location of the STP Site with Respect to Nearby Cities, the Matagorda Bay, and the Gulf of Mexico 2-15
2-10 Daily Mean Colorado River Discharge near Bay City, Texas 2-16
2-11 The Six LCRA Dams and the Corresponding Highland Lakes They Impound 2-18
2-12 Current and Previous Locations of the Main Drainage Channel 2-20
2-13 Kelly Lake and Local Drainages Flowing Into and Out of the Lake 2-21
2-14 Correlation of USGS and Texas Nomenclature 2-24
2-15 Aquifers of Texas 2-25
2-16 Generalized Hydrostratigraphic Section Underlying the STP Site 2-30
2-17 Hydrological Monitoring Locations for Existing STP Units 1 and 2 2-45
2-18 Stormwater Monitoring Locations for Existing STP Units 1 and 2 2-47
2-19 Vegetation Cover and Land-Use Cover Types at the STP Site 2-50
2-20 Locations of Wildlife Refuges and Critical Habitat Within 50 mi of the STP Site 2-59
2-21 Location of STP with Respect to Important Aquatic Resources and the 1975-1976 Aquatic Ecology Sampling Locations 2-71
2-22 Aquatic Ecology Sampling Locations for 2007-2008, from NMM 5 to 9 2-80
2-23 Aquatic Ecology Sampling Locations for 2007-2008, from GIWW to NMM 4 2-81
2-24 Map of Central Texas Gulf Coast, Showing Counties Potentially Affected by the Proposed Units 3 and 4 2-112
2-25 Road, Highway, and Rail Transportation System 2-128
2-26 Main Routes to STP Site 2-129
2-27 Aggregate Minority Populations in Block Groups Meeting Environmental Justice Selection Criteria 2-149
2-28 Black or African American Populations in Block Groups Meeting Environmental Justice Selection Criteria 2-150
2-29 Asian or Pacific Islander Populations in Block Groups Meeting Environmental Justice Selection Criteria 2-151
2-30 Hispanic Populations in Block Groups Meeting Environmental Justice Selection Criteria 2-152

2-31 Aggregate Low-Income Populations in Block Groups Meeting Environmental Justice Selection Criteria 2-154
3-1 Representative Ground-Level Photograph of STP Units 1 and 2 3-2
3-2 Simplified Flow Diagram of Reactor Power Conversion System 3-4
3-3 STP Site Layout Map 3-5
4-1 Total Workforce, STP Units 3 and 4 4-42
5-1 Exposure Pathways to Man 5-81
5-2 Exposure Pathways to Biota Other Than Man 5-82
6-1 The Uranium Fuel Cycle: No-Recycle Option 6-6
6-2 Illustration of Truck Stop Model 6-29
7-1 Geographic Area of Interest Evaluated to Assess Cumulative Impacts to Terrestrial Ecological Resources 7-24
8-1 Map of the ERCOT ISO Service Area 8-3
8-2 Peak Demand and Average Demand in the ERCOT Region 2010-2019 8-9
8-3 ERCOT 2009 Load Duration Curve 8-10
8-4 ERCOT 2006, 2007, 2008, 2009, and 2010 Peak Load Forecasts 8-11
8-5 ERCOT 2009 and 2010 Energy Demand Forecasts 8-12
8-6 Population in the ERCOT Region 8-13
8-7 Total Non-Farm Employment in the ERCOT Region 8-14
8-8 Per Capita Income in the ERCOT Region 8-14
8-9 ERCOT Net Load Duration Curve in 2018 with 18,456 MW of Wind Generation Capacity 8-21
8-10 Alternative ERCOT Generation Capacity Reduction Scenarios vs. Projected Demand 8-24
9-1 Candidate Areas 9-35
9-2 Potential Sites 9-38
9-3 Screening Criteria Evaluation Results 9-39
9-4 Primary Sites 9-40
9-5 Red 2 Alternative Site and 10-mi Radius 9-48
9-6 Geographic Area of Analysis of Cumulative Impacts to Terrestrial Resources for the Red 2 Site in Grayson and Fannin Counties 9-60
9-7 Block Groups with Minority Populations Meeting Environmental Justice Selection Critera within 50 mi of the Red 2 Alternative Site 9-85
9-8 Block Groups with Low-Income Populations Meeting Environmental Justice Selection Criteria Within 50 mi of the Red 2 Alternative Site 9-86
9-9 Allens Creek Alternative Site and 10-mi Radius 9-99
9-10 Geographic Area for the Analysis of Cumulative Impacts to Terrestrial Resources Within the Western Gulf Coast Plains Ecoregion in the Lower Brazos and San Bernard watersheds within Austin, Colorado, Wharton, Waller, and Fort Bend Counties 9-109

9-11 Block Groups with Minority Populations Meeting Environmental Justice Selection Criteria Within 50 mi of the Allens Creek Alternative Site 9-137
9-12 Block Groups with Low-Income Populations Meeting Enviornmental Justice Selection Criteria Within 50 mi of the Allens Creek Alternative Site 9-138
9-13 Trinity 2 Alternative Site and 10-mi Radius 9-154
9-14 Geographic Area of Analysis of Cumulative Impacts to Terrestrial Resources for the Trinity 2 Site in Freestone County 9-165
9-15 Block Groups With Minority Populations Meeting Environmental Justice Selection Criteria Within 50 mi of the Trinity 2 Alternative Site 9-192
9-16 Block Groups With Low-Income Popualtions Meeting Environmental Justice Selection Criteria Within 50 mi of the Trinity 2 Alternative Site 9-193

Tables

2-1 Land Use at the STP Site 2-7
2-2 Representative Hydrogeologic Properties of Confining Layers in the STP Hydrogeologic Strata 2-31
2-3 Representative Hydrogeologic Properties of Aquifers in the STP Hydrogeologic Strata 2-32
2-4 Groundwater Resource Estimates for Matagorda County 2-39
2-5 Maximum Tritium Concentration in Water Bodies Near the STP Site 2-46
2-6 Approximate Acreages of Habitats and Land Use Found on the STP Site 2-51
2-7 Amphibians Found in Matagorda County, Texas 2-53
2-8 Birds Observed On or Around the STP Project Area for Units 3 and 4 2-55
2-9 Federally Listed Terrestrial Species Identified by FWS as Occurring in the Vicinity of the STP Site and the STP-to-Hillje Transmission Corridor 2-57
2-10 State-Listed Species Occurring or Potentially Occurring in the Region of the STP Site and the STP-to-Hillje Transmission Corridor 2-61
2-11 Fish and Shellfish Collected in the MCR by Gear Type, 2007-2008 2-73
2-12 Aquatic Species Collected during Impingement Sampling in the MCR's CWIS for Units 1 and 2, 2007-2008 2-74
2-13 Aquatic Species Collected During Entrainment Sampling in the MCR's CWIS for Units 1 and 2, 2007-2008 2-75
2-14 Fish and Shellfish Collected in the Colorado River by Gear Type, 2007-2008 2-83
2-15 Important Aquatic Species that May Occur in the Vicinity of STP Site 2-89
2-16 Distribution of STP Employees, January 2007 2-110
2-17 Counties within 50 mi of the STP Site 2-111
2-18 Historical and Projected Populations for Counties in the STP Region 2-114
2-19 Municipalities in the 50-mi Region Surrounding the STP Site 2-115
2-20 Hotels Nights Available and Sold in Four-County Socioeconomic Impact Area Surrounding the STP Site, 2006 2-116
2-21 Minority and Low-Income Populations 2-118
2-22 Employment by Industry, 2006 2-119
2-23 Major Employers in Matagorda, Brazoria, Calhoun, and Jackson Counties 2-120
2-24 Employment and Unemployment Statistics for Matagorda, Brazoria, Calhoun, and Jackson Counties 2-122
2-25 Matagorda County Property Tax Information, 2000-2005 2-124
2-26 Property Tax Statistics for Matagorda County and Special Districts 2001-2006 2-124
2-27 Palacios Independent School District Property Tax Revenues and Disposition 2000-2005 2-126
2-28 Roadway Use Statistics for Most Likely Routes to the STP Site 2-130
2-29 Wildlife Management Areas and Parks Within 50 mi of the STP Site 2-131

2-30 Regional Housing Information by County for the Year 2000 2-133
2-31 Water Supply, Capacity, and Average Daily Consumption by Major Water Supply Systems in Brazoria, Calhoun, Jackson, and Matagorda Counties 2-136
2-32 Designed Capacity and Maximum Water Treated in Wastewater Treatment Systems in Brazoria, Calhoun, Jackson, and Matagorda Counties 2-137
2-33 Law Enforcement Personnel 2005 2-139
2-34 Fire Protection Personnel 2-140
2-35 Hospital Data for Brazoria, Calhoun, Jackson and Matagorda Counties 2-142
2-36 United Way Agencies of Matagorda County 2-144
2-37 Public School Statistics in the Four-County Socioeconomic Impact Area, 2005-2006 2-145
2-38 Private School Statistics in the Four-County Socioeconomic Impact Area, 2005-2006 2-146
2-39 Atmospheric Dispersion Factors for Proposed Units 3 and 4 Design Basis Accident Calculations 2-166
2-40 Maximum Annual Average Atmospheric Dispersion and Deposition Factors for Evaluation of Normal Effluents for Receptors of Interest 2-167
2-41 Construction Noise Sources and Attenuation with Distance 2-171
3-1 Descriptions and Examples of Activities Associated with Building Units 3 and 4 3-14
3-2 Summary of Resource Commitments Associated with Building Proposed Units 3 and 4 3-18
3-3 Representative Water Treatment Chemicals Used for STP Units 1 and 2 3-24
3-4 Summary of Resource Commitments Associated with Operation of Proposed STP Units 3 and 4 3-25
4-1 Drawdown in Feet at the STP Property Line (100 ft) and a Point 2500 ft from a Production Well 4-10
4-2 Estimated Acreage Affected by Proposed Activities by Habitat Type and Land Use 4-15
4-3 Calculation of Traffic Impacts on FM 521 from Building Activities at Proposed Units 3 and 4, Months 26-35 4-47
4-4 Estimated Impacts of Transporting Workers and Materials to and from the STP Site for a Single ABWR 4-71
4-5 Direct Radiation Doses to Unit 4 Construction Workers 4-73
4-6 Summary of Measures and Controls Proposed by STPNOC to Limit Adverse Impacts During Construction of Proposed Units 3 and 4 4-79
4-7 Summary of Construction and Preconstruction Impacts for Proposed Units 3 and 4 4-85
5-1 Summary Statistics of Simulated Colorado River Streamflow Below the RMPF 5-10
5-2 Drawdown at the STP Property Line (100 ft) and a Point 2500 ft from a Production Well 5-13
5-3 Summary Statistics of Simulated Water Temperature and Total Dissolved Solids of MCR Discharge 5-16
5-4 Potential Increase in Resident Population Resulting from Operating Units 3 and 4 5-52

5-5 Estimated Operations Impacts to Property Taxes for Matagorda County and Special Districts 5-56
5-6 Anticipated Atmospheric Emissions Associated With Operation of Proposed Units 3 and 4 5-67
5-7 MCR Fog Impact Analysis 5-69
5-8 Nonradiological Estimated Impacts of Transporting Operations Workers to and from the STP Site 5-78
5-9 Annual Doses to the MEI for Liquid Effluent Releases from a New Unit 5-84
5-10 Annual Doses to MEI for Gaseous Effluent Releases from a New Unit 5-85
5-11 Comparison of Annual MEI Dose Rates for a Single Unit with 10 CFR 50, Appendix I Design Objectives 5-86
5-12 Comparison of MEI Annual Doses with 40 CFR Part 190 Standards – (mrem/yr) 5-87
5-13 Biota Doses for Proposed Units 3 and 4 5-90
5-14 Comparison of Biota Doses from the Proposed Units 3 and 4 at the STP Site to Relevant Guidelines for Biota Protection 5-91
5-15 Atmospheric Dispersion Factors for STP Site DBA Calculations 5-99
5-16 Design Basis Accident Doses for an ABWR 5-99
5-17 Mean Environmental Risks from ABWR Reactor Severe Accidents at the STP Site 5-103
5-18 Comparison of Environmental Risks for an ABWR Reactor at the STP Site with Risks for Current-Generation Reactors at Five Sites Evaluated in NUREG-1150 5-104
5-19 Comparison of Environmental Risks from Severe Accidents Initiated by Internal Events for an ABWR Reactor at the STP Site with Risks Initiated by Internal Events for Current Plants Undergoing Operating License Renewal Review and Environmental Risks of the ABWR Reactor at Other Sites 5-105
5-20 Summary of Proposed Measures and Controls to Limit Adverse Impacts During Operation 5-114
5-21 Summary of Operational Impacts at the Proposed Units 3 and 4 Site 5-118
6-1 Table S–3 from 10 CFR 51.51(b), Table of Uranium Fuel Cycle Environmental Data 6-2
6-2 Comparison of Annual Average Dose Received by an Individual from All Sources 6-13
6-3 Numbers of Truck Shipments of Unirradiated Fuel for the Reference LWR and the ABWR 6-19
6-4 RADTRAN 5.6 Input Parameters for Unirradiated Fuel Shipments 6-20
6-5 Radiological Impacts Under Normal Conditions of Transporting Unirradiated Fuel to the STP Site or Alternative Sites 6-21
6-6 Nonradiological Impacts of Transporting Unirradiated Fuel to the STP Site and Alternative Sites, Normalized to Reference LWR 6-25
6-7 Transportation Route Information for Shipments from the STP Site and Alternative Sites to the Proposed Geologic Repository at Yucca Mountain, Nevada 6-27
6-8 RADTRAN 5.6 Normal (Incident-free) Exposure Parameters 6-28

6-9 Normal (Incident-Free) Radiation Doses to Transport Workers and the Public from Shipping Spent Fuel from the STP Site and Alternative Sites to the Proposed Geologic HLW Repository at Yucca Mountain....6-30
6-10 Radionuclide Inventories Used in Transportation Accident Risk Calculations for an ABWR....6-33
6-11 Annual Spent Fuel Transportation Accident Impacts for an ABWR at the STP Site and Alternative Sites, Normalized to Reference 1100-MW(e) LWR Net Electrical Generation....6-35
6-12 Nonradiological Impacts of Transporting Spent Fuel from the STP Site and Alternative Sites to the Proposed Geologic HLW Repository at Yucca Mountain, Nevada, Normalized to Reference LWR....6-36
6-13 Summary of Radioactive Waste Shipments from the STP Site and Alternative Sites....6-37
6-14 Nonradiological Impacts of Radioactive Waste Shipments from the STP Site....6-38
7-1 Past, Present, and Reasonably Foreseeable Future Projects and Other Actions Considered in the STP Cumulative Analysis. 7-3
7-2 Comparison of Annual Carbon Dioxide Emission Rates 7-46
7-3 Cumulative Impacts on Environmental Resources, Including the Impacts of Proposed Units 3 and 4 7-56
8-1 ERCOT Peak Demand and Calculated Reserve Margin, 2010-2015....8-17
8-2 Calculated ERCOT Reserve Margin, 2009-2025....8-18
8-3 ERCOT Region Forecasted Summer Resources, 2010-2025....8-22
8-4 STPNOC Forecasted Summer Capacity, Baseload Generation Units Only....8-25
8-5 Review Team Sensitivity Test, ERCOT Region Forecasted Summer Resources, 2010-2025 8-28
8-6 ERCOT/Review Team Forecasted Summer Capacity, Baseload Generation Units Only 8-29
8-7 ERCOT/Review Team Forecasted Unmet Need for Baseload Generation Compared with STPNOC Estimated Need for Baseload Power....8-32
9-1 Summary of Environmental Impacts of Coal-Fired Power Generation....9-14
9-2 Summary of Environmental Impacts of Natural Gas-Fired Power Generation 9-19
9-3 Summary of Environmental Impacts of a Combination of Power Sources 9-29
9-4 Summary of Environmental Impacts of Construction and Operation of New Nuclear, Coal-Fired, and Natural Gas-Fired Generating Units, and a Combination of Alternatives....9-31
9-5 Comparison of Direct Carbon Dioxide Emissions for Energy Alternatives 9-32
9-6 Criteria for Selection of Candidate Sites....9-41
9-7 Composite Ratings for the Primary Sites....9-42
9-8 Past, Present, and Reasonably Foreseeable Future Projects and Other Actions Considered in the Cumulative Analysis of the Red 2 Alternative Site 9-46

9-9 Estimated Land Cover Classes for Approximately 2000 ac of the 2500 ac Red 2 Site. 9-61
9-10 Federally and State-listed Threatened and Endangered Species in Fannin County, Texas 9-63
9-11 State-Listed Aquatic Species that are Endangered, Threatened, and Species of Concern for Fannin County....9-73
9-12 Past, Present, and Reasonably Foreseeable Future Projects and Other Actions Considered in the Allens Creek Alternative Site Cumulative Analysis....9-96
9-13 Estimated Acreages by Land Cover Classes for Approximately 300 ac of the 800-ac Allens Creek Site. 9-110
9-14 List of Federal and State Threatened and Endangered Species in Austin, Fort Bend, Colorado, and Wharton Counties, Texas 9-112
9-15 Federally and State-Listed Aquatic Species that are Endangered, Threatened, and Species of Concern for Austin County....9-125
9-16 Past, Present, and Reasonably Foreseeable Future Projects and Other Actions Considered in the Cumulative Analysis of the Trinity 2 Alternative Site. 9-149
9-17 Estimated Land Cover Classes for Approximately 2000 ac of the 2500-ac Trinity 2 Site. 9-166
9-18 Federally and State-listed Threatened and Endangered Species in Freestone County, Texas....9-168
9-19 Federally and State-Listed Aquatic Species that are Endangered, Threatened, and Species of Concern for Freestone County....9-179
9-20 Comparison of Cumulative Impacts at the Proposed and Alternative Sites 9-204
10-1 Unavoidable Adverse Environmental Impacts from Construction and Preconstruction Activities....10-4
10-2 Unavoidable Adverse Environmental Impacts from Operation 10-8
10-3 Summary of Benefits of the Proposed Action 10-19
10-4 Summary of Costs of Preconstruction, Construction, and Operation 10-22

Executive Summary

By letter dated September 20, 2007, the U.S. Nuclear Regulatory Commission (NRC or the Commission) received an application from STP Nuclear Operating Company (STPNOC) for combined construction permits and operating licenses (combined licenses or COLs) for South Texas Project Electric Generating Station (STP) Units 3 and 4, located in Matagorda County, Texas. The review team's evaluation is based on the October 2010 revision to the application, responses to requests for additional information, and supplemental letters.

The proposed actions related to the STP Units 3 and 4 application are (1) NRC issuance of COLs for construction and operation of two new nuclear units at the STP site, and (2) U.S. Army Corps of Engineers (Corps) issuance of a permit pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act) and Section 10 of the Rivers and Harbors Act to perform certain construction activities on the site. The Corps is participating with the NRC in preparing this environmental impact statement (EIS) as a cooperating agency and participates collaboratively on the review team. The reactor specified in the application is the certified U.S. Advanced Boiling Water Reactor design, as modified by a proposed amendment to the ABWR design certification that is being sought by STPNOC to address the requirements of 10 CFR 50.150 on the ability of the design to withstand the impact of a large commercial aircraft (U.S. ABWR, hereafter referred to as ABWR in this EIS).

Section 102 of the National Environmental Policy Act of 1969, as amended (NEPA) (42 USC 4321 *et seq.*) directs that an EIS be prepared for major Federal actions that significantly affect the quality of the human environment. The NRC has implemented Section 102 of NEPA in Title 10 of the Code of Federal Regulations (CFR) Part 51. Further, in 10 CFR 51.20, the NRC has determined that the issuance of a COL under 10 CFR Part 52 is an action that requires an EIS.

The purpose of STPNOC's requested NRC action—issuance of the COLs—is to obtain licenses to construct and operate two new nuclear units. These licenses are necessary but not sufficient for construction and operation of the units. A COL applicant must obtain and maintain the necessary permits from other Federal, State, Tribal, and local agencies and permitting authorities. Therefore, the purpose of the NRC's environmental review of the STPNOC application is to determine if two new nuclear units of the proposed design can be constructed and operated at the STP site without unacceptable adverse impacts on the human environment. The purpose of STPNOC's requested Corps action is to obtain a permit to perform regulated activities that would impact waters of the United States.

Upon acceptance of the STPNOC application, the NRC began the environmental review process described in 10 CFR Part 51 by publishing in the *Federal Register* a Notice of Intent

(72 FR 72774) to prepare an EIS and conduct scoping. On February 5, 2008, the NRC held two scoping meetings in Bay City, Texas, to obtain public input on the scope of the environmental review. The staff reviewed the comments received during the scoping process and contacted Federal, State, Tribal, regional, and local agencies to solicit comments.

To gather information and to become familiar with the sites and their environs, the NRC and its contractor Pacific Northwest National Laboratory (PNNL) visited the STP site in February 2008 and the Allens Creeks alternative site in March 2008. In August 2009, the NRC and PNNL visited the Red 2 and Trinity 2 alternative sites. During the site visits, the NRC staff and its contractors met with STPNOC staff, public officials, and the public.

Included in this EIS are (1) the results of the review team's analyses, which consider and weigh the environmental effects of the proposed actions; (2) potential mitigation measures for reducing or avoiding adverse effects; (3) the environmental impacts of alternatives to the proposed action; and (4) the NRC staff's recommendation regarding the proposed action.

To guide its assessment of the environmental impacts of a proposed action or alternative actions, the NRC has established a standard of significance for impacts based on Council on Environmental Quality guidance (40 CFR 1508.27). Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, provides the following definitions of the three significance levels – SMALL, MODERATE, and LARGE:

> SMALL – Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE – Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

In preparing this EIS, the review team reviewed the application, including the Environmental Report (ER) submitted by STPNOC; consulted with Federal, State, Tribal, and local agencies; and followed the guidance set forth in NUREG-1555, *Environmental Standard Review Plan* and Staff Memorandum on *Addressing Construction and Preconstruction, Greenhouse Gas Issues, General Conformity Determinations, Environmental Justice, Need for Power, Cumulative Impact Analysis, and Cultural/Historical Resources Analysis Issues in Environmental Impact Statements*. In addition, the NRC staff considered the public comments related to the environmental review received during the scoping process. Comments within the scope of the environmental review are included in Appendix D of this EIS.

A 75-day comment period began on March 26, 2010, when the U.S. Environmental Protection Agency (EPA) published a Notice of Availability of the draft EIS to allow members of the public and agencies to comment on the results of the environmental review. During this period, the NRC and Corps staff conducted two public meetings in Bay City, Texas, to describe the results of the environmental review, respond to questions, and accept public comment. All comments received on the draft EIS are included in Appendix E.

The NRC staff's recommendation to the Commission related to the environmental aspects of the proposed action is that the COLs be issued as requested. This recommendation is based on (1) the application, including the ER submitted by STPNOC; (2) consultation with other Federal, State, Tribal, and local agencies; (3) the staff's independent review; (4) the staff's consideration of public comments; and (5) the assessments summarized in this EIS, including the potential mitigation measures identified in the ER and this EIS. The Corps will issue its Record of Decision based, in part, on this EIS.

The NRC staff's evaluation of the site safety and emergency preparedness aspects of the proposed action will be addressed in the NRC's Safety Evaluation Report, which is still being developed.

Abbreviations/Acronyms

AADT	Average Annual Daily Traffic
ABWR	U.S. Advanced Boiling Water Reactor
ac	acre(s)
ac-ft/yr	acre-feet per year
ACHP	Advisory Council on Historic Preservation
ADAMS	Agencywide Documents Access and Management System
AEC	U.S. Atomic Energy Commission
AEP	American Electric Power
AEP	Archaeology and Ethnography Program
AIA	Aircraft Impact Assessment
APE	area of potential effect
ALARA	as low as is reasonably achievable
ARRA	American Recovery and Reinvestment Act of 2009
ASLB	Atomic Safety and Licensing Board
BACT	best available control technology
BEA	Bureau of Economic Analysis
BEIR	Biological Effects of Ionizing Radiation
BGCD	Bluebonnet Groundwater Conservation District
BGS	below ground surface
BMP	best management practice
Btu	British thermal unit(s)
Bq	Becquerel(s)
BRA	Brazos River Authority
BWR	boiling water reactor
°C	degree(s) Celsius
CAES	compressed air energy storage
CBC	Christmas Bird Count
CCD	Census County Division
CDC	Centers for Disease Control and Prevention
CDF	core damage frequency
CDR	Capacity, Demand, and Reserves Report
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
Ci	curie(s)
cm	centimeter(s)

CMP	Coastal Management Program
CMZ	Coastal Management Zone
CNP	CenterPoint Energy
CO	carbon monoxide
CO_2	carbon dioxide
COL	combined license
CORMIX	Cornell Mixing Zone Expert System
Corps	U.S. Army Corps of Engineers
CPGCD	Coastal Plains Groundwater Conservation District
CPS Energy	City Public Service Board of San Antonio, Texas
CPUE	catch per unit effort
CR	County Road (CR 360, CR 392)
CREZ	Competitive Renewable Energy Zones
CWA	Clean Water Act
CWIS	circulating water intake structure
CWS	circulating water system
CZMA	Coastal Zone Management Act
DBA	Design Basis Accident
dBA	decibel(s) (acoustic)
DC	design certification
DCD	Design Control Document
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DSM	demand side management
D/Q	deposition values
DWS	drinking water standards
EA	Environmental Assessment
EAB	Exclusion Area Boundary
ECP	Essential Cooling Pond
EIA	Energy Information Administration
EIS	environmental impact statement
EFH	essential fish habitat
ELF	extremely low frequency
ELCC	effective load carrying capability
EMF	electromagnetic field
EOF	Emergency Operations Facility
EPA	U.S. Environmental Protection Agency
ER	Environmental Report
ERCOT	Electric Reliability Council of Texas

ESA	Endangered Species Act of 1973, as amended
ESRP	Environmental Standard Review Plan
°F	degree(s) Fahrenheit
FAA	Federal Aviation Administration
FDA	final design approval
FERC	Federal Energy Regulatory Commission
FES	Final Environmental Statement
FM	Farm-to-Market
FMP	Fishery Management Plan
fps	feet per second
FR	Federal Register
FSAR	Final Safety Analysis Report
FSC	Federal Species of Concern
FSER	Final Safety Evaluation Report
ft	foot or feet
ft^2	square feet
ft^3	cubic feet
FWS	U.S. Fish and Wildlife Service
GBq	gigabecquerel
GCC	global climate change
GCRP	U.S. Global Change Research Program
GE	General Electric
GEIS	generic environmental impact statement
GHG	greenhouse gases
GIT	Georgia Institute of Technology
GIWW	Gulf Intracoastal Waterway
gpd	gallon(s) per day
gpm	gallon(s) per minute
GWMS	gaseous waste-management system
ha	hectare(s)
HAPC	habitat areas of particular concern
hr	hour(s)
Hg	mercury
HLW	high-level waste
Hz	hertz
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection

IGCC	integrated gasification combined cycle
in.	inch
INEEL	Idaho National Engineering and Environmental Laboratory
IOU	investor owned utility
ISD	Independent School District
ISO	independent system operator
I&S	interest and sinking fund
km	kilometer(s)
km^2	square kilometer(s)
kWh	kilowatt-hour(s)
kV	kilovolt(s)
L	liter(s)
lb	pound(s)
LCRA	Lower Colorado River Authority
LCRWPG	Lower Colorado Regional Water Planning Group
LEDPA	least environmentally damaging practicable alternative
LERF	large early release frequency
LLW	low-level waste
LNG	liquefied natural gas
LOS	level of service
LPZ	Low Population Zone
LRF	large release frequency
LST	local standard time
LSWP	LCRA-SAWS Water Project
LTDEF	long-term demand energy forecast
LTSF	Long-Term Storage Facility
LWA	Limited Work Authorization
LWMS	liquid waste management system
LWR	light water reactor
m	meter(s)
m^3	cubic meter(s)
MACCS2	MELCOR Accident Consequence Code System Version 2
MBq	megabecquerel(s)
MCEDC	Matagorda County Economic Development Corporation
MCEMO	Matagorda County Emergency Management Office
MCPE	market clearing prices of energy
MCR	Main Cooling Reservoir
MDC	Main Drainage Channel

MEI	maximally exposed individual
METGCD	Mid-East Texas Groundwater Conservation District
mg	milligram(s)
MGD	million gallons per day
mg/L	milligram(s) per liter
mi	mile(s)
mi^2	square mile(s)
MIT	Massachusetts Institute of Technology
mL	milliliter(s)
MMS	Minerals Management Service
mo	month
MOU	Memorandum of Understanding
M&O	maintenance and operations
mph	mile(s) per hour
mR	milliroentgen
mrad	millirad(s)
mrem	millirem(s)
µS	microsiemens
MSA	Metropolitan Statistical Area
MSL	mean sea level
mSv	millisievert(s)
MT	metric ton(s) (or tonne[s])
MTU	metric ton(s) of uranium
MUD	municipal utilities district
MW	megawatt(s)
MWd	megawatt-day(s)
MW(e)	megawatt(s) electrical
MW(t)	megawatt(s) thermal
NCI	National Cancer Institute
NCRP	National Council on Radiation Protection & Measurements
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act of 1969, as amended
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act of 1966, as amended
NIEHS	National Institute of Environmental Health Sciences
NINA	Nuclear Innovation North America
NMFS	National Marine Fisheries Services
NMM	navigation mile marker
NOAA	National Oceanic and Atmospheric Administration

NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	U.S. Nuclear Regulatory Commission
NRG	NRG South Texas LP
NRHP	National Register of Historic Places
NSR	new source review
NTF	Nuclear Training Facility
OCS	outer continental shelf
ODCM	offsite dose calculation manual
OSF	Onsite Staging Facility
OSGSF	Old Steam Generator Storage Facility
OSHA	Occupational Safety and Health Administration
OW	observation well
PAM	primary amoebic meningoencephalitis
pCi	picocuries
pCi/L	picocuries per liter
PGC	Power Generation Company
PIR	Public Interest Review
PM	particulate matter
$PM_{2.5}$	particulate matter with a diameter of 2.5 microns or less
PM_{10}	particulate matter with a diameter of 10 microns or less
PNNL	Pacific Northwest National Laboratory
POSGCD	Post Oak Savannah Groundwater Conservation District
ppt	parts per thousand
PSD	prevention of significant deterioration
PUCT	Public Utility Commission of Texas
PWR	pressurized water reactors
RAI	request for additional information
RCRA	Resource Conservation and Recovery Act of 1976, as amended
RCRWPG	Region C Regional Water Planning Group
RCW	Reactor Building Cooling Water
RE	refueling
rem	roentgen equivalent man (a special unit of radiation dose)
REMP	radiological environmental monitoring program
RIMS	Regional Input-Output Model System
RMPF	Reservoir Makeup Pumping Facility
RMR	reliability must run
ROD	Record of Decision

ROI	region of interest
ROW	right of way
RRGCD	Red River Groundwater Conservation District
RSICC	Radiation Safety Information Computational Center
RSW	Reactor Service Water
RV	recreational vehicle
Ryr	reactor-year
s	second(s)
SACTI	Seasonal and Annual Cooling Tower Impacts
SAMA	severe accident mitigation alternatives
SAMDA	severe accident mitigation design alternatives
SAWS	San Antonio Water System
SCR	selective catalytic reduction
SECPOP 2000	Sector Population, Land Fraction, and Economic Estimation Program
SER	Safety Evaluation Report
SGIA	signed generation interconnection agreement
SHPO	State Historic Preservation Officer
SO_2	sulphur dioxide
SO_x	sulphur oxide
STP	South Texas Project Electric Generating Station
STPEGS	STP Electric Generating Station
STPNOC	STP Nuclear Operating Company
SUV	sport utility vehicle
Sv	sievert
SWMS	solid waste management system
SWPPP	Stormwater Pollution Prevention Plan
TAC	Texas Administrative Code
TAMUG	Texas A&M University at Galveston
TBEG	Texas Bureau of Economic Geology
TBq	terabecquerel(s)
TCC	Texas Central Company
TCEQ	Texas Commission on Environmental Quality
TCMP	Texas Coastal Management Plan
TDCJ	Texas Department of Criminal Justice
TDHCA	Texas Department of Housing and Community Affairs
TDS	total dissolved solids
TDSHS	Texas Department of State Health Services
TEA	Texas Education Agency
TEDE	total effective dose equivalent

Texas RE	Texas Reliability Entity
THC	Texas Historical Commission
TIS	Texas Interconnected System
TLD	thermoluminescent dosimeter
TMDL	total maximum daily load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TPWP	Texas Prairie Wetlands Project
TRAGIS	Transportation Routing Analysis Geographic Information System
TRC	Texas Railroad Commission
TSECO	Texas State Energy Conservation Office
TSHA	Texas State Historical Association
TWC	Texas Water Code
TWDB	Texas Water Development Board
TX	Texas
TxDOT	Texas Department of Transportation
U_3O_8	triuranium octaoxide ("yellowcake")
UF_6	uranium hexafluoride
UFSAR	Updated Final Safety Analysis Report
UHS	Ultimate Heat Sink
UMTRI	University of Michigan Transportation Research Institute
UO_2	uranium oxide
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USGS	U.S. Geological Survey
VOC	volatile organic compound
WCS	Waste Control Specialists, LLC
WHO	World Health Organization
WMA	Wildlife Management Area
WSEC	White Stallion Energy Center
WSWTS	West Sanitary Waste Treatment System
WCID	Water Control and Improvement District
χ/Q	atmospheric dispersion values
yd	yard(s)
yd^3	cubic yard(s)
yr	year(s)

Appendix A

Contributors to the Environmental Impact Statement

Appendix A

Contributors to the Environmental Impact Statement

The overall responsibility for the preparation of this environmental impact statement (EIS) was assigned to the Office of New Reactors, U.S. Nuclear Regulatory Commission (NRC). The EIS was prepared by members of the Office of New Reactors with assistance from other NRC organizations, the U.S. Army Corps of Engineers, Pacific Northwest National Laboratory, and Idaho National Laboratory.

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(a) Staff member is no longer with the NRC, Office of New Reactors, or the Division of Siting and Environmental Reviews.
(b) Pacific Northwest National Laboratory is operated by Battelle for the U.S. Department of Energy.
(c) Staff member is no longer with Pacific Northwest National Laboratory.
(d) Idaho National Laboratory is operated by Battelle Energy Alliance for the U.S. Department of Energy.

Appendix B

Organizations Contacted

Appendix B

Organizations Contacted

The following Federal, State, regional, Tribal, and local organizations were contacted during the course of the U.S. Nuclear Regulatory Commission staff's independent review of potential environmental impacts from the construction and operation of two new nuclear units, Units 3 and 4, at the South Texas Project Electric Generating Station in Matagorda County, Texas:

Advisory Council on Historic Preservation, Director Office of Federal Agency Programs, Washington, D.C.

Alabama-Coushatta Tribe, Historical Preservation Department, Livingston, Texas

Angleton Independent School District (ISD), Angleton, Texas

Bay City Chamber of Commerce, Bay City, Texas

Bay City Community Development Corporation, Bay City, Texas

Bay City ISD, Bay City, Texas

Bay City Ministerial Alliance, Bay City, Texas

Bay City Salvation Army, Bay City, Texas

Bell Valuation Services, Bay City, Texas

Bluebonnet Groundwater Conservation District, Navasota, Texas

Brazoria County Judge, Angleton, Texas

Brazos River Authority, Waco, Texas

Brazos Valley Groundwater Conservation District, Waco, Texas

Calhoun County Judge, Port Lavaca, Texas

City of Bay City, Mayor, Bay City, Texas

City of Corpus Christi, Intergovernmental Relations

Coastal Plains Groundwater Conservation District, Bay City, Texas

Columbia-Brazoria ISD, West Columbia, Texas

Comanche Nation, Lawton, Oklahoma

Electric Reliability Council of Texas

Environmental Protection Agency, Regional Office, Dallas, Texas

Frankson and Griffith, Certified Public Accountants, Bay City, Texas

Greater Texoma Utility Authority, Bonham, Texas (now Red River Groundwater Conservation District)

Guadalupe-Blanco River Authority, Seguin, Texas

Jackson County, Edna, Texas

Kiowa Tribe of Oklahoma, Carnegie, Oklahoma

Matagorda County Museum Archives and Collections Department, Bay City, Texas

Mid-East Texas Groundwater Conservation District, Centerville, Texas

Lower Colorado River Authority, Austin, Texas

National Marine Fisheries Service, Galveston Laboratory, Galveston, Texas

National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, Florida

NRG Energy, Inc., Limestone Electric Generating Station, Jewett, Texas

Palacios ISD, Palacios, Texas

State of Texas, Office of the Governor, Austin, Texas

St. Anthony of Padua Church, Palacios, Texas

Tarrant Water District, Fort Worth, Texas

Texas Commission on Environmental Quality, Austin, Texas

Texas General Land Office, Coastal Coordination Council, Austin, Texas

Texas Historical Commission, Austin, Texas

Texas Parks and Wildlife Department, Austin, Texas

Texas State Historic Preservation Officer, Austin, Texas

Texas State Soil and Water Conservation Board, Temple, Texas

Texas Water Development Board, Austin, Texas

Tidehaven ISD, El Maton, Texas

Tonkawa Tribe of Oklahoma, Tonkawa, Oklahoma

Trinity River Authority of Texas Southern Region, Huntsville, Texas

Upper Neches River Municipal Water Authority, Palestine, Texas

U.S. Army Corps of Engineers Galveston District, Galveston, Texas

U.S. Army Corps of Engineers, Fort Worth, Texas

U.S. Congressman Ron Paul's Office, Galveston, Texas

U.S. Environmental Protection Agency, Temple, Texas

U.S. Fish and Wildlife Service, Ecological Services, Houston, Texas

Van Vleck ISD, Van Vleck, Texas

Appendix C

NRC and Corps Environmental Review Correspondence

Appendix C

NRC and Corps Environmental Review Correspondence

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) or the U.S. Army Corps of Engineers (Corps) and STP Nuclear Operating Company (STPNOC). Also included is other correspondence related to the environmental review of STPNOC's application for combined licenses (COLs) and a Corps permit at the South Texas Project Electric Generating Station (STP) site in Matagorda County, Texas.

All documents, with the exception of those containing proprietary information, are available electronically from the Public Electronic Reading Room found on the Internet at the following web address: http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Documents Access and Management System (ADAMS), which provides text and image files of the NRC's public documents. The ADAMS accession numbers for each document are included below.

October 16, 2007	Letter to Mr. Mark McBurnett, Vice President, STPNOC, from NRC, regarding Acknowledgement of Receipt of The Combined License Application for South Texas Project, Units 3 and 4, and Associated Federal Register Notice. (Accession No. ML072670515)
November 8, 2007	Letter from Mr. Gregory T. Gibson, Manager, STPNOC, to NRC, regarding Environmental Report Acceptance Review: Outstanding Issues. (Accession No. ML073190645)
November 16, 2007	Letter to Mr. Mark McBurnett, Vice President, STPNOC, from NRC, regarding Acceptance Review of The Combined License Application for South Texas Project (STP), Units 3 and 4. (Accession No. ML073200761)
November 21, 2007	Letter from M.A. McBurnett, STPNOC, to NRC, regarding Supplement to Combined License Application. (Accession No. ML073310616)
November 29, 2007	Letter to Mr. Mark McBurnett, STPNOC, from NRC, regarding the Docketing of The Combined License Application (COL) For South Texas Project (STP), Units 3 and 4. (Accession No. ML073320290)

December 5, 2007	Letter from Mr. Gregory T. Gibson, STPNOC to NRC, Resubmitted Aquatic Ecology Monitoring: Six-Month Interim Report. (Accession No. ML073410357)
December 11, 2007	Letter to Mr. Mark McBurnett, STPNOC, from NRC, regarding the Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Related to Combined Licenses for the South Texas Project Sites, Units 3 and 4. (Accession No. ML073400695)
December 19, 2007	Letter to Mr. Mark McBurnett, STPNOC, from NRC, regarding Federal Register Notice Regarding Opportunity to Petition for Leave to Intervene - South Texas Project Units 3 and 4. (Accession No. ML073390202)
December 21, 2007	Letter to Ms. Martha Johnson, Bay City Public Library, from NRC staff, regarding the Maintenance of Documents at The Bay City Public Library Related to Application by STP Nuclear Operating Company For Combined Licenses for The South Texas Project Site, Units 3 and 4. (Accession No. ML073480284)
January 13, 2008	Email from Mr. Paul Kallan, NRC, to Mr. Greg Gibson, STPNOC, Site Audit Schedule and Preliminary Needs for Site Audit. (Accession No. ML082400729)
January 18, 2008	Notice of Public Meeting to Discuss Environmental Scoping Process for the South Texas Project Site, Units 3 & 4 Combined Licenses (TAC NO. RA2764). (Accession No. ML080020250)
January 25, 2008	Letter to Mr. David Bernhart, Assistant Regional Administrator, National Marine Fisheries Service, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080020174)
January 25, 2008	Letter to Alabama-Coushatta Tribe, Historical Preservation Department, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080090115)
January 25, 2008	Letter to Mr. Billy Evans Horse, Chairman of the Kiowa Tribe, Kiowa Tribe of Oklahoma, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML073620378)

January 25, 2008	Letter to Ms. Ruth Toahty, NAGPRA Coordinator, Comanche Nation NAGPRA and Historic Preservation Program, Comanche National Museum, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML073620358)
January 25, 2008	Letter to Mr. Anthony E. Street, Tribal President, Tonkawa Tribe of Oklahoma, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080090198)
January 25, 2008	Letter to Mr. Don Klima, Director Office of Federal Agency Programs, Advisory Council on Historic Preservation, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080100669)
January 25, 2008	Letter to Mr. Lawrence Oaks, Executive Director of the Texas SHPO, State Historic Preservation Officer, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080110216)
January 25, 2008	Letter to Ms. Moni Belton, Fish and Wildlife Biologist, U.S. Fish and Wildlife Service Ecological Services, from Mr. William Burton, NRC, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080090170)
January 31, 2008	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Submittal of Combined License Application Revision 1. (Accession No. ML080700399)
February 28, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC staff, Reponses to Environmental Report Site Audit Comments. (Accession No. ML080660150)
February 08, 2008	Site Audit Summary Report. (Accession No. ML081010440)
February 13, 2008	Notice Withdrawing Hearing Notice Regarding the Application for a Combined Operating License for South Texas Project Units 3 and 4. (Accession No. ML080450208)

April 4, 2008	Letter to Ms. Kathy Boydston, Habitat Assessment Program Manager, Texas Parks and Wildlife Department, from NRC staff, regarding Application for The South Texas Project Site, Units 3 and 4 Combined Licenses. (Accession No. ML080730469)
April 10, 2008	Summary of Public Scoping Meetings to Support Review of the South Texas Plant Combined License Application (TAC NO. MD6691). (Accession No. ML081000171)
May 19, 2008	Letter to Mr. William Burton, NRC, from Mr. Carter Smith, Texas Parks and Wildlife, Proposed application for combined licenses for South Texas Project, Units 3 and 4, Matagorda County. (Accession No. ML090330752)
May 19, 2008	Letter to Mr. Gregory Gibson, STPNOC, from Mr. Paul Kallan, NRC, Request for Additional Information, Letter Number One Related to the Environmental Report for the South Texas Combined License Application. (Accession No. ML081360531)
June 04, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC, Cultural or Historical Artifact Discovery During Construction. (Accession No. ML081610296)
June 09, 2008	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Cultural or Historical Artifact Discovery During Construction. (Accession No. ML081640213)
June 17, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC, Final Aquatic Ecology Report. (Accession No. ML081750196)
July 02, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC, Response to Requests for Additional Information. (Accession No. ML081900569)
July 07, 2008	Letter to Mr. Scott Flanders, NRC, from Mr. Fred Anthamatten, U.S. Army Corps of Engineers, Environmental Impact Statement for the South Texas Project Nuclear Operating Company's Combined License Application. (Accession No. ML082140640)
July 15, 2008	Letter from Mr. Greg Gibson, STPNOC, to NRC, Response to Requests for Additional Information. (Accession No. ML082040684)

July 30, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC, Response to Requests for Additional Information. (Accession No. ML082140629)
August 27, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC, Response to Requests for Additional Information. (Accession No. ML082420332)
August 29, 2008	Letter to Mr. Fred Anthamatten, U.S. Army Corps of Engineers, from Mr. Scott Flanders, NRC, Request to Cooperate with the Nuclear Regulatory Commission on the Environmental Impact Statement for the South Texas Project Nuclear Operating Company, Units 3 and 4 Combined License Application. (Accession No. ML0823106192)
September 04, 2008	Letter from Mr. Gregory Gibson, STPNOC, to NRC, Completion of NRC Commitment. (Accession No. ML082530234)
September 26, 2008	Letter to Mr. Scott Head, STPNOC, from Mr. William Burton, NRC, Scoping Summary Report Related to the Environmental Scoping Process for the South Texas Project, Units 3 and 4 Combined License Application. (Accession No. ML082260471)
September 24, 2008	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Submittal of Combined License Application Revision 2. (Accession No. ML082830938)
November 18, 2008	Letter to Mr. Scott Head, STPNOC, from Mr. Paul Kallan, NRC, Request for Additional Information, Letter Number Two Related to the Environmental Report for the South Texas Combined License Application. (Accession No. ML083190269)
January 14, 2009	Memorandum from Ms. Jessie Muir, NRC, to Mr. William Burton, NRC, Summary of Teleconferences Held with South Texas Nuclear Operating Company Regarding the Draft Requests for Additional Information. (Accession No. ML090030003)
January 21, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Second Re-submittal of Response to Request for Additional Information. (Accession No. ML090270986)
January 22, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML090270720)

February 03, 2009	Letter from Mr. Scott Head, STPNOC, to Mr. Mark Fisher, TCEQ, Request for State Water Quality Certification of Federally Permitted Activity. (Accession No. ML ML090360530)
February 10, 2009	Letter from Mr. George Wunder, NRC, to Mr. Mark McBurnett, STPNOC, South Texas Project Units 3 and 4 Combined License Application Review Schedule. (Accession No. ML083650198)
February 20, 2009	Federal Register Notice of Order, Hearing, and Opportunity to Petition for Leave to Intervene Docket Nos. 52-012 and 52-013. 74 FR 7934. (Accession No. ML083570595)
February 26, 2009	Summary of the Second Site Audit Related to the Environmental Review of the Combined Operating License Application for South Texas Project Units 3 and 4. (Accession No. ML090350504)
March 03, 2009	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Contracts for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste. (Accession No. ML090640920)
March 16, 2009	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Re-Submittal of Response to Requests for Additional Information. (Accession No. ML090860879)
March 18, 2009	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Update to Aquatic Ecology Monitoring Report Data. (Accession No. ML090830503)
April 07, 2009	Letter from Mr. Kenny Jaynes, U.S. Army Corps of Engineers, to Mr. Gregory Gibson, STPNOC, Jurisdictional Determination, 7,000-Acre Mass Cooling Reservoir (MCR), Wadsworth, Matagorda County, Texas. (Accession No. ML091050501)
April 22, 2009	Letter to Mr. Scott Head, STPNOC, from Ms. Jessie Muir, NRC, Requests for Additional Information, Letter Number Three Related to the Environmental Report for the South Texas Combined License Application. (Accession No. ML090960303)
May 13, 2009	U. S. Army Corps of Engineers to NRC, Preliminary Jurisdictional Determination Form. (Accession No. ML091390115)

May 14, 2009	Letter from Mr. Kenny Jaynes, U.S. Army Corps of Engineers, to Mr. Russell Kiesling, STPNOC, Preliminary Jurisdictional Determination, Wadsworth, Montgomery County, Texas. (Accession Nos. ML091350101; ML091390111)
May 18, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML091410061)
June 04, 2009	Letter from Mr. Scott Head, STPNOC, to Mr. Jayson Hudson, U.S. Army Corps of Engineers, Permit Determination Request. (Accession No. ML092030309)
June 29, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML091830339)
July 08, 2009	Letter from Mr. Casey Cutler, U.S. Army Corps of Engineers, to Mr. Scott Head, STPNOC. (Accession No. ML092030304)
July 30, 2009	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML092150963)
August 10, 2009	Letter from Mr. Jayson Hudson, U.S. Army Corps of Engineers to Ms. Jessie Muir, NRC, Cooperating Agency Scoping Request for South Texas Project Electric Generating Station Units 3 and 4. (Accession No. ML092460137)
August 14, 2009	Letter to Mr. Scott Head, STPNOC, from Ms. Jessie Muir, NRC, Request for Additional Information, Letter Number Four Related to the Environmental Report for the South Texas Combined License Application. (Accession No. ML091620673)
September 14, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML092580491)
September 16, 2009	Letter from Mr. Mark McBurnett, STPNOC, to NRC, Submittal of Combined License Application Revision 3. (Accession No. ML092930393)
September 22, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Second Re-submittal Response to Request for Additional Information. (Accession No. ML092710535)

September 28, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML092740321)
October 01, 2009	Letter from Jessie M. Muir, NRC, to Mr. Scott Head, STPNOC, Request for Additional Information related to Alternative Sites. (Accession No. ML092750384)
October 15, 2009	Letter to Mrs. Moni Belton, USFWS, from Mr. Ryan Whited, NRC, Information Request Regarding Alternative Sites Related to the Combined Licenses Application for South Texas Project, Units 3 and 4. (Accession No. ML092580516)
October 15, 2009	Letter to Mr. Carter Smith, Texas Parks and Wildlife Department, from Mr. Ryan Whited, NRC, Information Request Regarding Alternative Sites Related to the Combined Licenses Application for South Texas Project, Units 3 and 4. (Accession No. ML092580421)
October 27, 2009	Letter from Mr. Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML093060175)
October 28, 2009	Letter from STPNOC to USACE, Permit Determination Request. (Accession No. ML093210232)
November 09, 2009	Site Audit Summary of South Texas Project Nuclear Operating Company's Revised Alternative Sites Analysis. (Accession No. ML092870574)
November 09, 2009	Forthcoming Teleconference with South Texas Project Nuclear Operating Company to Discuss Responses to Request for Additional Information Related to Alternative Sites for the South Texas Project Units 3 and 4 Environmental Reviews. (Accession No. ML093130330
November 10, 2009	Letter from Jayson Hudson, US Army Corps, to Scott Head (STPNOC) dated November 10, 2009 in response to STPNOC October 28, 2009 request for a permit determination. (Accession No. ML093210227)
November 10, 2009	Letter from Scott Head, STPNOC, to NRC, Proposed Revision to Environmental Report. (Accession No. ML093170197)
November 11, 2009	Letter from Scott Head, STPNOC, to NRC, Proposed Revision to Environmental Report. (Accession No. ML093200201)

November 13, 2009	Letter from Kathy Boydston, Texas Parks and Wildlife Division, to Ryan Whited, NRC, Proposed Alternative Sites Related to the Combined License Application for South Texas Project, Units 3 and 4. (Accession No. ML093210221)
November 16, 2009	Letter from Mark McBurnett, STPNOC, to NRC, Request for Limited Work Authorization. (Accession No. ML093230143)
November 23, 2009	Letter from Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML093310296)
November 23, 2009	Letter from Scott Head, STPNOC, to NRC, Supplemental Response to Request for Additional Information. (Accession No. ML093310392)
November 30, 2009	Letter from Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML093370158)
November 30, 2009	Letter from Scott Head, STPNOC, to NRC, Response to Request for Additional Information. (Accession No. ML093380310)
November 30, 2009	Letter from Scott Head, STPNOC, to NRC, Supplemental Response to Request for Additional Information. (Accession No. ML093360350)
December 14, 2009	Summary of November 17, 2009, Public Teleconference Related to the Environmental Review of the South Texas Project Units 3 and 4 Combined Licenses Application. (Accession No. ML093350861)
January 08, 2010	Letter from Michael Johnson, NRC, to Mark McBurnett, STPNOC regarding South Texas Project Nuclear Power Plan Units 3 and 4 Request for a Limited Work Authorization for Installation of Crane Foundation Retaining Walls. (Accession No. ML093350744)
January 20, 2010	Letter to Amy Hanna, Texas Parks and Wildlife Division, from Jessie Muir, NRC, Comments Regarding Alternative Sites Related to the Combined Licenses Application for South Texas Project, Units 3 and 4. (Accession No. ML093450914)
February 2, 2010	Letter from Mark McBurnett, STPNOC, to NRC, Request for Exemption to Authorize Installation of Crane Foundation Retaining Walls. (Accession No. ML100350219)

February 2, 2010	Letter from Charles Maguire, Texas Commission on Environmental Quality, to Ryan Whited, NRC, 401 Water Quality Certification of South Texas Nuclear Project. (Accession No. ML100500926)
February 19, 2010	Letter from Casey Cutler, Department of Army, to Ryan Whited, NRC, regarding Draft Environmental Impact Statement for the Combined Licenses for South Texas Project Generating Station Units 3 and 4. (Accession No. ML100660017)
March 9, 2010	Letter from Scott Head, STPNOC, to the U.S. Army Corps of Engineers Galveston District regarding South Texas Project Units 3 and 4 Application for Department of Army Permit. (Accession No. ML102700237)
March 19, 2010	Letter from NRC, to Moni Belton, FWS, regarding Request for Comments on the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100470259)
March 19, 2010	Letter from NRC, to David Bernhart, NMFS, regarding Draft Environmental Impact Statement, Essential Fish Habitat Assessment, and Biological Assessment Related to the Review of the Combined License Application for the South Texas Project, Units 3 and 4. (Accession No. ML100470304)
March 19, 2010	Letter to EPA, from NRC, regarding Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application. (Accession No. ML100470410)
March 19, 2010	Letter to John Fowler, ACHP, from NRC, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100490064)
March 19, 2010	Letter to Billy Evans Horse, Kiowa Tribe, from NRC, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100490124)

March 19, 2010	Letter to Anthony Street, Tonkawa Tribe of Oklahoma, from NRC, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100490722)
March 19, 2010	Letter to Principal Chief Oscola Clayton Sylestine, Alabama-Coushatta Tribe, from NRC, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100490732)
March 19, 2010	Letter to Mark Wolfe, Texas Historical Commission, from NRC, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100490740)
March 19, 2010	Letter to Ruth Toahty, Comanche Nation, from NRC, regarding Section 106 Consultation and Notification of the Issuance of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application Review. (Accession No. ML100490795)
March 19, 2010	Letter to Mark McBurnett, STPNOC, from NRC, regarding Notice of Availability of the Draft Environmental Impact Statement for the South Texas Project, Units 3 and 4, Combined License Application. (Accession No. ML100600998)
March 26, 2010	Federal Register Notice of Availability of the Draft Environmental Impact Statement for Combined Licenses for Units 3 and 4 at the South Texas Project Site. (Accession No. ML100600982)
March 23, 2010	Letter from Mark McBurnett, STPNOC, to NRC, regarding Request for Exemption to Authorize Installation of Crane Foundations Retaining Walls. (Accession No. ML100880055)
March 30, 2010	Letter from William A. Martin for Mark Wolfe, Texas Historical Commission, to Ryan Whited, NRC, regarding Section 106 Consultation for the Draft Environmental Impact Statement for the Combined Licenses for South Texas Project Generating Station Units 3 and 4. (Accession No. ML100990381)

April 20, 2010	Letter from Rusty Swafford for Miles M. Croom, National Marine Fisheries Service, to NRC, regarding Essential Fish Habitat Biological Assessment and the Draft Environmental Impact Statement for the Combined Licenses for South Texas Project Generating Station Units 3 and 4. (Accession No. ML101190379)
May 6, 2010	Email from Bryant J. Celestine, Alabama-Coushatta Tribe, to NRC, regarding South Texas Project COL. (Accession No. ML101300039)
May 24, 2010	Summary of Public Meetings Conducted for the Draft Environmental Impact Statement for South Texas Project Units 3 and 4, Combined License Application. (Package Accession No. ML101540288)
June 2, 2010	Email from Michael Bechdol, US EPA Region 6 Ground Water Center, to NRC, regarding Comments on Draft EIS for the COLs for S TX Project Electric Generating Station Units 3 and 4. (Accession No. ML101540268)
June 8, 2010	Email from Stephen Spencer, U.S. Department of the Interior, to NRC, regarding NUREG-1937, Draft Environmental Impact Statement for Combined Licenses at the South Texas Project, Texas. (Accession No. ML101600049)
June 9, 2010	Letter from Cathy Gilmore, U.S. EPA Region 6, to Jessie Muir, NRC, regarding Draft EIS for STP Units 3 and 4. (Accession No. ML101610346)
June 9, 2010	Letter from Jayson Hudson, USACE, to Scott Head, STPNOC, regarding Permit Determination. (Accession No. ML101660315)
July 7, 2010	Letter from Scott Head, STPNOC, to NRC, regarding Additional Information Regarding Draft Environmental Impact Statement. (Accession No. ML101930157)
July 21, 2010	Letter from Scott Head, STPNOC, to NRC, regarding Revised Request for Exemption to Authorize Installation of Crane Foundations Retaining Walls. (Accession No. ML102070274)
August 6, 2010	Notice of Public Teleconference to Discuss Topics Raised in Public Comments on the Draft Environmental Impact Statement. (Accession No. ML102140545)

September 9, 2010	Letter from Mark McBurnett, STPNOC, to NRC, regarding Additional Information Regarding Draft Environmental Impact Statement. (Accession No. ML102570059)
September 16, 2010	Letter from Casey Cutler, Corps, to Scott Head, STPNOC, regarding Permit Determination. (Accession No. ML103020111)
September 22, 2010	Memorandum from Jessie Muir, NRC, to Ryan Whited, NRC, Summary of August 25, 2010, Public Teleconference with South Texas Project Nuclear Operating Company to Discuss Topics Raised in Public Comments on the Draft Environmental Impact Statement. (Accession No. ML102520341)
October 5, 2010	Letter from Scott Head, STPNOC, to NRC, Submittal of Combined License Application Revision 4. (Accession No. ML102860292)
October 12, 2010	Letter from Scott Head, STPNOC, to the Corps, Submittal of South Texas Project Units 3 and 4 SWG-2007-00786 Mitigation Plan. (Accession No. ML103060028)
November 5, 2010	Letter from George Wunder, NRC, to Mark McBurnett, STPNOC, South Texas Project Nuclear Power Plant Units 3 and 4 Exemption from the Requirements of Title 10 of The Code of Federal Regulations, Part 50, Section 50.10 (TAC No. RG1056). (Accession No. ML102770454)
November 17, 2010	Letter from Ryan Whited, NRC, to David Bernhart, NMFS, regarding Section 7 Consultation Related to the Combined License Application for the South Texas Project, Units 3 and 4. (Accession No. ML102880822)
December 10, 2010	Letter from Mark McBurnett, STPNOC, to NRC, regarding Change in Lead Applicant for STP 3 & 4. (Accession No. ML103490483)
January 18, 2011	Letter from Roy E. Crabtree, National Marine Fisheries Service, to Ryan Whited, NRC, regarding Draft Environmental Impact Statement, Essential Fish Habitat Assessment and Biological Assessment Related to the Review of the Combined License Application for the South Texas Project, Units 3 and 4. (Accession No. ML110190723)
January 19, 2011	Letter from Mark McBurnett, STPNOC, to NRC, regarding Update to Change in Lead Applicant for STP 3 & 4. (Accession No. ML110250369)

January 26, 2011	Letter from Mark McBurnett, NINA, to NRC, regarding Submittal of Combined License Application Revision 5. (Accession No. ML110340451)

Appendix D

Scoping Comments and Responses

Appendix D

Scoping Comments and Responses

On December 21, 2007, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process in the *Federal Register* (72 FR 72774). The Notice of Intent notified the public of the staff's intent to prepare an environmental impact statement (EIS) and conduct scoping for the application for combined licenses (COLs) received from STP Nuclear Operating Company (STPNOC) for two new nuclear units identified as South Texas Project Electric Generating Station (STP) Units 3 and 4, to be located at the existing STP site, located approximately 12 mi south-southwest of Bay City, Texas. NRC invited the applicant; Federal, Tribal, State, and local government agencies; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meetings and/or submitting written suggestions and comments no later than February 18, 2008.

D.1 Overview of the Scoping Process

The scoping process provides an opportunity for public participants to identify issues to be addressed in the EIS and highlight public concerns and issues. The Notice of Intent identified the following objectives of the scoping process:

- Define the proposed action which is to be the subject of the EIS.
- Determine the scope of the EIS and identify significant issues to be analyzed in depth.
- Identify and eliminate from detailed study those issues that are peripheral or that are not significant.
- Identify any environmental assessments and other EISs that are being prepared or will be prepared that are related to, but not part of, the scope of the EIS being considered.
- Identify other environmental review and consultation requirements related to the proposed action.
- Identify parties consulting with the NRC under the NHPA, as set forth in 36 CFR 800.8(c)(1)(i).

- Indicate the relationship between the timing of the preparation of the environmental analyses and the Commission's tentative planning and decision-making schedule.
- Identify any cooperating agencies and, as appropriate, allocate assignments for preparation and schedules for completing the EIS to the NRC and any cooperating agencies.
- Describe how the EIS will be prepared and include any contractor assistance to be used.

Two public scoping meetings were held at the Bay City Civic Center, on Tuesday, February 5, 2008. The scoping meetings began with NRC staff members providing a brief overview of the COL process and the NEPA process. After the NRC's prepared statements, the meeting was open for public comments. Fifty one (51) meeting attendees provided either oral comments or written statements that were recorded and transcribed by a certified court reporter. In addition to the oral and written statements provided at the public scoping meeting, 11 letters and 7 emails were received during the scoping period. Preparation of the draft EIS has taken into account all of the relevant issues raised during the scoping process.

Transcripts for both afternoon and evening scoping meeting can be found in the NRC Agency Document Access and Management System (ADAMS), under accession numbers ML080950499 and ML080950504, respectively. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams/web-based.html (in the Public Electronic Reading Room). (Note: the URL is case-sensitive.) Additional comments received later in letters or emails are also available. A meeting summary memorandum (ML081000171) was issued April 10, 2008.

At the conclusion of the scoping period, the NRC staff reviewed the scoping meeting transcripts and all written material received during the comment period and identified individual comments. These comments were organized according to topic within the proposed EIS or according to the general topic, if outside the scope of the EIS. Once comments were grouped according to subject area, the staff determined the appropriate response for the comment. The staff made a determination on each comment that it was one of the following:

- A comment that was actually a question and introduced no new information.
- A comment that was either related to support or opposition of combined licensing in general (or specifically the STPNOC COLs) or that made a general statement about the COL process. In addition, it provided no new information and did not pertain to 10 CFR Part 52.

- A comment about an environmental issue that
  - provided new information that would require evaluation during the review
  - provided no new information.

- A comment that was outside the scope of the COL, which included, but was not limited to
  - a comment on the safety of the existing units.

Preparation of the EIS has taken into account the relevant issues raised during the scoping process. The comments received on the draft EIS will be considered in the preparation of the final EIS. The final EIS, along with the staff's Safety Evaluation Report (SER), will provide much of the basis for the NRC's decision on whether to grant the STPNOC COLs.

The comments related to this environmental review are included in this appendix. They were extracted from the *South Texas Project Combined License Scoping Summary Report* (Accession No. ML082260454), and are provided for the convenience of those interested specifically in the scoping comments applicable to this environmental review. The comments that are outside the scope of the environmental review for the proposed STP site are not included in this Appendix. The out of scope comments include comments related to:

- Safety
- Emergency Preparedness
- NRC Oversight for operating plants
- Security and Terrorism
- Support or Opposition to the licensing action, licensing process, nuclear power, hearing process or the existing plant

More detail regarding the disposition of general or out of scope comments can be found in the Scoping Summary Report (ML082260454). To maintain consistency with the Scoping Summary Report, the comment source ID and comment number along with the name of the commenter used in that report is retained in this appendix. Any changes that have occurred since the publication of the Scoping Summary Report (e.g., revisions to the EIS outline) are indicated within <new information> angle brackets.

Table D-1 identifies in alphabetical order the individuals providing comments during the scoping period, their affiliation, if given, and the ADAMS accession number that can be used to locate the correspondence. Although all commenters are listed, the comments presented in this appendix are limited to those within the scope of the environmental review. Table D-2 lists the comment categories in alphabetical order and commenter names and comment numbers for each category. The balance of this appendix presents the comments themselves with NRC staff responses organized by topic category.

Table D-1. Individuals Providing Comments During Scoping Comment Period

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #
Acevedo, NK	Self	Meeting Transcript (ML080950499)
Acevedo, NK	Self	Meeting Transcript (ML080950504)
Alvarado, Robert	Self	Meeting Transcript (ML080950499)
Alvarado, Robert	Self	Meeting Transcript (ML080950504)
Bludau, Owen	Matagorda County Economic Development Corporation	Meeting Transcript (ML080950499)
Bludau, Owen	Matagorda County Economic Development Corporation	Meeting Transcript (ML080950504)
Castro, Geoffrey	Citizens League for Environmental Action Now	Meeting Transcript (ML080950499)
Conrad, A.C.	Self	Meeting Transcript (ML080950499)
Corder, John	Self	Meeting Transcript (ML080950504)
Cushing, Lara	Self	Email (ML081140370)
Cushing, Lara	Self	Meeting Transcript (ML080950499)
Dancer, Susan	Matagorda County Coalition for Nuclear Industry Accountability	Meeting Transcript (ML080950499)
Dunham, D.C.	Bay City Community Development Corporation	Meeting Transcript (ML080950499)
Dunham, D.C.	Bay City Community Development Corporation	Meeting Transcript (ML080950504)
Dykes, Ed	Self	Meeting Transcript (ML080950504)
Edwards, Nancy	Self	Letter (ML08064019)
Garcia, Sandra	Self	Meeting Transcript (ML080950499)
Griffith, Mike	Self	Letter (ML080840434)
Gunter, Paul	Beyond Nuclear	Meeting Transcript (ML080950504)
Hadden, Karen	SEED Coalition	Letter (ML080840435)
Hadden, Karen	SEED Coalition	Meeting Transcript (ML080950499)
Hadden, Karen	SEED Coalition	Meeting Transcript (ML080950504)
Head, Bobby	Self	Meeting Transcript (ML080950504)
Hearn, Polly	Self	Letter (ML080840439)
Hefner, James	STP	Meeting Transcript (ML080950499)
Hefner, James	STP	Meeting Transcript (ML080950504)

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #
Johnson, Matthew	Public Citizen-Texas Office	Email (ML081140369)
Kale, Stephen	Self	Letter (ML080840438)
Kale, Stephen	Self	Meeting Transcript (ML080950504)
Knapik, Richard	Bay City	Meeting Transcript (ML080950499)
Knapik, Richard	Bay City	Meeting Transcript (ML080950504)
Lindsey, Joy	Self	Letter (ML080460530)
Lopez, Diana	Self	Meeting Transcript (ML080950499)
Marceaux, Brent	Self	Meeting Transcript (ML080950504)
Martin, Bruce	Self	Meeting Transcript (ML080950504)
McBurnett, Mark	STPNOC	Meeting Transcript (ML080950499)
McBurnett, Mark	STPNOC	Meeting Transcript (ML080950504)
McCauley, Jimmy	Self	Meeting Transcript (ML080950504)
McCormick, Mr.	Self	Meeting Transcript (ML080950504)
McDonald, Nate	Matagorda County	Letter (ML080840425)
Mitchell, James	Matagora County	Meeting Transcript (ML080950499)
Mitchell, James	Matagora County	Meeting Transcript (ML080950504)
Morton, Joe	Palacios, TX	Meeting Transcript (ML080950499)
Morton, Joe	Palacios, TX	Meeting Transcript (ML080950504)
O'Day, Mike	Self	Meeting Transcript (ML080950499)
O'Day, Mike	Self	Meeting Transcript (ML080950504)
Opella, Ernest	Self	Meeting Transcript (ML080950504)
Payne, Cameron	Self	Email (ML081420662)
Payne, Cameron	Self	Meeting Transcript (ML080950499)
Public Citizen, Texas Office	Public Citizen, Texas Office	Letter (ML080640543)
Reed, Cyrus	Sierra Club, Lone Star Chapter	Email (ML081140366)
Reed, Cyrus	Sierra Club, Lone Star Chapter	Meeting Transcript (ML080950499)
Rendon, Genaro	Self	Meeting Transcript (ML080950499)

Table D-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #
Rice Herreth, Georgia	Self	Meeting Transcript (ML080950499)
Russell, Nancy	Self	Letter (ML080640196)
Ryan, Timothy	Self	Email (ML081140368)
Scheurich, Venice	Self	Letter (ML080840437)
Schwank, Eleanor	Self	Meeting Transcript (ML080950499)
Shepherd, Joe	STP, Nuclear Operating Company	Meeting Transcript (ML080950499)
Shepherd, Joe	STP, Nuclear Operating Company	Meeting Transcript (ML080950504)
Singleton, Robert	Self	Meeting Transcript (ML080950499)
Singleton, Robert	Self	Meeting Transcript (ML080950504)
Sinkin, Lanny	Self	Email (ML081140364)
Sinkin, Lanny	Self	Email (ML081140367)
Smith, Tom	Public Citizen, Texas Office	Letter (ML080640543)
Smith, Tom	Public Citizen, Texas Office	Meeting Transcript (ML080950499)
Thames, Mitch	Bay City Chamber of Commerce	Meeting Transcript (ML080950499)
Thames, Mitch	Bay City Chamber of Commerce	Meeting Transcript (ML080950504)
Wagner, William	Self	Meeting Transcript (ML080950504)
Williams, Mina	Coastal Bend Sierra Club	Letter (ML080840436)

Table D-2. Comment Categories with Associated Commenters and Comment IDs

Comment Category	Commenter (Comment ID)
Accidents-Design Basis	• Public Citizen, Texas Office (0010-16) • Smith, Tom (0010-16)
Accidents-Severe	• McBurnett, Mark (0008-123) • Payne, Cameron (0005-3) (0005-4) (0005-5) • Reed, Cyrus (0003-45) • Singleton, Robert (0007-121) • Sinkin, Lanny (0002-17) • Williams, Mina (0015-7)
Alternatives-Energy	• Acevedo, NK (0007-89) • Castro, Geoffrey (0007-87) • Cushing, Lara (0007-90) (0007-100) (0018-1) (0018-3) (0018-4) (0018-5) (0018-6) • Dykes, Ed (0008-104) (0008-105) • Edwards, Nancy (0012-6) • Garcia, Sandra (0007-98) • Head, Bobby (0008-31) • Kale, Stephen (0008-29) (0008-30) (0014-4) • Lindsey, Joy (0009-7) • McBurnett, Mark (0007-139) • Reed, Cyrus (0003-2) (0003-5) (0003-11) (0003-15) (0003-16) (0003-18) (0003-19) (0007-44) (0007-58) • Russell, Nancy (0011-1) • Schwank, Eleanor (0007-132) • Shepherd, Joe (0008-127) • Singleton, Robert (0007-118) • Sinkin, Lanny (0002-29) (0002-30) (0002-31) (0002-33) (0002-34) (0002-36) (0004-1) • Smith, Tom (0007-28) • Williams, Mina (0015-8) (0015-9)
Alternatives-Sites	• Reed, Cyrus (0003-20)
Alternatives-System Design	• McBurnett, Mark (0008-122) • Wagner, William (0008-73) (0008-76)
Benefit-Cost Balance	• Cushing, Lara (0007-92) • Edwards, Nancy (0012-3) • Kale, Stephen (0008-28) (0014-3) • Lindsey, Joy (0009-2) • Lopez, Diana (0007-73) • Reed, Cyrus (0003-4) (0003-6) (0003-7) (0003-8) (0003-12) • Sinkin, Lanny (0002-25) • Wagner, William (0008-86) • Williams, Mina (0015-4) (0015-11)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
Cumulative Impacts	• Hadden, Karen (0007-32) (0008-54) • Reed, Cyrus (0003-21) (0003-22) • Rendon, Genaro (0007-62) (0007-63) • Wagner, William (0008-67)
Decommissioning	• Sinkin, Lanny (0002-26)
Ecology-Aquatic	• Acevedo, NK (0008-78) • Head, Bobby (0008-32) • Payne, Cameron (0005-6) • Reed, Cyrus (0003-30) (0003-31) (0003-34)
Ecology-Terrestrial	• Head, Bobby (0008-33) (0008-34) • Marceaux, Brent (0008-23) • O'Day, Mike (0008-2) • Public Citizen, Texas Office (0010-17) • Smith, Tom (0007-21) (0010-17)
Environmental Justice	• Smith, Tom (0007-25)
Geology	• Wagner, William (0008-69)
Health-Radiological	• Conrad, A.C. (0007-127) • Dancer, Susan (0007-99) • Hadden, Karen (0008-58) (0008-59) (0008-60) (0008-61) (0008-62) (0008-63) (0008-64) (0008-65) • Hefner, James (0007-115) (0007-116) (0008-90) (0008-91) • McBurnett, Mark (0008-117) • Payne, Cameron (0007-97) • Public Citizen, Texas Office (0010-3) (0010-18) • Reed, Cyrus (0003-46) • Scheurich, Venice (0017-4) • Sinkin, Lanny (0002-18) (0002-20) (0002-21) • Smith, Tom (0007-17) (0010-3) (0010-18) • Wagner, William (0008-80)
Hydrology-Groundwater	• Public Citizen, Texas Office (0010-8) • Scheurich, Venice (0017-2) • Smith, Tom (0007-23) (0010-8)
Hydrology-Surface Water	• Conrad, A.C. (0007-126) • Lopez, Diana (0007-68) • McBurnett, Mark (0007-141) • Public Citizen, Texas Office (0010-4) (0010-5) (0010-6) (0010-7) (0010-9) (0010-10) (0010-11) • Reed, Cyrus (0003-25) (0003-26) (0003-27) (0003-28) (0003-29) (0007-45) (0007-47) (0007-48) (0007-49) • Scheurich, Venice (0017-1) • Schwank, Eleanor (0007-133) (0007-134)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Sinkin, Lanny (0002-6) (0002-11) (0002-12) (0002-13) (0002-14) (0002-15) (0002-16) • Smith, Tom (0007-18) (0010-4) (0010-5) (0010-6) (0010-7) (0010-9) (0010-10) (0010-11) • Wagner, William (0008-77) (0008-79) • Williams, Mina (0015-6)
Land Use-Transmission Lines	• McBurnett, Mark (0008-121)
Meteorology and Air Quality	• Cushing, Lara (0007-93) • Lopez, Diana (0007-81) (0007-82) • O'Day, Mike (0008-6) • Reed, Cyrus (0003-32) (0003-41) • Shepherd, Joe (0007-145) (0008-126) • Singleton, Robert (0007-105) (0007-119) • Sinkin, Lanny (0002-3) (0002-4) (0002-5)
Need for Power	• Kale, Stephen (0008-25) (0008-27) (0014-2) • Lindsey, Joy (0009-3) • McBurnett, Mark (0007-138) • Morton, Joe (0008-19) • Public Citizen, Texas Office (0010-20) (0010-21) (0010-22) • Reed, Cyrus (0003-9) (0003-10) (0003-13) (0003-14) (0003-17) (0007-43) • Smith, Tom (0007-27) (0010-20) (0010-21) (0010-22) • Alvarado, Robert (0007-60) • Conrad, A.C. (0007-128) • Edwards, Nancy (0012-1) • Lindsey, Joy (0009-1) • Lopez, Diana (0007-78) • Ryan, Timothy (0001-1) • Scheurich, Venice (0017-5) • Schwank, Eleanor (0007-135) • Williams, Mina (0015-1) • Hadden, Karen (0008-51) • Reed, Cyrus (0003-3) • Castro, Geoffrey (0007-85) (0007-88) • Edwards, Nancy (0012-2) (0012-4) (0012-7) • Hadden, Karen (0007-30) • Reed, Cyrus (0007-59) • Rendon, Genaro (0007-66) • Singleton, Robert (0007-117) • Sinkin, Lanny (0002-28) • Williams, Mina (0015-3) (0015-10) • Singleton, Robert (0008-106) • Bludau, Owen (0007-76) (0008-101)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• McDonald, Nate (0016-2) • Mitchell, James (0008-12) • Morton, Joe (0008-21) • Public Citizen, Texas Office (0010-12) (0010-13) (0010-14) (0010-15) • Singleton, Robert (0007-122) • Sinkin, Lanny (0002-7) (0002-8) • Smith, Tom (0010-12) (0010-13) (0010-14) (0010-15) • Hadden, Karen (0007-35) • Johnson, Matthew (0006-1) • Kale, Stephen (0008-26) (0014-1) • Reed, Cyrus (0003-24) • Rendon, Genaro (0007-61) • Sinkin, Lanny (0002-32) • Wagner, William (0008-85) • Dancer, Susan (0007-108) • Morton, Joe (0007-15) (0008-22) • Sinkin, Lanny (0002-37) (0002-38) • Corder, John (0008-40) • Dancer, Susan (0007-101) • Hadden, Karen (0007-37) • Lindsey, Joy (0009-5) (0009-6) • Lopez, Diana (0007-80) • McBurnett, Mark (0007-137) (0008-118) (0008-119) (0008-120) • McCauley, Jimmy (0008-87) • McCormick, Mr. (0008-110) • Payne, Cameron (0005-1) (0005-2) (0007-110) (0007-111) (0007-112) (0007-114) • Reed, Cyrus (0003-33) (0003-39) (0003-40) (0007-46) (0007-50) • Rice Herreth, Georgia (0007-130) • Shepherd, Joe (0007-143) (0008-124) • Singleton, Robert (0008-107) (0008-108) • Sinkin, Lanny (0002-2) (0002-9) (0002-10) (0002-19) • Smith, Tom (0007-19) (0007-20) • Wagner, William (0008-66) (0008-68) (0008-70) • Acevedo, NK (0008-71) (0008-83) • Alvarado, Robert (0008-74) • Dancer, Susan (0007-104) • Gunter, Paul (0008-45) (0008-46) • Hadden, Karen (0007-33) • Head, Bobby (0008-36) • McBurnett, Mark (0008-115) (0008-116) • McCormick, Mr. (0008-109) • Mitchell, James (0007-6) (0008-8) (0008-9) (0008-10) (0008-11) • Morton, Joe (0007-13)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Reed, Cyrus (0003-44) (0007-53) (0007-56) • Singleton, Robert (0007-123) • Sinkin, Lanny (0002-23) (0002-35) • Wagner, William (0008-72) (0008-75) (0008-84) • Williams, Mina (0015-5)
Process-ESP-COL	• Acevedo, NK (0008-55) • Hadden, Karen (0007-34) (0007-36) (0007-38) (0007-39) (0007-40) (0008-53) (0008-56) (0008-57) • Reed, Cyrus (0003-1) (0007-42) • Shepherd, Joe (0007-142) • Sinkin, Lanny (0002-1) • Wagner, William (0008-81) (0008-82)
Process-NEPA	• Cushing, Lara (0018-2) • Hadden, Karen (0008-52) (0020-1)
Site Layout and Design	• McBurnett, Mark (0007-136) • Payne, Cameron (0007-113) • Shepherd, Joe (0007-146) (0007-147) (0008-128)
Socioeconomics	• Acevedo, NK (0007-150) • Bludau, Owen (0007-71) (0007-72) (0007-74) (0007-84) (0008-92) (0008-94) (0008-96) (0008-97) (0008-98) (0008-99) (0008-100) • Cushing, Lara (0007-96) • Dancer, Susan (0007-102) (0007-103) (0007-106) (0007-120) • Dunham, D.C. (0007-79) (0008-47) • Head, Bobby (0008-38) (0008-39) • Hearn, Polly (0013-2) • Knapik, Richard (0007-9) (0008-14) • McBurnett, Mark (0008-113) • Morton, Joe (0008-18) • O'Day, Mike (0008-4) • Public Citizen, Texas Office (0010-1) (0010-2) • Rice Herreth, Georgia (0007-129) • Shepherd, Joe (0007-144) (0007-148) (0007-149) (0008-125) (0008-129) • Smith, Tom (0007-16) (0007-29) (0010-1) (0010-2) • Bludau, Owen (0007-69) (0007-77) (0008-93) (0008-102) • Dunham, D.C. (0007-64) (0008-48) • Griffith, Mike (0019-2) • Head, Bobby (0008-35) • Hearn, Polly (0013-3) (0013-4) (0013-5) • Knapik, Richard (0007-8) (0007-11) (0008-15) • Marceaux, Brent (0008-24) • Martin, Bruce (0008-41) • McCormick, Mr. (0008-112) • Mitchell, James (0007-7) (0008-13)

Table D-2. (contd)

Comment Category	Commenter (Comment ID)
	• Morton, Joe (0007-14) • Opella, Ernest (0008-88) • Rice Herreth, Georgia (0007-131) • Thames, Mitch (0007-41) (0008-49) • Morton, Joe (0008-17) • Bludau, Owen (0008-95) • O'Day, Mike (0007-2) (0007-3) (0007-4) (0008-1) (0008-3) (0008-5) (0008-7) • Bludau, Owen (0007-70) (0007-75) • Griffith, Mike (0019-1) (0019-3) • Head, Bobby (0008-37) • Hearn, Polly (0013-1) • Knapik, Richard (0007-10) (0008-16) • Martin, Bruce (0008-42) • McDonald, Nate (0016-1) (0016-3) • Morton, Joe (0007-12) (0008-20) • O'Day, Mike (0007-1) (0007-5) • Opella, Ernest (0008-89)
Transportation	• Cushing, Lara (0007-94) • Rendon, Genaro (0007-65) • Smith, Tom (0007-24)
Uranium Fuel Cycle	• Acevedo, NK (0007-95) (0008-44) • Castro, Geoffrey (0007-86) • Cushing, Lara (0007-107) (0007-109) • Dancer, Susan (0007-91) • Dykes, Ed (0008-103) • Edwards, Nancy (0012-5) • Gunter, Paul (0008-43) • Hadden, Karen (0007-31) • Lindsey, Joy (0009-4) • Lopez, Diana (0007-83) • McBurnett, Mark (0007-140) (0008-114) • McCormick, Mr. (0008-111) • Public Citizen, Texas Office (0010-19) (0010-23) • Reed, Cyrus (0003-23) (0003-35) (0003-36) (0003-37) (0003-38) (0003-42) (0003-43) (0007-51) (0007-52) (0007-54) (0007-55) (0007-57) • Rendon, Genaro (0007-67) • Scheurich, Venice (0017-3) • Singleton, Robert (0007-124) (0007-125) • Sinkin, Lanny (0002-22) (0002-24) (0002-27) (0004-2) • Smith, Tom (0007-22) (0007-26) (0010-19) (0010-23) • Williams, Mina (0015-2)

D.2 In-Scope Comments and Responses

The in-scope comment categories are listed in Table D-3 in the order that they are presented in this appendix. In-scope comments and responses are included below the table. Parenthetical numbers shown after each comment refer to the Comment Identification (ID) number (correspondence number-comment number) and the commenter name. Responses have been edited since publication of the Scoping Summary Report to update section references.

Table D-3. Comment Categories in Order as Presented in this Report

Category Number	Category Name
D.2.1	COL Process
D.2.2	Process - NEPA
D.2.3	Site Layout and Design
D.2.4	Land Use - Transmission Lines
D.2.5	Meteorology and Air Quality
D.2.6	Geology
D.2.7	Hydrology - Surface Water
D.2.8	Hydrology - Groundwater
D.2.9	Ecology - Terrestrial
D.2.10	Ecology - Aquatic
D.2.11	Socioeconomics
D.2.12	Environmental Justice
D.2.13	Health - Radiological
D.2.14	Accidents - Design Basis
D.2.15	Accidents - Severe
D.2.16	Uranium Fuel Cycle
D.2.17	Transportation
D.2.18	Decommissioning
D.2.19	Cumulative Impacts
D.2.20	Need for Power
D.2.21	Alternatives - Energy
D.2.22	Alternatives - System Design
D.2.23	Alternatives - Sites
D.2.24	Benefit-Cost Balance

D.2.1 COL Process

Comment: The entire process involved from start to finish of a nuclear project needs to be examined for direct, indirect, secondary, and cumulative impacts, e.g.: Site preparation The extraction of materials to build the plant The transportation of the materials to the plant site The construction process The extraction of materials to produce the equipment to be installed The transportation of that equipment to the site The installation of that equipment The extraction of uranium The milling and enriching of uranium The transportation of enriched uranium to the site The operation of the plant Potential impacts on endangered species (**0002-1** [Sinkin, Lanny])

Response: *With respect to environmental impact analysis, the NRC's COL process is as follows: The NRC regulations governing a COL application require that an applicant for a COL must provide the NRC with an environmental report that meets the requirements of 10 CFR 51.45 and 51.50. As described in 10 CFR 52.17, the contents of an application must focus on the environmental effects of construction and operation of a reactor or reactors that might be built at the proposed site. Additionally, Section 52.18 requires that the NRC prepare an EIS for the application that focuses on the same issues. In its EIS, the NRC staff will review the impacts of the proposed construction and operation of new nuclear units based on the information provided in the application and on information obtained from independent sources. The NRC will document the bases for its conclusions in the EIS and in the COL permit, if approved. The majority of the impacts noted in the comment are evaluated as part of this COL environmental review process. Other issues noted fall outside of the regulatory purveyance of the environmental review.*

Comment: We believe that the decision by the NRC to reverse its decision to accept the application indicates there are serious problems with the process designed by the NRC, and would suggest that until an EIS is completed, the clock on filing for petition to intervene should not begin so that the applicant, NRC and potential petitioners can have the benefit of seeing what an EIS process finds out. (**0003-1** [Reed, Cyrus])

Comment: Since 1992 there has been a consistent effort to constrain citizen input, not to expand it. Right now we've seen -- and this is all too familiar in Texas -- what we're seeing is fast tracking of these permits, and it's unacceptable. We've gone from what should be four and a half years down to three. We've gone from shortened input -- and to be honest, this is -- if this permit moves forward, it is actually illegal. (**0007-36** [Hadden, Karen])

Comment: We have a licensing process moving forward with an EIS not even begun. These are both violations of the statutes and regulations that apply to this process, and I would urge you to halt all further proceedings on the license application until the environmental impact statement is finalized as is required by federal law. (**0007-40** [Hadden, Karen])

Response: *These comments express general opposition to the NRC licensing process for the STP Units 3 and 4 COL, and provide no specific information to the NRC's associated environmental review. These comments also fall outside the scope of 10 CFR 51 and 52 which describe in broad outline the NRC's environmental review process for a COL. Therefore, these*

comments will not be considered further in regards to the NRC EIS for the STP Units 3 and 4 COL.

Comment: I would also ask that you hold scoping meetings in Houston, which is down wind, as is Dallas/Ft. Worth, from any potential accident, in Austin and San Antonio, where the cities could potentially be partners, and to let more people speak up and be part of this process. (**0007-34** [Hadden, Karen])

Response: *Public meetings are generally held in the community geographically located closest to the proposed project location. Interested parties that are unable to attend the public meetings in person are also afforded the opportunity to submit written comments. This comment expresses opposition to NRC's scoping process, but provides no specific information on the NRC's environmental review of the STP Units 3 and 4 COL application. Therefore, this comment will not be considered further in regards to the NRC DEIS for the STP Units 3 and 4 COL.*

Comment: In the case of a nuclear power plant, the NEPA process is interrelated with the licensing, public participation is through filing petitions to intervene. A key document that could provide information upon which interveners could build contentions, is the final environmental impact statement. Yet the 60 day clock has started on intervention petitions as soon as the NRC accepted the application for docketing, so we now have a deadline of February 25, with no date even set for a draft environmental impact statement. The EIS will not even begin before the final deadline for interveners to file. (**0007-38** [Hadden, Karen])

Comment: And the first concern I would raise is one that's already been mentioned, which is the time factor, that there is a feeling among anyone who analyzes the application and analyzes the environmental report that 60 days simply is not enough time to have a logical and reasonable assessment, particularly when there's new information coming in. I do take note of the issue you raised earlier, which is one can raise contentions later on if new information comes in. (**0007-42** [Reed, Cyrus])

Comment: I spoke to Mr. Barrs earlier and, again, was informed that the safety review is not complete. And even so we as citizens are being asked to have contentions ready in just 20 days. Something tells me that that safety review will not be done during that time. How can we read it, analyze it, get experts, and prepare a case? That is not right. It is not valid. This -- and other reports -- the safety review and the final environmental impact statement should be finished before the licensee procedure goes forward and before citizens have to raise their contentions. (**0008-53** [Hadden, Karen])

Response: *It is the Commission's policy that petitions to intervene in the hearing process be based on the application itself, not the staff's review of the application. These comments express opposition to the NRC's timeline for filing intervention petitions, and provide no specific information to the NRC's environmental review of the STP Units 3 and 4 COL application. Therefore, these comments will not be considered further in regards to the NRC DEIS for the STP Units 3 and 4 COL.*

Comment: The NEPA law prohibits irreversible or irretrievable commitments of resources prior to the completion of the EIS. That involves the work that the NRC does on the permit. So basically what's going on is that we have docketing of a license application for two nuclear reactors that is grossly incomplete, forcing potential interveners to decide on whether to pursue intervention, and to decide on what issue or issues to pursue without a complete application available. (**0007-39** [Hadden, Karen])

Response: *Section 102(2)(C)(v) of NEPA requires that an EIS include information on any irreversible and irretrievable commitments of resources that would occur if the proposed action (approval of the COL) is implemented. Irreversible and irretrievable resource commitments are relevant to the use of nonrenewable resources and the effects that the loss of use of these resources may have on future generations. These issues will be discussed in Chapter 10 of the DEIS. The remainder of this comment expresses opposition to the NRC's timeline for filing intervention petitions for the STP Units 3 and 4 COL, and provides no specific information regarding the associated environmental review.*

Comment: We really are not looking for secrets. Our letter of intent in June was published on the NRC website, was available in the public document room. There were no secrets about our announcement of the new units. (**0007-142** [Shepherd, Joe])

Response: *This comment makes a statement of fact about the Notice of Intent for the STP Units 3 and 4 COL application, but provides no specific information on NRC's associated environmental review. Therefore, this comment will not be considered further in regards to the NRC EIS for the STP Units 3 and 4 COL.*

Comment: There's something called the Design Criteria Document, and that's called the DCD. I started looking at this license application online and I found a whole section that said incorporated by reference in the DCD. It took a long time to find out what was a DCD. And then when I tried to call and get answers I couldn't get them. Tonight I was informed by Mr. Kallan that that document is available. Unfortunately it is available only in Washington, D.C. in the reading room of the Nuclear Regulatory Commission. That is a document that we need. That is the design criteria for the two advanced boiling water reactors that NRG wants to build here. That is a document that we need in our hands to effectively be able to write contentions to submit them in a timely manner. (**0008-55** [Acevedo, NK])

Comment: Today is February 5. Our contentions have to be submitted in 20 days. I would like to officially ask when will the DCD be available. The licensing procedure should be halted immediately until that is available. (**0008-56** [Hadden, Karen])

Response: *These comments express opposition to the limited availability of the Design Criteria Document during the period for filing intervention petitions. These comments provide no specific information to the NRC's environmental review of the STP Units 3 and 4 COL application, therefore, these comments will not be considered further in regards to the NRC EIS for the STP Units 3 and 4 COL.*

Comment: In section 5.4.1 of the environmental report there is a section of radiological impact and exposure pathways. Here is says -- and I will quote -- Radioactive liquids and gasses would be discharged to the environment during normal operation of STP 3 and 4. The released quantities have been estimated in Tables 12.2-20 for the gasses and Table 12.2-22 for liquids of the ABWR DCD. So the documents containing the quantities of radioactive material that would be released during normal operations are not yet available to the public. (**0008-57** [Hadden, Karen])

Response: *This comment expresses opposition to the limited availability during the scoping period of documents containing the quantities of radioactive material that would be released during normal operations. This comment provides no specific information relevant to the environmental review of the STP Units 3 and 4 COL application and therefore will not be considered further in the EIS.*

Comment: In the old days we used to have a PSAR, a preliminary safety analysis report. Now we don't have that. Now we have an FSAR. How on earth can anybody call that thing final. It's totally incomplete at this time. We don't have to fib to each other. It's not done. It's not even close. Okay. We need to extend the comment period because the information is not there. (**0008-81** [Wagner, William])

Comment: The other part of this that's a real hard spot with me because I am an old reactor operator is it is totally inappropriate to license operation on a woefully incomplete safety analysis report. I don't know how the devil you guys ever came to that conclusion, but that needs to be looked at seriously. (**0008-82** [Wagner, William])

Response: *This comment expresses opposition to the length of the NRC's scoping comment period due to a perceived lack of safety information. The safety review is outside the scope of the environmental review process and therefore this comment will not be considered further in the EIS for STP Units 3 and 4.*

D.2.2 Process - NEPA

Comment: justifies moving forward - NEPA requirements [The commenter was questioning if there should have been a NEPA review prior to accepting the application to justify moving forward with the process.] (**0020-1** [Hadden, Karen])

Response: *A NEPA environmental review could not have been conducted prior to accepting the application because the NRC would have had no project-specific information on which to base its review. Docketing an application for review is not a major federal action and therefore does not require a NEPA review. The comment provides no new information relevant to the environmental review process and will not be evaluated further.*

Comment: I'd also like to request additional scoping meetings regarding the environmental report. There are many people I know of in Austin who could not make this trip who would like to comment in person. There are people in San Antonio and Houston as well. I would urge you to

set up scoping meetings in those communities for this environmental report. (**0008-52** [Hadden, Karen])

Comment: We also deserve and request that the NRC conduct public hearings in San Antonio on those [energy] alternatives and the environmental impacts of STP 3 & 4 as part of the scoping process. (**0018-2** [Cushing, Lara])

Response: *Although NEPA does require Federal agencies to initiate a scoping process, the decision of how to implement scoping is left to the agencies' discretion. It is the policy of the NRC to involve the public in the Commission's decision-making process and therefore it elects to conduct open public scoping meetings in association with their environmental review process. Meetings are generally held in a location to reach the highest population that will experience the most direct environmental impact as a result of the proposed action. In the case of STP Units 3 and 4, this population is located in the area of Bay City, Texas. The NRC will hold additional public meetings after the DEIS is published. Separate meetings will be held by the NRC in association with the safety review process. Members of the public who are unable to attend the public meetings in person may submit written comments during the open comment periods.*

D.2.3 Site Layout and Design

Comment: So how come we learned today that the design of record is by Toshiba? I think there's a big mess going on here that we don't know about. (**0007-113** [Payne, Cameron])

Response: *The applicant experienced unresolvable issues with the vendor originally identified in the application. The type and design of the reactor did not change as a result of the change in vendors, therefore, the reactor-specific information provided in the application is still valid for the analysis.*

Comment: The advance boiling water reactor in Japan, there's four of them in operation in Japan, was developed as a joint venture between General Electric, Hitachi and Toshiba. They all jointly own that design in Japan. GE took that design and got it certified in the United States. Where did that design come from, you asked about the safety, what is this, what is the safety record. We've been operating boiling water reactors in the United States since 1960. The boil water reactors, through each generation, have evolved into -- further and further involved into a more advanced design. When GE and Hitachi and Toshiba went to develop the advanced boiling water reactors, they started with the BWR-6, the latest design that's currently in operation in the United States. They took that design and they looked at the rules under Part 52, what they needed to address, and they looked at the things that were bothering them about the BWR-6 that didn't work as well as they wanted it to, things they could make it safer, things that make it more reliable, they addressed those issues and developed the advanced boiling water reactor. It's very similar in operation and design to the BWR-6. We have many, many, many years of experience operating those plants. (**0007-136** [McBurnett, Mark])

Comment: [The ABWR's] lineage is over 60 years of operation in the United States and around the world. And the plans that we're looking at are an evolutionary design that's based upon the

best that was in the United States. The design's certified by the NRC, and meets all U.S. standards. (**0007-146** [Shepherd, Joe])

Comment: Besides the good operating record that we saw with the advanced boiling water reactors in Japan, we choose them also because of their record associated with on-time construction, on-budget cost, and on schedule. And that performance, we believe we can replicate in the United States. (**0007-147** [Shepherd, Joe])

Comment: This technology [ABWR] has a long lineage in the United States. The design that has been built in Japan was predicated by 60 years of operations of boiling water reactors in the United States as a evolutionary design from our very best in the United States, the BWR6. And it's better. It's a G.E. design. It's been certified by the Nuclear Regulatory Commission. And it meets all U.S. standards. We [STP] chose the ABWR because of the operating record that it has, but we also chose it because of the record that it has for being constructed on time and on budget. (**0008-128** [Shepherd, Joe])

Response: *These comments are general in nature regarding the advanced boiling water reactor (ABWR) design chosen for Units 3 and 4. No new information relevant to the environmental analysis was provided and therefore the comments will not be evaluated further.*

D.2.4 Land Use - Transmission Lines

Comment: Actually South Texas has three different power line corridors leaving the site. The advanced boiling water reactors will also have cross-ties into the Unit 1 and 2 switch yard. (**0008-121** [McBurnett, Mark])

Response: *The power transmission system will be described in Chapter 3 of the DEIS. The applicant proposes to upgrade two of the six existing transmission lines and does not intend to construct any new transmission lines or corridors. Environmental impacts associated with the planned upgrades to the existing transmission lines will be addressed under construction impacts in Chapter 4 of the DEIS.*

D.2.5 Meteorology and Air Quality

Comment: One of the new issues affecting decisions on nuclear power is the global concern over Human activity creating global climate change with unpredictable and potentially devastating results. While the nuclear industry successfully used this concern to drive their lobbying effort for a new generation of nuclear power plants, the premise that nuclear power is a positive response to global climate change concerns may not withstand objective examination. The EIS should include such an objective examination. (**0002-3** [Sinkin, Lanny])

Comment: The context for evaluating emissions of gasses attributable to a nuclear power plant should include those gasses emitted during the following: Site preparation The extraction of materials to build the plant The transportation of the materials to the plant site The construction process The extraction of materials to produce the equipment to be installed The transportation

of that equipment to the site The installation of that equipment The extraction of uranium The milling and enriching of uranium The transportation of enriched uranium to the site The operation of the plant, including the emission of heat and evaporated water. (Water vapor is a powerful green house gas. The EIS should provide a conversion of the amount of water vapor created by the nuclear plant operating process to the equivalent carbon dioxide emissions.) The decommissioning of the plant. The transportation of radioactive waste, including high level, low level, and decommissioning waste to final storage. The preparation and operation of sites where the radioactive waste is to be stored. (**0002-4** [Sinkin, Lanny])

Comment: Water vapor is a powerful green house gas. The EIS should provide a conversion of the amount of water vapor created by the nuclear plant operating process to the equivalent carbon dioxide emissions. (**0002-5** [Sinkin, Lanny])

Comment: Climate change can also be associated with increased air and water temperature which could impact the ability of the cooling system and intake to operate sufficiently. Thus, temperature change must be assessed more accurately. (**0003-32** [Reed, Cyrus])

Comment: While the ER takes credit for the emissions reduction that would be made by investing in a nuclear plant as opposed to a coal or natural gas plant (see discussion above), it does not discuss the global warming emissions resulting from the mining, processing, enrichment and fuel fabrication of uranium needed for the plant. (**0003-41** [Reed, Cyrus])

Comment: We feel there are cleaner, safer and quicker ways of achieving global warming goals. For example, nuclear power plants take a long time to build, and they're not going to really do anything in terms of the carbon footprint. (**0007-105** [Singleton, Robert])

Comment: When you look at the carbon footprint for a nuclear power plant, you also have to consider the fact that mining and manufacturing -- mining of uranium and enrichment of uranium add carbon to the air, and the lower grade that uranium is, the harder it is to mine, the further you have to go to get it, all of those things add to the footprint. Also, transportation and storing of nuclear waste have to be added to that. This is not a zero carbon footprint industry. It's only a zero carbon footprint industry is you look just at plant operation. And I'm not even sure that's true. But if you look beyond plant operation to how they get the uranium, and what they do with the waste, it's to a zero carbon footprint industry. (**0007-119** [Singleton, Robert])

Comment: We are not against renewables, solar, wind, conservation, efficiency. We teach our people to look carefully at decisions, ... I think that the studies that you look at on global warming, on greenhouse gases all tell you that you need all of that, including nuclear power, to be able to make any kind impact on reducing the emission of greenhouse gases and reversing the trends that we see in our global climate. (**0007-145** [Shepherd, Joe])

Comment: Also -- it is also a myth that nuclear energy will save us from global warming. We hear that a lot and it is not. It is not the truth, it is a myth. A nuclear power plant also creates global warming. (**0007-81** [Lopez, Diana])

Comment: So you have uranium in South Texas, so you need to get it enriched, and there are only two coal power plants that do that, and they're not in Texas. So you have to transport the uranium to these coal power plants and you have to enrich it, and it causes -- it's one of the primary sources of a potent greenhouse gas that causes global warming. So -- and then you have to transport it back to the nuclear reactor, so that causes CO2 emissions, so you have all these accumulating effects just for that source of energy. (**0007-82** [Lopez, Diana])

Comment: The enrichment takes place at coal-fired facilities that pollute the air and contribute to global warming. This is an environmental impact of the South Texas Project. (**0007-93** [Cushing, Lara])

Comment: We seem to be given what we at the plant call a sucker's choice. Either you have renewables and efficiency or you have nuclear power. The studies that I have read that are done by eminent researchers say that in order to make any kind of significant contribution to the reduction of greenhouse gasses being released into the environment, you need it all. You need efficiency; you need renewables; and you need nuclear power if you want to make any kind of a significant contribution to reducing greenhouse gasses being released into the environment. (**0008-126** [Shepherd, Joe])

Comment: The two nuclear plants that are being proposed here would offset 15.8 million tons of carbon dioxide, 38.8 thousand tons of sulfur dioxide, and 10.7 thousand tons of nitrogen oxide. (**0008-6** [O'Day, Mike])

Response: *<The review team characterized the affected environment and the potential greenhouse gas impacts of the proposed actions and alternatives in this EIS. The impacts of fuel cycle, transportation, and decommissioning on climate change and global warming are addressed in Chapter 6. Appendix I provides details of the carbon dioxide footprint estimate for a 1000 MW(e) light water reactor. In addition, where it was important to do so, the review team considered the potential effects of global climate change during the period of the proposed action on other resource assessments.>*

D.2.6 Geology

Comment: We may have a problem with soil subsidence. Not too far away from the existing site, on the other side of Highway 60, there is an old Texas Gulf sulphur site at Gulf. Sulphur was mined out of there for many, many years. The site was finally abandoned. The company moved north out of the county in the area between Highway 60 and Bowling. About five years after I moved down here in 1983, that highway fell down into the ground -- a sinkhole. That was caused by that sulphur mining that was going on at a place called Newgulf. Is this a possibility for the old Gulf site? Would this offer some compromise to the ultimate heat sink or cooling pond? (**0008-69** [Wagner, William])

Response: *Geologic impacts on the proposed facility from off-site actions are in scope of the safety analysis and will be addressed in the FSAR issued and maintained by the applicant and SER issued by the NRC. The topic of subsidence and sink holes and their potential impact on*

the proposed facility will be addressed in Section 2.5 of the FSAR. This comment is out of scope with regard to the EIS.

D.2.7 Hydrology - Surface Water

Comment: Exelon Nuclear decided to move its proposed nuclear plant from Matagorda County to Victoria County based on concerns about the costs of preparing for a 20 to 30 foot storm surge. How would those same concerns apply to the STNP Units 3 and 4? (**0002-11** [Sinkin, Lanny])

Comment: If global warming increases sea level rise by 7 meters - will STNP be within the storm surge zone? (**0010-11** [Public Citizen, Texas Office] [Smith, Tom])

Response: *As part of the NRC's site safety review, the staff will consider whether the site is suitable based on storm surge issues. The results of this review will be found in the site Safety Evaluation Report. This issue is not within the scope of the environmental review.*

Comment: There are also numerous studies underway regarding the needs of the bays and estuaries near STNP. Review of those studies regarding potential fresh water needs of the environment and potential effects on the availability of water to STNP should also be part of the EIS process. (**0002-16** [Sinkin, Lanny])

Comment: [T]he LCRA [Lower Colorado River Authority] still has an ongoing assessment of the flow needs of Matagorda Bay. The Inflow Needs Study has yet to be finalized and integrated into any management decisions of the LCRA and has yet to be incorporated into any water rights requirements. An EIS must assess the inflow needs of the Matagorda Bay and its potential impact on the South Texas Project. We would specifically suggest that an EIS examine the comments submitted by TPWD on the Matagorda Bay Inflow Criteria Report on January 22nd, 2008. (**0003-26** [Reed, Cyrus])

Comment: [A]ny EIS must address the proposed water rights permit being sought by LCRA for the so-called "excess" flows. This proposed water right is presently being contested by the Sierra Club in part because of our concern that existing and proposed water use - such as the South Texas Project - as well as the proposed permit would impact the flows into Matagorda Bay. The permit being sought by LCRA is intimately connected to the so-called LCRA -SAWS water project to provide the City of San Antonio with surface water through construction of an off-river reservoir not far from the proposed South Texas project. How construction of such a reservoir might impact water quality, water availability, water temperature and other parameters that could impact the South Texas plant must be considered. (**0003-27** [Reed, Cyrus])

Comment: [M]y wife has a place in Egypt, Texas, and that's probably why I'm here today. She couldn't come today. I'll talk a little bit on her behalf. She's a direct competitor for the water that's already allocated to the makeup water I guess for that cooling lake. And so she's concerned on a -- just a on a practical matter. She's a rice farmer, cattle rancher and a low crop farmer in Egypt, Texas. (**0007-126** [Conrad, A.C.])

Comment: My issue here today is water. If we're going to be taking water from the Colorado River, and giving 3,935 gallons per minute to cool a new nuclear reactor, we're also going to be compromising our need for water to San Antonio where humans need water to drink, because San Antonio, with the SAWS project, which is San Antonio Water System, the LCRA is going to be draining water off the Colorado River to provide for San Antonio. (**0007-133** [Schwank, Eleanor])

Comment: We have our rice farmers who absolutely need our water. We have out cattlemen who absolutely need our water. And let's not forget our aquaculture, or bays and our estuaries. Everybody's coming to Matagorda because they all love our fishing, but we're not going to have fish, we're not going to have oysters, we're not going to have shrimp, we're not going to have anything if we're not protecting our water. (**0007-134** [Schwank, Eleanor])

Comment: There are a number of river studies going on right now, not the least of which by the Lower Colorado River Authority, who is in charge of this particular chunk of water. (**0008-79** [Wagner, William])

Comment: This new plant will use 4,000 gallons of water per minute. The plant is also authorized to use both river and groundwater water. The plant is authorized to use up to 102 acre feet of river water per year, and use about half of that annually for STNP 1 & 2. If the plant uses its full allotment (of water), will there be adequate water for the new reservoir? (**0010-4** [Public Citizen, Texas Office] [Smith, Tom])

Comment: The LCRA-SAWS Water Project (LSWP) is based on a Definitive Agreement between SAWS and LCRA, signed in 2002, for the purchase of up to 150,000 acre ft/yr of surface water from the Lower Colorado River Basin at Bay City. If the plant takes its full 102 acre feet, will there be enough water for San Antonio to meet its water needs? (**0010-5** [Public Citizen, Texas Office] [Smith, Tom])

Comment: If it [the new plant] takes its full allotment of 3,935 gallons per minute will there be adequate water for rice farmers and others? (**0010-6** [Public Citizen, Texas Office] [Smith, Tom])

Response: *The impact on current and future water use in the vicinity of the site from the additional water withdrawals from the Colorado River needed to operate STP Units 3 and 4 will be evaluated and presented in Chapter 5 of the EIS.*

Comment: A similar situation would be the temperature of that water. We've had issues -- and I say we -- I mean the United States has had issues recently on nuclear plant where because the temperatures have gone up, the water temperature has gone up, which has made it difficult for those operators to be able to use the water and then discharge the water back in the rivers. And I'm speaking about some -- a nuclear plant in Tennessee. And some of the nuclear plants in Europe had a similar situation last summer. (**0007-48** [Reed, Cyrus])

Response: *The comment refers to rising temperatures in the Main Cooling Reservoir and how this condition may relate to continued operation of the STP units and to blowdown from the reservoir to the Colorado River. The NRC staff's evaluation of the thermal properties of the*

blowdown discharge from the reservoir to the Colorado River when all four units are in operation will be presented in Chapter 5 of the EIS.

Comment: My understanding was when you reach certain amounts of -- when the water quality is of a certain type, in other words, if there's a lot of sediment in the water, you do have to discharge some back into the river. (**0007-49** [Reed, Cyrus])

Response: *The comment refers to the blowdown from the Main Cooling Reservoir to the Colorado River at the STP site. The NRC staff's evaluation of the frequency of blowdown and its impact on the Colorado River when all four STP units are in operation will be presented in Chapter 5 of the EIS.*

Comment: Our cooling reservoir's a closed cycle system. We do take make-up water out of the river to keep that reservoir filled. We take make-up water out of the river most of the times during high-flow conditions when it's, you know, a lot of water flowing through it, to keep it filled. The water actually cools in the reservoir, it goes around its little loop and cools to the air, it doesn't -- the hot water does not go back to the river. So it's closed cycle. We use it for make-up, and just to clarify the operating points, because I think that was confused earlier. (**0007-141** [McBurnett, Mark])

Response: *This comment provides some information regarding the closed-loop cooling system in use for STP Units 1 and 2. No response is needed.*

Comment: Nuclear Power Plants use vast amounts of water. The Union of Concerned Scientists, in a document entitled "Got Water? Nuclear power plant cooling water needs," details in a 14-page illustrated summary problems power plants have when the "insatiable cooling water needs were not met." The threat of drought is real in Texas, as is the potential shortage of water. (**0015-6** [Williams, Mina])

Response: *The NRC staff's assessment of water use requirements for the operation of STP Units 3 and 4 including those during drought conditions will be presented in Chapter 5 of the EIS.*

Comment: ...of the 12,200 acres containing the current South Texas Nuclear Project, 7,000 of these acres (over 57%) comprise the reservoir needed for the cooling water. ... how much of this water is lost to evaporation and how much more water might need to be diverted into the reservoir if STP expansion is approved. (**0017-1** [Scheurich, Venice])

Response: *The water withdrawal and consumptive use requirements for the operation of STP Units 3 and 4 will be provided in* <Chapter 2> *of the EIS.*

Comment: As sea levels rise, groundwater can be affected, both in terms of expansion into the surrounding soils and in water quality, e.g. salt water intrusion. The effects of such changes should be included in the EIS. (**0002-12** [Sinkin, Lanny])

Comment: The combination of reduced precipitation, higher rates of evaporation and evapotransporation, and increased number of droughts suggest that relying on the worst historical drought may not be a conservative approach. (**0002-13** [Sinkin, Lanny])

Comment: A conservative approach to evaluating the adequacy of the water supply available to STNP would incorporate the possibility that global warming would produce a drought worse than the worst historical drought at a time when available water is already reduced by reduced precipitation and increased evaporation and evaportransporation. That evaluation would consider: -- the time frame within which the global warming impacts would be expected and the projected operating life of the reactors, including renewal of licensing and -- the likelihood of a drought worse than the worst historical drought and the potential impact of such a drought on the operations of the reactors. (**0002-14** [Sinkin, Lanny])

Comment: At the same time, there are credible studies that posit greenhouse warming as a precursor to rapid cooling. Schwartz and Randall, An Abrupt Climate Change Scenario and Its Implications for United States National Security, October 2003. Any evaluation of potential global warming impacts should examine the potential impacts of this alternative scenario for climate change, including the impacts on available water. (**0002-15** [Sinkin, Lanny])

Comment: A true EIS must examine the relationship between the water needs of the proposed plants, its water use, water availability as well as how climate might impact those uses. (**0003-25** [Reed, Cyrus])

Comment: The impacts of global warming on the proposed plant must be assessed. Thus, when the first STP site was assessed, normal historic drought and water availability were a concern, and today, the flow of the Colorado upstream of STP is a real concern during summer months, when flows are often lower and evaporation is higher. Nonetheless, the recent IPCC Assessments on the impacts of global warming, as well as independent assessments in Texas - such as the 1995 Gerald North study - suggest that global warming is likely to affect climate and water availability, including in Central Texas. (**0003-28** [Reed, Cyrus])

Comment: It would seem any EIS must assess the impacts of global warming and the likelihood that droughts in coming decades could be more severe than droughts in the 1940 and 1950s which are traditionally used as the “drought of record” to determine likely flows. Contingencies must be added for flows that are 20 percent or more less than historic drought levels. The EIS should rely in part on studies being conducted by the LCRA on the issue of the impact of climate change on flows as part of the assessment. (**0003-29** [Reed, Cyrus])

Comment: What about water use? With the droughts we’ve been having and with the increasing belief that global warming is a significant issue in this part of the country, will there be significant decreases in the amount of available water, and what will that mean to the operations of this plant? (**0007-18** [Smith, Tom])

Comment: One of the issues that’s come up in terms of what scientists are telling us is that climate is changing. Yes, it always has changed, but it’s changing more rapidly than in the past.

And so, again, I would urge you, in the environmental analysis to look at how climate change might impact river flow, because I know that STP has an existing water right, and it appears on paper that you've got the water to operate your -- you know, the present plants and the plants in the future. (**0007-45** [Reed, Cyrus])

Comment: Is it really a good investment if in 30 years our flows are going to be that much less, will the water really be available and be there? Because if the plant is built and then doesn't operate, it doesn't make economic sense for anybody. (**0007-47** [Reed, Cyrus])

Comment: So I'm here to tell about global warming and how it affects it. With the growth of global warming you have to include how will this contribute the nuclear power plants, and how it will affect them. So the plant requires water to cool it down, and it requires cold water. So with global warming, there's going to be less water and it's going to be warmer, so you have to consider what the nuclear reactors will be in situations like that. (**0007-68** [Lopez, Diana])

Comment: Are there going to be temperature limits? We're living in a world where climatological change is causing warming -- global warming. We know the sea level is rising. It's already bothering the Chinese. It's not bothering us yet, but it will. Now, what's causing it isn't a concern here. The mere fact that it's happening -- and it needs to be analyzed. We're talking about a grand total of about 60 years. We need to look at that. (**0008-77** [Wagner, William])

Comment: If global warming is occurring and as severe as we anticipate: If the plant adds approximately 14.3°F to the water temperature, and the current intake temperature has been as high as 95.6°F, can the plant operate safely with a predicted 3-10°temperature increase due to global warming by 2100? (**0010-10** [Public Citizen, Texas Office] [Smith, Tom])

Comment: If global warming is occurring and as severe as we anticipate: Will there be enough water for cooling decline if a 25% decrease in river flows occurs? (**0010-7** [Public Citizen, Texas Office] [Smith, Tom])

Comment: If global warming is occurring and as severe as we anticipate: Will the cooling water be cool enough to allow the plant to operate? (**0010-9** [Public Citizen, Texas Office] [Smith, Tom])

Response: *The construction and operation of a nuclear plant involves the consumption of water. The staff will independently assess the impact of these consumptive water losses on the sustainability of both the local and regional water resources. This assessment will consider both current and future conditions, including changes in water demands to serve the needs of the future population and changes in water supply resulting from climate variability and climate change. While NRC does not regulate or manage water resources, it does have the responsibility under NEPA to assess and disclose the impacts of the proposed action on water resources. The staff's assessment of the impacts on the sustainability of water resources will be presented in Chapters 4 and 5 of the EIS for construction and operation, respectively.*

Comment: There is substantial evidence to support the prediction that melting the South Antactic ice cap and the Greenland glacier will cause a rise in sea level ranging from 6 to 12 feet (This scenario is presented as a reasonable probability, not a worst case. The sea level rise

would probably take place over an extended period of time and probably within the operating life of the proposed nuclear power plants). Assuming that sea level were to rise to that extent, what would be the impact on: (1) the operations of the plant (2) the access to the plant from off-site, particularly by emergency response personnel and equipment (3) the ability to evacuate the plant in case of emergency (4) the ability to evacuate surrounding communities in case of emergency (**0002-6** [Sinkin, Lanny])

Response: *Parts (2)-(4) of this comment relate to emergency planning and response and are not within the scope of NRC staff's environmental review. Part (1) of the comment can be interpreted to have both a safety and an environmental aspect. As part of the NRC's site safety review, the staff will consider whether the site is suitable based on characteristics of the site including long-term variability in flooding levels. The results of this review will be found in the site Safety Evaluation Report. This issue is not within the scope of the environmental review and will not be discussed in the EIS. As part of the NRC's environmental review, the staff will independently assess the impact of consumptive water losses during operation of the plant on the sustainability of water resources including consideration of current and future conditions resulting from climate variability and climate change. The staff's assessment of the operation impacts will be presented in Chapter 5 of the EIS.*

D.2.8 Hydrology - Groundwater

Comment: Subsidence, no. What happens if we over-use the ground water in this community, and will there be a decrease in the level of the plant? (**0007-23** [Smith, Tom])

Response: *The NRC is also concerned about subsidence and will be evaluating the potential for subsidence at the station. Information on the NRC evaluation of subsidence will appear in Chapter 4 on water-use impacts during construction and in Chapter 5 on water-use impacts during station operation. The topic of subsidence and sink holes and their potential impact on the facility will also be addressed in Section 2.5 of the applicant's FSAR.*

Comment: If global warming is occurring and as severe as we anticipate: Will groundwater decline? (**0010-8** [Public Citizen, Texas Office] [Smith, Tom])

Comment: ...in researching in-situ uranium mining, we have discovered that that activity also requires enormous amounts of groundwater during the mining process and that there is a high likelihood that the mining will contaminate portions of the Gulf Coast Aquifer. For example, the company which has applied for a permit to mine in Goliad County, about 100 miles west of here, will need 72,000 gallons of water a day during mining and additional vast amounts when restoration (which probably won't be possible) is attempted. (**0017-2** [Scheurich, Venice])

Response: *Changes in the availability of the water resource by competing demands and long-term variability will be addressed in the cumulative impacts <Section 7.2> on water use and quality.*

D.2.9 Ecology - Terrestrial

Comment: What about endangered species? There are kemp ridley turtles, whooping cranes, and others that are on the threatened and endangered species list in this community. Many of them we are beginning to understand how significant they are since they last time this plant was permitted in this community. (**0007-21** [Smith, Tom])

Comment: There are Kemp Ridley sea turtles and whooping cranes in the vicinity. How will construction and operation of the new reactors affect their habitats? What other species will be affected? (**0010-17** [Public Citizen, Texas Office] [Smith, Tom])

Response: *The comments relate to aquatic and terrestrial ecology issues and will be considered in the preparation of the DEIS. NRC's consultations with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service regarding threatened and endangered species will be discussed in Chapter 4 of the DEIS.*

Comment: [T]he lake that [STP has] -- the 7,000 acre -- also creates some of the best bird habitats in the state of Texas. (**0008-2** [O'Day, Mike])

Comment: [R]ecently I had the opportunity to go and sit on a pier and watch my brother fish and a friend of his. ... So we sat for a time. And as we did, as the conversation waned, I heard something. And the longer you listened, the louder it got. And that that I was hearing were frogs: frogs that were speaking loudly. And if you know anything about frogs, they're the most -- or one of the most sensitive animals in our environment. And they were not only loud, but they were interactive. And I came to understand that as sensitive an issue as this is the creatures of the world tell us a lot. And for them to be out in such a large and strong body to be heard at night, and them being such a sensitive creature that they through their skins osmose anything the environment deals to them, their presence made me understand that we have a very environmentally safe -- not just our nuclear facility, but numerous facilities that operate along our river -- something I'm very proud of in our county -- something they should be proud of, and I think everyone should be well aware of. (**0008-23** [Marceaux, Brent])

Comment: Also the alligators -- the nuclear power plant is -- the whole grounds -- in a protected wildlife zone. They've not only done that, they've gone in and put in a -- what's called a wetlands -- their own private wetlands so, you know, to help that. (**0008-33** [Head, Bobby])

Comment: In the last 20 years that the nuclear power plant has been here the National Audubon Society, year in and year out -- I don't know if you all know this but Matagorda County is the number one birding center in the nation -- more birds -- more species of birds every year. They just did the Christmas bird count -- number one in the nation again this year -- more species of birds in Matagorda County. (**0008-34** [Head, Bobby])

Response: *The comments are noted. Terrestrial resources, including all the aforementioned species, will be discussed in Chapter 2 of the DEIS.*

D.2.10 Ecology - Aquatic

Comment: I had an opportunity one night working nights to go out and work where the pumps are out on the reservoir. And I walked out and I looked down and I said, Geez, as a fisherman here are these huge catfish and these huge red fish swimming together down there. Now, at -- the environment -- if they're doing something about the environment they're making the fish grow big. I can tell you that. (**0008-32** [Head, Bobby])

Response: *The DEIS will discuss the aquatic resources at STP in Chapter 2 and will consider potential impacts from construction and operation of the two new units in Chapters 4 and 5, respectively.*

Comment: As evidenced in the Environmental Report itself, low-flow conditions move the line of salinity upstream from Matagorda Bay, leading to more entrainment and entrapments of estuarine species, as well as the likely movements of bird species such as pelicans which feed on such aquatic species. Thus, the relationship between the salinity line, aquatic species and climate must be examined. (**0003-30** [Reed, Cyrus])

Response: *The DEIS will consider the aquatic biota in the Colorado River, including species that move up the river from Matagorda Bay. Recent data collected in the lower Colorado River will be used to characterize the aquatic biota, as well as, various water quality indicators (including salinity) that will be used to describe the aquatic environment and analyze potential impacts from the project. Entrainment, entrapment and impingement of the aquatic biota in the river at the vicinity of the plant's intake structure will be evaluated in Chapter 5 of the DEIS. Potential behavioral changes in other non-aquatic species, such as pelicans, resulting from the proposed construction and operation of the additional units will also be analyzed.*

Comment: It should be noted that the ER relies heavily on monitoring data of aquatic species and water levels from the initial application of 1973 which must be updated to reflect a much more saline, lower flow regime which typifies the region today. (**0003-31** [Reed, Cyrus])

Comment: In terms of the assessment of water contained in the ER, there are multiple sections which continue to rely on dated aquatic monitoring of the Colorado River which must be updated and specified as part of an EIS. Thus, as an example, relying on histograms of sediment levels in the Colorado River from 1957 to 1973, as is done in Section 2.3.1.1.5 is clearly incomplete. (**0003-34** [Reed, Cyrus])

Response: *The DEIS will include the results of a 12-month monitoring program conducted in 2007 and 2008 to assess aquatic species and conditions of the lower Colorado River.*

Comment: I know that more than half (by weight) of the biomass in the earth is in the form of microorganisms which live under the surface of the earth and bodies of water. The earth is teaming with life to depths below 10,000 feet, especially in coastal plains such as found around STP. Some of these organisms have beneficial effects on the biosphere, e.g., producing oxygen and absorbing carbon. I am concerned about the effect on these organisms which would result

from a massive radioactive effluent leak into the ground, or cooling pond, or the Colorado River. An EIS should consider this important effect. (**0005-6** [Payne, Cameron])

Response: *NRC regulations require strict monitoring of radioactive effluent releases. In addition, new plants are commonly required by other State or Federal agencies to perform special monitoring of aquatic and terrestrial species for some period of time after a new plant commences operation. Ecological impacts related to radioactive effluent releases from the proposed facility will be evaluated in the DEIS.*

Comment: We need to figure out whether we're going to preserve that estuary or whether we're going to let it go to hell. Right now I understand that at the intake for the cooling [pond] we're getting brackish water. The original design was that they were not to remove enough water such that there was back-flow to cause saltwater in at the inlet station. It appears it's happening regardless of whether they pump or don't pump. This says there's been a change in the basic environmental impact statement. That needs to be analyzed for. (**0008-78** [Acevedo, NK])

Response: *The DEIS will describe the function of the intake structure on the Colorado River and will discuss the potential impacts to aquatic resources from the operation of that structure. The DEIS will also describe changes, unrelated to operation of STP Units 1 and 2, that have occurred in the lower Colorado River since publication of NRC's final environmental statement for the two existing units.*

D.2.11 Socioeconomics

Comment: Units 1 and 2 provide safe, reliable power to millions of Texans. As Mark said, that drives that economy of Texas. And it brings millions of dollars of benefits to Matagorda County and the surrounding area. (**0007-144** [Shepherd, Joe])

Comment: We believe that the benefits to Matagorda County will be significant, not only just the jobs that will be created, we've talked about the 800 permanent jobs, the 4,000 construction jobs, but we believe it'll have a significant positive affect on the quality of life in Matagorda County. (**0007-148** [Shepherd, Joe])

Comment: The STP 3 and 4 expansion, as has been mentioned earlier, would bring about 800 new jobs to the county. It's been stated that we need jobs, and we do because our high school students need opportunities that are not here now, our college-age students are going away from the county after they graduate because there's nothing here to bring them back, what limited job we have. Also, we have a number of under-skilled, or under-employed people here who are looking for new opportunities to increase the career potential that they have, and that they could stay in the county as well. (**0007-71** [Bludau, Owen])

Comment: The percentage of new employees living here is important to us. Right now we have about 60 percent of the 1200 employees that STP has living in the county, and we would like to have an equal percentage or higher of the new hires coming with 3 and 4 that would be

here. They would be able to purchase homes and cars here, groceries, retail activities, they would use the services of our banks, our medical facilities, insurance, utility service providers. And if we could get 600 of those 800 living here, that would generate another 1,000 secondary support jobs. Those new employees' salaries will circulate in the community and that will expand it economically. (**0007-72** [Bludau, Owen])

Comment: [W]e're beginning to see the impacts already of the anticipation of Units 3 and 4. We saw new retailers open up in Bay City in 2007. We had new retailers who have purchased properties in Palacios and in Bay City, and there's new construction in Palacios and Bay City in anticipation of this larger customer base that is going to be here. So these businesses are coming, and they're expanding our tax base and our employee base. (**0007-74** [Bludau, Owen])

Comment: STP is looking at about 5,000 construction -- temporary construction workers here over a six year period. ... At maximum construction period they're looking at about 4,000 workers for two years, but then they would ramp down. ... [T]hose living here are going to spend most of their money here. Those commuting in are going to spend some of their money here buying gas and refreshments as they go in and out of the county. That's going to create a strong financial benefit to our local businesses and attract some new businesses. (**0007-84** [Bludau, Owen])

Comment: We are strong supporters of STP. What community would not welcome a $6.4 billion investment in their community? I mean, this is great. We're talking about 8,000 construction jobs during peak, 800 -- I mean 4,000 jobs, 800 permanent jobs. (**0007-9** [Knapik, Richard])

Comment: I'm indeed pleased to be here tonight and have a chance to talk about bringing new reactors to the South Texas Project site and increasing the capacity of the South Texas Project. It's clearly a strong boost for Matagorda County. It's important for Texans and Texas, for energy independence, and having adequate supplies of electricity, which drives our overall economic engine that keeps our society going. (**0008-113** [McBurnett, Mark])

Comment: Units 1 and 2 provide clean, reliable power to millions of Texans. ... We also provide millions of dollars of benefits to Matagorda County. (**0008-125** [Shepherd, Joe])

Comment: We think that the benefits associated with Units 3 and 4 will be significant for Matagorda County and the surrounding communities. It's not only the jobs -- the 800 permanent jobs and 4,000 construction jobs -- bit the quality of life that we believe the economic impact of Units 3 and 4 will bring to this area. (**0008-129** [Shepherd, Joe])

Comment: Palacios is going through an economic change. The shrimping industry is on the way down and it will never return. The Harris and Galveston County Council of Governments, which is 13 counties, including Matagorda County, recently started last year making plans for an additional 2.5 million people coming to our area by year 2015. (**0008-18** [Morton, Joe])

Comment: As far as the economic impact to Matagorda County ... we've got businesses here that have ... been here since the early 1900's. ... Yes, we have new industry coming in. ...But we

have these old businesses too. ...down in Palacios ...Blessing and Matagorda and Clemville and Bowling ...all these communities around close that are going to have impact by Units 3 and 4. Also, it's going to secure future for our children and our children's children. (**0008-38** [Head, Bobby])

Comment: The economic impact on the state of Texas will create -- or one nuclear plant would create $9.2 billion statewide from one reactor and 5,564 jobs. (**0008-4** [O'Day, Mike])

Comment: The focus of the Matagorda County EDC and my job is to bring new economic development to Matagorda County. And this ... is a chance of a lifetime that most economic developers would dream of. The value of that STP is talking about investing equals the combined -- it exceeds the combined value of the eight largest industrial projects in Texas in the last four years. It exceeds those. So that is big. That is economic development right big. (**0008-92** [Bludau, Owen])

Comment: We're after STP 3 and 4 for a number of reasons ... We want to attract their employees to live here. If you can get 3 and 4 -- a major percentage of the employees of 3 and 4 to live here they're going to buy homes and cars. They're going to buy their groceries, their retail products. They're going to use the services of our banks, our medical facilities, their insurers, utility companies, and our various service providers. That's going to help all the existing businesses in the community. It's going to attract more businesses to the community. If we could get 600 of 800 to live here that would generate an additional 1,000 service sector jobs. And that is good economic development. (**0008-96** [Bludau, Owen])

Comment: The temporary construction workers that are going to be here will be over a six-year period. ... And while they're living here they're going to be spending their money here. While they are commuting in and out they're going to be buying gasoline and refreshments and spending some of their money here. So that's going to create additional strong business for our local employers, our local businesses, and it's going to add and attract other businesses. (**0008-97** [Bludau, Owen])

Comment: We saw some of this retail happening already, as was mentioned earlier. We had new retailers coming in in 2007. We had more of them buy -- more retailers buy property in Palacios and Bay City for new facilities. There are new retail facilities under construction because they are anticipating an increased customer base. So this is adding to our employment opportunities and it's adding to the existing tax base, which we all need. (**0008-98** [Bludau, Owen])

Comment: The plant location provides jobs on a regional basis without causing development problems, such as increased traffic, whlch would occur in a densely industrialized area. (**0013-2** [Hearn, Polly])

Response: *These comments cite some of the projected favorable socioeconomic impacts on the community of plant construction and operation. These comments are covered within the existing scope of the DEIS and will be discussed in sections < 4.4 and 5.4 of the EIS.>*

Comment: I think the first question that you all, in this community, may want to ask is, is this going to be a benefit to you, or will your taxes have to go up to pay for the infrastructure to support the growth of the plant, the additional hospitals and security systems, roads, schools and other issues. (**0007-16** [Smith, Tom])

Comment: Tax abatements for NRG will mean the community will bear costs in higher taxes. The community will have to come up with funds to build more public infrastructure. The new plant will require:1. New roads, new schools, a new hospital, and a paid fire department.2. How high will local cities have to raise taxes in order to build this infrastructure? (**0010-1** [Public Citizen, Texas Office] [Smith, Tom])

Response: *These comments briefly identify potential adverse socioeconomic impacts on the community of plant construction and operation, including required investments in community infrastructure. These topics will be discussed in Chapters 4 and 5 of the DEIS.*

Comment: I think that Matagorda County and Bay City are so much better prepared for two more units than we were for the first two units. I happen to have been on the city council at that time, and let me tell you, I believe at that time there were 13,000-plus construction workers here, which at that time it was the largest construction project in the United States at that time, or up to that time, or going on then. (**0007-129** [Rice Herreth, Georgia])

Comment: Already ... advanced education has come to the city due to our partnership with the local community colleges and with Texas A&M. There's now a satellite campus at Wharton Junior College in Bay City, we're teaching courses and there are students there today, and that did not exist a year ago. And that's all because of Units 3 and 4. (**0007-149** [Shepherd, Joe])

Comment: Ms. Dancer talked about the security of the workforce. I'm sorry if, as we went through our deliberations on how we should best manager our costs, that that caused anxiety within any of employees. But the truth is, we outsourced not one job. Not one. And we have changed our outlook. We've gone from an outlook of constriction to one of expansion, and that's the bright future for STP Nuclear Operating Company, and that's the bright future for Matagorda County. We prefer local talent, and the onsite campus in Bay City is part of our commitment to try and attract and retain that local talent. And we have many other activities that'll go forth in the future to bring that workforce to Matagorda County. (**0007-150** [Acevedo, NK])

Comment: With the announcement of expansion to Units 3 and 4, we have the opportunity to bring industry, education, and government together to solve a huge problem, but it was a good problem. ... In just a matter of months we came up with a degree program, associate degree program called Power Technology, which we have students enrolled in already today, and the Mid-Coast Education and Industry Alliance still meets quarterly. We are continuing to address the issues to see how we can improve our education systems and make this a great place to raise our young adults and have our young adults come back and raise their families for many, many years to come, creating another huge strength for our community. (**0007-79** [Dunham, D.C.])

Comment: The city of Bay City is ready to meet the challenges of the growth and expansion of Units 3 and 4. The city three years ago passed a $6 million bond issue to repave all the streets in the city of Bay City. We're also actively engaged right now in creating a diversion road around our community to help alleviate traffic that we anticipate coming. (**0008-14** [Knapik, Richard])

Comment: With this announcement we had the opportunity to bring together industry and educators and solve a really huge problem. But it was a good problem, especially for this community that has had traditionally double-digit unemployment. Our problem was how are we going to meet the demands of our local industries' needs for all of the jobs that are going to be created. ...Within just a matter of months we developed the idea of coming up with power technology, which is an associate degree program that's being taught to our students today. (**0008-47** [Dunham, D.C.])

Comment: STP has made Matagorda County a much strong economic entity by its presence. It is our largest private sector employer. Units 3 and 4 would add another 800 jobs. And those jobs, as has been mentioned before, are going to be opportunities for our high school graduates, our graduates at colleges to come back to school -- come back from school and work here and for people who are underemployed to improve their education and have better career opportunities. (**0008-94** [Bludau, Owen])

Response: *These comments discuss community responses designed to take advantage of expanding economic opportunities expected as a result of plant construction and operation. Such activities are part of the context for economic impact analysis and will be discussed in the DEIS.*

Comment: So where initially you had a workforce that by default had to be based in the local economy, that paradigm has changed. So as the economy became more global, in part due to advances in the internet and electronics communication age, STP began to court workforces elsewhere, workforces without roots in Matagorda County. And suddenly, all of those jobs, all of those careers that we had been promised, and that had largely come to fruition, suddenly lost their stability. (**0007-102** [Dancer, Susan])

Comment: If there is any doubt that STP's ownership didn't have loyalty to their workforce, or their location, pre-announcements of Units 3 and 4, Frank Mallen ended that with a comment spoken to a group -- a senior manager, with a comment spoken to a group of recently outsourced employees when he said, It's all about the money. That's the most poignant and honest thing that STP management has presented to this community so far. (**0007-103** [Dancer, Susan])

Comment: Fortunately for us, we have hindsight and we can see what building two new nuclear reactors could bring us. We can see now because we're 30 years later from the same thing happening before. Our unemployment rate is still well above the state average, our school districts are still extremely poor, and the owners and operators of the plants still don't live here or show loyalty to our community. (**0007-106** [Dancer, Susan])

Comment: When they started bringing executives in to prepare for 3 and 4, guess where they relocated those executives to? Lake Jackson. All the -- and these are the same people who tell you they have great love and loyalty for Matagorda County and that we have the infrastructure to support the plant growth and to support all the new employees here. (**0007-120** [Dancer, Susan])

Comment: As far as the concerns I have is the number of STP employees who choose to live outside of Matagorda County. I understand. They've got beautiful country clubs and stuff like that every place else. But I would like to work with both STP, our local officials, and Matagorda County to make Matagorda County the preferred residence of not only the construction families it will bring, but also the management and employees of STP. (**0008-39** [Head, Bobby])

Comment: While the company postulates that it will need between 5000-6000 construction workers, how many of them can be found locally or in the region with other major power plants being proposed or under construction? There hasn't been a new reactor ordered in the US for decades. The knowledge and skill to build the reactor design is in Japan. 1. Who will NRG hire to build and operate the new plant? 2. Will they have to rely on international labor? (**0010-2** [Public Citizen, Texas Office] [Smith, Tom])

Response: *These comments involve choices by the applicant and their contractors on where the construction and operating workforces will come from, and choices by the workforce concerning where they will live while working at the proposed plant. These factors affect the size of the local resident workforce and the potential socioeconomic impacts and will be discussed in the DEIS.*

Comment: [E]mergency planning ... has an aspect to economic development that often is not perceived. A lot of the business that I'm talking to -- the industries -- have a concern about the Texan fire services -- emergency services. And when we mention the types of planning that are undertaken in Matagorda County because of the presence of STP that gives them a good comfort level that their needs will be met also and they can participate as a member in this emergency planning and response within the county. (**0008-100** [Bludau, Owen])

Comment: STP is a major financial supporter to a lot of the activities in the community as has been mentioned -- the community events, the organization of the civic activities. Many of these events, activities, and so forth could not exist without the financial support of STP. (**0008-99** [Bludau, Owen])

Response: *These comments discuss past actions of the existing plant management and employees for activities that support the community. They provide some context for expectations regarding future behavior. Although this type of response is not an inevitable socioeconomic consequence of construction and operation, past performance will be used as part of the context in the DEIS discussion.*

Comment: If we can do energy efficiency less expensively than building this plant, and put Texans to work as opposed to people in Japan or in Russia or in Africa that will be mining this uranium. Wouldn't it be better to have the jobs and money stay here in the United States? (**0007-29** [Smith, Tom])

Response: *This comment expresses the belief that investments in energy efficiency would be less expensive and would provide more domestic jobs than an investment in nuclear power. It does not ask for an analysis within the EIS of the job and cost consequences of the nuclear fuel cycle compared with energy efficiency. Job and cost impacts will be identified and quantified to the extent possible in the EIS.*

Comment: I do think that Bay City is being presented with a false choice, either two new nuclear reactors, or you're not going to have any jobs, when, in fact, there are alternatives to that, to those two options. (**0007-96** [Cushing, Lara])

Response: *This comment states that there are alternatives to constructing and operating the proposed plant. Chapter 9 of the EIS will discuss the socioeconomic impacts of alternative technologies and sites.*

D.2.12 Environmental Justice

Comment: Environmental justice, what will the net impact be on your taxes and the community, the low-income communities of color? (**0007-25** [Smith, Tom])

Response: *This comment asks what the impact on local taxes and on communities of color will be from constructing and operating the proposed plant. Both types of impacts will be considered and discussed as part of the socioeconomic and environmental justice impacts, respectively.*

D.2.13 Health - Radiological

Comment: There is a need for measurements on the amount of radioactivity in the water currently flowing from the plant into Matagorda Bay to determine whether there is any leakage or release of any kind. If there is documentation of such leakage, that potential from two additional reactors should also be evaluated. (**0002-18** [Sinkin, Lanny])

Response: *STP has an ongoing Environmental Monitoring Program which does monitor for radionuclides in surface water, groundwater and drinking water on an annual basis. Tritium is the only anthropogenic radionuclide that has been measured in onsite water samples for the past several years. No radionuclides have been detected in offsite water samples. During 2006 there were two occurrences of the Total Dissolved Solids discharge line leaking some liquid. The water from the leaks was recovered. No radioactive material was released from the site. However, the potential for releases will be discussed in EIS Chapter 5.*

Comment: Prior to STNP Units 1 and 2 going into operation, the public health data for the three counties closest to the site showed a cancer death rate 4.5% lower than the statewide rate. In the 16 years since the nuclear plants began operating, the cancer death rate in the three counties rose to more than 7% higher than the statewide rate. The statewide rate both went up, with the three county rate rising four times faster. There is no obvious reason, other than the presence of operating nuclear power plants, explaining the data from the three counties. Based on this data, an increased cancer death rate would be expected to result from the addition of two more operational reactors at the same site. The cumulative impacts analysis for the STNP II reactors should address this question. Source: Joseph J. Mangano, MPH, MBA Radiation and Public Health Project, January 24, 2008. There is also a recent study indicating that operating nuclear power plants adversely affect infant mortality (**0002-20** [Sinkin, Lanny])

Comment: There have been numerous cancer studies and infant mortality studies involving nuclear plants that should be examined as part of the EIS. While some of these studies have been contradictory, a true ER and EIS process must assess the latest studies to estimate the actual damages in cancer incidence and death due to the opening of more nuclear power plants. (**0003-46** [Reed, Cyrus])

Comment: What will the impact of cancer be on this community? And if you look at data you see that the cancer rates have gone from below average to above average since this plant's been in operation. (**0007-17** [Smith, Tom])

Comment: I do want to go on record and say that I am concerned about increased cancer rates (**0007-99** [Dancer, Susan])

Comment: ... a large-scale, carefully conducted study concluded: "Our study confirmed that in Germany a connection has been observed between the distance of a domicile to the nearest nuclear power plant... and the risk of developing cancer, such as leukemia, before the fifth birthday." The study was conducted by the German Register of Child Cancer, an office which is funded by the 16 German states and the Federal Health Ministry. Among several alarming and unexplained findings was that 37 children living within 3 miles of nuclear power plants had come down with leukemia between 1980 and 2003, whereas the statistical average for Germany would have predicted just 17 cases In that group. Of course, additional research, which takes time, must be done to determine whether proximity to nuclear plants was a factor in causing the high number of cases. At this time, scientists can only conclude that this is just "another piece in a growing puzzle'" of childhood leukemia's association with nuclear installations and they emphasize the need to keep investigating. We all know that there are risks to almost everything we do in life and that there is no escaping some hazards. However, in the case of granting nuclear power plant expansion, the risk is too high. (**0017-4** [Scheurich, Venice])

Response: *As will be discussed in the EIS, the staff accepts the linear, no-threshold dose-response model. In a recent report entitled "Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII - Phase 2 (National Research Council 2006), the BEIR VII Committee concluded that the current scientific evidence is consistent with the hypothesis that there is a linear, no-threshold dose-response relationship between exposure to ionizing*

radiation and the development of cancer in humans. Having accepted this model, the staff does think that this model is conservative when applied to workers and members of the public who are exposed to radiation from nuclear power plants. This is based on the fact that numerous epidemiological studies have not shown conclusive evidence of increased incidences of cancer at the low dose rates typical of nuclear power plant operations. Further, routine releases from operating nuclear power plants are far below the level at which regional excess cancer incidences would be expected. These studies include: (1) the National Cancer Institute study (1990) of cancer mortality rates around nuclear facilities, including 52 nuclear power plants, (2) the University of Pittsburgh study (Talbott et al. 2003) that found no link between radiation released during the 1979 accident at the Three-Mile Island nuclear power station and cancer deaths among residents, and (3) the Connecticut Academy of Sciences and Engineering study (2001) that found no meaningful associations from exposures to radionuclides around the Connecticut Yankee nuclear power plant that ceased electricity production in 1996 to the cancers studied. Radiological Health Impacts to the public will be addressed in Chapter 5 of the EIS.

Comment: I read a story on the front page of the New York Times two days ago, and ...he discovered that his drinking water was contaminated with radioactive tritium. That's ionizing radiation, not the kind of radiation you get from the sun. And he was naturally upset about that, and went to Exelon, the largest nuclear reactor manufacturer in the country, and he asked them about it, and to make a long story short, they confessed that they knew about this. Exelon believed that the tritium found in the drinking water well near the plant in Braidwood, Illinois came from millions of gallons of water that had leaked from the plant years earlier, but went unreported at the time. That could be happening right here. That concerns me. That bothers me. (**0007-97** [Payne, Cameron])

Response: *STP has an ongoing Environmental Monitoring Program which does monitor for radionuclides in surface water, ground water and drinking water on an annual basis. Tritium is the only anthropogenic radionuclide that has been measured in onsite water sample for the past several years. No radionuclides have been detected in offsite water samples. Drinking water in the area is obtained from deep aquifer wells, which is also monitored quarterly and no tritium has been detected in this water.*

Comment: There was a comment earlier regarding cancer and radiation in the populations living near nuclear facilities. It's interesting because that question's been around a long time. In the 16 years I've been [the site doctor] at STP, the evolution of the answer has been ongoing. And I think it's time, finally, to put that question to bed, because it's been studied massively, and internationally. National Academy of Sciences, National Cancer Institute, long-term big-time studies, quality research that have concluded, unequivocally, that living in the shadow of a nuclear plant will not give you cancer. So we need to put this to bed. These are American studies, British studies, Canadian studies, and, again, it's good reading. So take it home. There's some real issues to deal with here. This is a non-issue. (**0007-115** [Hefner, James])

Comment: As far as locally, less than a year ago, right here in Matagorda County, two Rice [University] professors wanted to address his particular question, germane specifically to the

county. Can the folks here in Matagorda County -- is there more cancer death rate right here than other counties in Texas? The answer is no. Two Rice professors, eminently qualified, studied this question and concluded that out of 230 counties studied, Matagorda County ranked 108 out of 230 counties as far as cancer death rates. And for sure 206 of those counties don't have a nuclear facility. (**0007-116** [Hefner, James])

Comment: [W]e're upstream of the water -- of your water, and we're downwind of any kind of problems. And Wharton County does have a lot of cancer. Now is it because of you all? Probably not. But it has a lot of cancer. (**0007-127** [Conrad, A.C.])

Comment: Advanced boiling water reactors in Japan have an impressive record on low radiation worker exposures. It's lower than what we typically see in this country in any of our plants. They have an impressive record, and we look forward to being able to do this. There's design features in those plants that enable that to happen. (**0008-117** [McBurnett, Mark])

Comment: Later there is a comment that 1.9 fatal cancers would occur from the annual fuel cycle. Please add information about the day-to-day operations as well. (**0008-65** [Hadden, Karen])

Comment: Also going on is what's known as LCRA-SAWS, or the San Antonio Water System. Now, that's not close. It's up near Interstate -- or U.S. Highway 59 between Wharton and El Campo. But they're going to build a large reservoir that's going to feed the city of San Antonio from the Colorado River. This is a large open body of potable water that is in a possible patch for any radioactive release from the site. It needs to be analyzed as part of the environmental report. (**0008-80** [Wagner, William])

Comment: The National Academy of Sciences, National Cancer Institute put together multiple studies. The NEI has put this fact sheet together ... A whole bunch of long-term studies that have concluded unequivocally now that living near a nuclear facility will not increase your incidence for cancer. It just won't happen. (**0008-90** [Hefner, James])

Comment: Two Rice [University] professors were asked to analyze the cancer death rate in Matagorda County. Statisticians, Ph.D., full professors -- one of them an adjunct professor at M.D. Anderson Hospital -- these folks know numbers, they know cancer -- one a Ph.D. environmental engineer. They concluded the same as the national and international studies. Living in the shadow of a nuclear facility will not increase the cancer death rate. (**0008-91** [Hefner, James])

Response: *Health impacts associated with plant operation will be discussed in Chapter 5 of the EIS.*

Comment: [The Environmental Report] discussed the maximally exposed individual. Please, if you would, expand this section to include impact on all age groups. It should be women and children, young children, pregnant women, not just adult males. In some sections there was analysis of children, and that's good. But the impact should be done for all categories for all types of impacts. (**0008-58** [Hadden, Karen])

Response: *The software packages that the NRC authorizes for use in calculating the maximally exposed individual (MEI) do calculate doses to various age groups, including teenagers and children. The concept of the maximally exposed individual is set to maximize the dose consequences from all pathways and all age groups.*

Comment: There was data that said water downstream is not used for drinking water or irrigation. Please analyze the impacts, however, because there is wildlife in the area and breeding grounds in the wetlands. We need to have added explanations of what the data means. There is some data provided in here, but no context given to what it means. (**0008-59** [Hadden, Karen])

Response: *In addition to STP's ongoing environmental monitoring program that monitors for radionuclides in surface water, groundwater, and drinking water, the DEIS will examine downstream water uses and impacts from construction and operation of the proposed plant.*

Comment: Gaseous pathways are analyzed in terms of 50 miles, in terms of exposure to ground and air, and inhalation. Then there's a reference to radiation shielding, but no explanation. I would like the document to include exactly what is meant by radiation shielding -- how does it work, why does it work, what does it mean. (**0008-60** [Hadden, Karen])

Response: *Shielding is any material or obstruction that absorbs radiation and is designed to protect personnel or materials from the effects of ionizing radiation.*

Comment: There's a conservation estimate of 2.5 milli[rems] per year at the site boundary. They come up with a total body exposure to the maximally exposed individual per year of .35 milli[rems] per unit. So if you double that you're talking about .70 milli[rems] per year. But we need to bear in mind this would now be four units and cumulative impacts need to be addressed throughout. (**0008-61** [Hadden, Karen])

Response: *Cumulative impacts will be discussed in Chapter 7 of the EIS. The National Council for Radiation Protection Report 93 (NCRP 1987) estimates that the average American citizen receives a natural background, (i.e., terrestrial and cosmic radiation in origin) radiological dose of 280 millirem per year, so 0.7 millirem is about 0.25 percent of that background dose rate.*

Comment: Several times the study just simply concludes that these exposure limits would be small -- in capital letters small. Please give us some context. What is the criteria for small? What do you mean? And why are they small? (**0008-62** [Hadden, Karen])

Response: *The National Council for Radiation Protection in its 1987 Report number 93 estimated that the average American citizen receives a natural background, (i.e., terrestrial and cosmic radiation in origin) radiological dose rate of 280 millirem per year. The radiological doses reported in the Environmental Report are considerably less than natural background for the average American citizen and are therefore considered 'small' as defined in 10 CFR Part 51, Appendix B. According to the noted regulation, radiological impacts are considered small if they "do not exceed permissible levels in the Commission's regulations."*

Comment: The occupational radiation doses are listed as 197.8 person-rem for the two units per year. This is over 200 times, by my calculations, of what the average exposure would be. And if you double that, workers at the plant may be getting very high levels of radiation. Cumulative impacts must be analyzed. (**0008-64** [Hadden, Karen])

Response: *The occupational population doses noted in the comment refer to the large work force (~5950 workers) that will be building the two new reactors. The average dose rate to that work force is about 33 mrem per person. Cumulative impacts will be addressed in Chapter 7 of the EIS.*

Comment: More radiation means bigger risk of cancer. The EIS should include an analysis of the impact on humans and other living systems of an increase in radiation levels as a result of 4 operating reactors at STP. ... Will the two new reactors increase the amount of low-level radiation exposure to surrounding populations? (**0010-3** [Public Citizen, Texas Office] [Smith, Tom])

Response: *Radiological impacts from the normal operation of the two new reactors will be discussed in Chapter 5 and cumulative impacts will be discussed in Chapter 7 of the EIS.*

Comment: There is a need for a baseline of current animal, bird, fish, reptile, and other non-Human creature level of radioactive uptake, so that a later comparison can determine health effects of reactor operation. (**0002-21** [Sinkin, Lanny])

Comment: [The Environmental Report] refers to the fact that gamma and beta emitters are typically part of the normally released radionucleids of power plants. Again, the impacts to biota are considered small. Please explain. (**0008-63** [Hadden, Karen])

Comment: What is the effect of low-level radiation over prolonged periods on wildlife in the area? (**0010-18** [Public Citizen, Texas Office] [Smith, Tom])

Response: *The affected radiological environment will be addressed in Chapter 2 of the DEIS. Radiological impacts to biota from operation of the reactors will be discussed in Chapter 5.*

D.2.14 Accidents - Design Basis

Comment: The last analysis of a credible accident was the CRAC II study done while STNP was still under construction. The STNP estimates were: 1. 15,200 early deaths (25 mile radius around plant) 2. 8,770 early injuries (35 mile radius) 3. $112 billion (1980 dollars) With nearly 25 years of sustained population growth in the region, it is certain that these impacts need to be updated. The review in the application is inadequate to inform citizens of the threat. (**0010-16** [Public Citizen, Texas Office] [Smith, Tom])

Response: *The environmental review of the STPNOC application will include analyses of both design-basis and severe accidents. The results of these analyses will be included in DEIS Chapter 5 that discusses the environmental impacts of reactor operation.*

D.2.15 Accidents - Severe

Comment: LCRA is involved in negotiations with San Antonio to establish long term contracts for interbasin transfers of water. The storage of that water will be in a large open reservoir. The EIS should examine the potential impact on the proposed reservoir of an accident at STNP. (**0002-17** [Sinkin, Lanny])

Comment: The ER analyzes likely dosages to the population and resulting from moderate or severe accidents. It predictable finds that all resulting dosages meet NRC requirements and guidelines. What is lacking, however, is any analysis of the potential health effect impacts of STP 3 and 4 in combination with STP 1 and 2. (**0003-45** [Reed, Cyrus])

Comment: While I understand that the proposed ABWR is safer than the Chernobyl reactor, it is possible that there could be a meltdown at STP leading to a massive explosion causing a similar nuclear catastrophe. I would like the EIS to show what would happen to the people living in Houston, as well as those who live even closer. How many would die of severe radiation poisoning? A million? How many thousands of square miles of agricultural land would have to be abandoned for years to come? Also what about those living in San Antonio, the tenth largest city in the U.S. What about Austin,TX? As a U.S. citizen, I think an EIS should make these calculations and let the public know. (**0005-4** [Payne, Cameron])

Comment: The things I want to see more concern with in the environmental review, in the -- and since this is a scoping hearing, let me say this, you have to consider the worst case scenario. What if something like Three Mile Island happens? What will the effects on this area of Texas be? And that's not even the worst accident that's been known to happen. What if something like Chernobyl happens? I want to see the environmental review include the worst case scenario, the absolute worst that could happen. You'll not find one word about that in the current environmental report. (**0007-121** [Singleton, Robert])

Response: *The DEIS for the proposed new reactors will include an evaluation of the risks associated with potential severe accidents including accidents that involve reactor core melts. The evaluation will include estimates of health and economic risks to a distance of 50 mi from exposure to the plume and from exposure to contaminated land and water. These risks will be compared with risks associated with the existing plants. This evaluation will be in the DEIS <Chapter 5> on operational impacts. In addition, the evaluation will include an estimate of the cumulative risk of severe accidents for all units at the STP site. <This evaluation will be in Chapter 7 of the DEIS.> Consistent with the general NEPA philosophy that environmental review under NEPA contain realistic estimates of impacts, the Commission in its Safety Goals policy statement (51 FR 30028, 1986) has adopted the use of mean estimates rather than worst case estimates of accident risks.*

Comment: I would point out in a boiling water -- a boiling water reactor is a very robust design. Loss of that piece of equipment [the cooling tower] does not result in a catastrophic event for a boiling water reactor. (**0008-123** [McBurnett, Mark])

Comment: Nuclear power plants are not safe. Regardless of the safety efforts and record of specific nuclear powers plants, the fact remains that there need be only one accident to have a catastrophic result. Nuclear waste poses a real threat since it is generated throughout all parts of the fuel cycle in these power plants. (**0015-7** [Williams, Mina])

Response: *These comments do not provide new information related to the environmental review. They will not be addressed in the environmental impact statement.*

Comment: LCRA is involved in negotiations with San Antonio to establish long term contracts for interbasin transfers of water. The storage of that water will be in a large open reservoir. The EIS should examine the potential impact on the proposed reservoir of an accident at STNP. (**0002-17** [Sinkin, Lanny])

Response: *The environmental impact statement for the proposed new reactors will include an evaluation of the risks associated with potential severe accidents including accidents that involve reactor core melts. The evaluation will include estimates of health and economic risks to a distance of 50 mi from exposure to the plume and from exposure to contaminated land and water. These risks will be compared with risks associated with the existing units. This evaluation will be in the DEIS <Chapter 5> on operational impacts. In addition, the evaluation will include an estimate of the cumulative risk of severe accidents for all units at the STP site. <This evaluation will be in Chapter 7 of the DEIS.> Consistent with the general NEPA philosophy that environmental review under NEPA contain realistic estimates of impacts, the Commission in its Safety Goals policy statement (51 FR 30028, 1986) has adopted the use of mean estimates rather than worst case estimates of accident risks.*

Comment: The National Environmental Policy Act (NEPA) require that plausible statements as to the prospective environmental impacts be disclosed in advance. Any Environmental Impact Statement that did not raise the twin specters of nuclear core meltdown and a meltdown in a spent nuclear fuel pool is inadequate, and should be challenged in court. (**0005-3** [Payne, Cameron])

Comment: Possibly even worse than a reactor core meltdown would be a meltdown in one of the spent nuclear fuel pools. Please give us the effects of that. (**0005-5** [Payne, Cameron])

Response: *The environmental impact statement for the proposed new reactors will include an evaluation of the risks associated with potential severe accidents including accidents that involve reactor core melts. The probability of simultaneous reactor accident involving a core melt and a spent fuel pool accident involving a fire is too low to be plausible. Therefore, the environmental impact statement will not address the consequences of simultaneous severe reactor accidents and fuel fires in the spent fuel pool.*

D.2.16 Uranium Fuel Cycle

Comment: The EIS should examine the likelihood that a solution to the high level waste disposal issue will be forthcoming any time in the near future and the consequences for STNP, such as indefinite on-site storage, if such a solution is not forthcoming. (**0002-22** [Sinkin, Lanny])

Comment: The ER is short on details on how the proposed plant will deal with thousands of curies and tons of low-level and high-level waste to be generated by the plant. Radioactive waste management in the U.S. has been and continues to be nightmarish and difficult. (**0003-35** [Reed, Cyrus])

Comment: There are now only three facilities which are taking low-level waste from nuclear plants in the States of South Carolina, Utah and Washington. However, none of the three will currently take all types of low-level radioactive waste from Texas power plants. Thus, the [EIS] must address how much of which kinds of low-level radioactive waste will go to which facilities must be addressed. In addition, because there is the real possibility that no facility will be found in the short-term for the most radioactive of low-level rad waste, an EIS must address the possibility and impacts of permanent disposal of low-level rad waste on-site. (**0003-36** [Reed, Cyrus])

Comment: If the ER fails to adequately assess the generation, storage and disposal of low-level waste, the oversights in terms of high level radioactive waste are much greater. First of all, the ER assesses the transport of spent fuel (high level waste) to a depository, using Yucca Mountain as an example. Yet both the NRC and NRG know that even if Yucca Mountain were to open sometime in the first years of operation of STP No. 3 and 4, storage of spent fuel would be taken up by existing nuclear plants. There has yet to be, and does not appear to be any resolution of the question of how to dispose of high level radioactive waste. (**0003-37** [Reed, Cyrus])

Comment: I think it's irresponsible to be considering permitting new reactors when we have yet to permit or identify a viable site to dispose of the waste. (**0007-109** [Cushing, Lara])

Comment: Even assuming that that worst case doesn't happen, you still have one non -- one problem that there is no good solution for. And that is what you're going to do with nuclear waste. I don't believe the time frame. I think it should be longer. But the federal government says we're going to have to store high-level waste for 10,000 years, that we're going to have to protect for 10,000 years. (**0007-124** [Singleton, Robert])

Comment: I assure you we have the capability at South Texas to store nuclear waste. We have the capability to store all the waste, the high-level waste out of Units 1 and 2 through 2028. We have the capability for 10 years of storage in the new advanced boiling water reactor design, and there are technologies to allow us to develop storage that goes much beyond that, and basically we can store it as long as we need to, until the federal government fulfills their contact and takes possession of that spent fuel and ultimately disposes of it. Ten thousand years? Not 10,000 years. That fuel becomes less radioactive than what we dug out of the ground originally in a few hundred years. But, yes. (**0007-140** [McBurnett, Mark])

Comment: What about wastes? The whole community of -- the whole question about the plant being permitted is dependant upon your ability to dispose of wastes. ... And we do not yet have a licensed and operating low-level radioactive waste disposal site, which means that the disposal, up until we get those things permitted, if we ever do, is here in this community. (**0007-22** [Smith, Tom])

Comment: With a nuclear power plant, the waste issue has not been solved. Yucca Mountain has been cutting back the workers to 15 now. And to bring more of this into the community is putting the community at risk. (**0007-31** [Hadden, Karen])

Comment: A third issue is radioactive waste. It's the big bugaboo in the room, nobody likes to talk about it. But the fact is, you know, for 50 years we've been talking about how we're going to deal with radioactive waste. We still haven't dealt with it. We still don't have a final repository for radioactive waste. (**0007-51** [Reed, Cyrus])

Comment: I saw some discussion about, you know, the transportation of the spent fuel rods to a final repository, and about the amount of space you would have at STP 3 and 4 to have these spent fuel rods. But I didn't see the contingency. What happens if we never -- you know, what happens if we are never able to locate a place to put all this waste? Does it just sit there forever? Do you have the capacity? (**0007-52** [Reed, Cyrus])

Comment: Similarly with low-level rad waste, you know, there are currently only three sites that are taking it, one of the which, Barnwell, has now said they're not going to take it. We haven't yet had the Andrews County site open up. Where is the contingency in here for what to do with that waste? (**0007-54** [Reed, Cyrus])

Comment: [I]n the 50 years of the nuclear industry we have yet to identify a safe way to dispose of the waste. And that is an environmental impact of the South Texas Project. High-level radioactive waste stays deadly for tens of thousands of years. And it's a real engineering challenge to think of how to contain such a thing on such a geological time scale. So I think that the NRC needs to consider all of those impacts in the environmental scope of their review. And it's a real engineering challenge to think of how to contain such a thing on such a geological time scale. So I think that the NRC needs to consider all of those impacts in the environmental scope of their review. (**0007-95** [Acevedo, NK])

Comment: Yes, we [STP] generate high level nuclear waste. We know how to store it. We store it safely. We have the capability to store it safely for as long as we need to store it. Ultimately the federal -- we have a contract with the federal government to take possession of that material and dispose of it. Until they do so, we'll store it and continue to do so in a safe manner. I want point out our waste is not in a tin building; it is a concrete building. (**0008-114** [McBurnett, Mark])

Comment: And right now we've got a crisis because the scientific process that we're looking to manage the nuclear waste South Texas 1 and 2, 3 and 4, the 104 operating reactors around the country -- right now there's only one site that's being looked at. And that's in Yucca Mountain, Nevada. And the issue is is that if this were a scientific process you would be looking at least

three sites. And you would be looking -- likely you would be looking at Deaf Smith County, Texas, as one of those other sites. And it wasn't until 1987 that Deaf Smith County, Texas, was taken off of the list and Yucca Mountain, Nevada, was the only one that was left. (**0008-43** [Gunter, Paul])

Comment: Now, the issue is is that we believe and -- that you should be able to raise this issue of nuclear waste within the context of building more reactors. But currently -- the current NRC process says that we are not allowed to raise that because of what they call the nuclear waste confidence decision. And that decision was made by rule-making with the U.S. Nuclear Regulatory Commission that said someday somewhere somebody somehow is going to figure out what to do with, you know, right now 55,000 metric tons. You add more reactors -- it's going to be up to 100,000 metric tons, 120,000 metric tons. And right now the only place we're looking at is to send it off to a seismologically and volcanically active area. And it's not for sure that it's going to happen. Right now the Yucca Mountain process is alling apart. And, in fact, there is no confidence. (**0008-44** [Acevedo, NK])

Comment: How can the generation of waste which we still do not know how to safely store be justified? (**0009-4** [Lindsey, Joy])

Comment: No high or low level site has yet been permitted Recognizing that generating nuclear energy produces tons of high and low-level radioactive waste that remains dangerous to living systems for tens of thousands of years, and radioactive and toxic waste is produced at every stage of the fuel cycle, including plant operations, the EIS should address waste issues thoroughly. (**0010-19** [Public Citizen, Texas Office] [Smith, Tom])

Comment: There is still no ways to safely store nuclear waste for the millions of years during which it will remain radioactive. (**0012-5** [Edwards, Nancy])

Comment: Nuclear power plants are not a clean energy source and they are not long-lived. Radioactive waste remains dangerous to human health for thousands of years, and no country in the world has found a solution for disposing of it. (Public Citizen April 2006). These plants have a life span of only 30-40 years, after which they must be upgraded at huge costs or decommissioned, leaving the site contaminated for thousands ofyears. (Southwest Workers' Union October 25, 2007). (**0015-2** [Williams, Mina])

Comment: It has also long been common knowledge that there are health and safety concerns associated with the production of nuclear power. We all know there are huge quantities of nuclear waste produced for which there is no satisfactory storage solution, and there are documented accidents resulting in contamination due to leakages. (**0017-3** [Scheurich, Venice])

Response: *Onsite storage and offsite disposal of spent nuclear fuel are Category 1 issues. The safety and environmental effects of long-term storage of spent fuel on site has been evaluated by the NRC and, as set forth in the Waste Confidence Rule at 10 CFR 51.23, the NRC generically determined that "if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the*

licensed life for operation . . . of that reactor at its spent fuel storage basin or at either onsite of offsite independent spent fuel installations. Further, the Commission believes there is reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century and sufficient repository capacity will be available within 30 years beyond the licensed life for operation of any reactor to dispose of the commercial high-level waste and spent fuel originating in any such reactor and generated up to that time." The comment provides no new significant information, and, therefore, will not be evaluated further.

Comment: The low level waste analysis should examine the likelihood of off-site storage being available for such waste. (**0002-24** [Sinkin, Lanny])

Response: *Radiological wastes will be addressed in Chapter 6 of the EIS.*

Comment: Waste produced from uranium mining, including tailings, is another waste which should be included in the analysis. (**0002-27** [Sinkin, Lanny])

Comment: Chapter 10 of the Environmental Report does not discuss the land that will likely be used to mine, process, enrich and fabricate uranium fuels, and the waste and air emissions that are generated in that process, nor does it discuss the long-term implications of the low-level and high-level waste generated by the operations of the plants, including their potential impact on water resources and human health. (**0003-23** [Reed, Cyrus])

Comment: [T]here is no discussion of where uranium is likely to be mined as a result of the potential additional nuclear plants. Thus, while the ER suggests that uranium is a resource that is mainly imported and that the uranium mining industry in the U.S. has been depressed in recent years, the Sierra Club notes in Texas, there are currently 19 exploratory permits for uranium mining that have been granted or are being processed by the Railroad Commission of Texas since mid-2006, that four uranium mines are currently operating in Kleberg and Duval Counties, and that two new applications are being processed by the Texas Commission on Environmental Quality for mines in Duval and Goliad Counties. The EIS should assess different scenarios and the likely impacts, including in South Texas on water resources and health impacts. (**0003-42** [Reed, Cyrus])

Comment: If NRC is to license a new nuclear plant, it must be based on the impacts from the whole uranium cycle that will result. For 50 years, nuclear power has been presented as a clean energy source, even as communities at Three Mile Island, Pennsylvania in West Valley, New York, in Sheffield, Illinois, Hanford, Washington, Barnwell and a myriad of other locations were impacted from the generation and waste disposal, in some cases leading to deaths. Any EIS must address the full impacts so more communities do not suffer. (**0003-43** [Reed, Cyrus])

Comment: And then the source of uranium. We all think that the uranium will probably come from someplace else, and most of it will, but here in Texas we have a number of communities, particularly those around Karnes City and Kingsville where we have significant impact already to ground water as a result of uranium mining. We're about ready to get into another round of

uranium mining in Goliad and Duval Counties. And the impact of the uranium extraction on those communities typically means that ground water is no longer safe. (**0007-26** [Smith, Tom])

Comment: And then also you have ... high-grade and low-grade uranium, so once you finish with the high-grade, when you enrich it you have to use energy to do that. So when you use low ...the low-level one, you have to use more energy just to get it so it could be used at the nuclear reactor plants. (**0007-83** [Lopez, Diana])

Comment: While it's true that nuclear power plants don't emit carbon dioxide, one of the principle ingredients fueling global warming, the mining of uranium to fuel these plants is anything but clean. I'd ask all of you to consider the indirect costs associated with uranium mining. It's a nasty business that can pollute aquifers, and taint drinking water and irrigation for nearby residents. (**0007-86** [Castro, Geoffrey])

Comment: Mining and enriching uranium results in radioactive contamination of the environment and risks to public health. Exposure to radon has been shown to cause kidney failure, chronic lung disease, and tumors for the brain, bone, lung, and nasal passage. The EIS needs to assess the impact of uranium mining in the regions from where STP 3 and 4 will derive its fuel. (**0010-23** [Public Citizen, Texas Office] [Smith, Tom])

Response: *Impacts from the uranium fuel cycle have been tabulated in 10 CFR 51.51 Table S-3, which is used as the basis for evaluating the contribution of the environmental effects of uranium mining and milling to the environmental costs of licensing the nuclear power reactor. Associated effects also discussed in the noted CFR include the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low-level wastes and high-level wastes related to uranium fuel-cycle activities. Health effects from normal plant operation will be addressed in Chapter 5.*

Comment: An EIS must assess the much more likely scenario that radioactive waste will be stored on-site well.... Forever. That assessment must include an assessment of any potential leaks, accidents or gases escaping from the containment zone. (**0003-38** [Reed, Cyrus])

Response: *Radiological waste will be discussed in Chapter 6 and accidents will be discussed in Chapter 7 of the EIS.*

Comment: In the economics analysis, the EIS should consider the burden on the public treasury potentially created by Units 3 and 4. For example, the Federal Government is already ten years behind in its promise to establish a long term repository for high level nuclear waste and remove such wastes from existing nuclear power sites. Based on that failure to perform, the Federal Government is having to pay for on site storage, amounting to billions of dollars. This expense is discussed in "As Nuclear Waste Languishes, Expense to U.S. Rises," New York Times, February 17, 2008. (**0004-2** [Sinkin, Lanny])

Response: *NRC regulation (10 CFR 50.75) requires the establishment of a decommissioning trust fund. Sufficient funds are required to be collected and placed in a secure trust that would assure decommissioning, including the disposal of low-level waste. Funds are also collected from licensees annually to defray costs associated with the ultimate disposal of high-level waste.*

Comment: It's mentioned in the application that you currently send it (low-level waste) to several locations. It seems like more detail would be needed so that we, the public, can be sure that this rad waste, both low-level and high waste, is taken care of. (**0007-55** [Reed, Cyrus])

Comment: I am concerned about the waste issues, and I am concerned about Matagorda County being essentially set up as a permanent radioactive waste site because there doesn't seem to be a solution for that one. (**0007-91** [Dancer, Susan])

Response: *Radiological wastes will be addressed in Chapter 6 of the EIS.*

Comment: [W]here is that uranium going to come from? We have at the Railroad Commission now 19 new exploratory permits for a uranium mine. To make the nuclear power plant you need uranium, uranium mining can have some environmental impacts here in Texas. So how are we going to make that if -- where that uranium's coming from, and what the total fuel cycle impacts are going to be. (**0007-57** [Reed, Cyrus])

Response: *The NRC staff evaluated the environmental impacts of the uranium fuel cycle including the impacts of fuel manufacturing, transportation, and the onsite storage and eventual disposal of spent fuel. The staff's evaluation accounts for the Commission's "Waste Confidence" decision embodied in 10 CFR 51.23 to the extent that decision applies to such impacts. The comment does not provide new information and will not be evaluated further.*

Comment: If you're looking at the enriching of uranium, you have to do -- and you have to do that at coal burning power plants as well. You know, so, one, maybe when it gets to the nuclear reactor here the pollution is not being produced, but every step of that process there's pollution that's impacting people, and once it arrives here at the South Texas Nuclear Project, then there's a huge question of radioactive waste which we have nowhere to put. (**0007-67** [Rendon, Genaro])

Response: *Impacts from the uranium fuel cycle have been tabulated in 10 CFR 51.51 Table S-3, which is used as the basis for evaluating the contribution of the environmental effects of uranium mining and milling to the environmental costs of licensing the nuclear power reactor. Associated effects also discussed in the noted CFR include the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low-level wastes and high-level wastes related to uranium fuel cycle activities. Radiological wastes will be addressed in Chapter 6 of the EIS.*

Comment: I'm not going to presume to tell you what's best for your community, I am going to talk in solidarity with the communities that are facing the impacts of uranium mining. Eighty percent comes from overseas. Most of those places don't even have environmental or worker protections. (**0007-107** [Cushing, Lara])

Comment: The most radical nuclear people will admit that something is going to come along that's going to be cleaner and safer and better, and that eventually -- well, we're still going to be storing the waste from this 50 years or 100 years of nuclear power and have to safeguard it. What language are we going to put on the warnings to people from the nuclear waste and have any guarantee that it's going to be spoken 10,000 years from now? (**0007-125** [Singleton, Robert])

Comment: Interestingly enough, nuclear reactors remove radiation from the environment. This is probably going to come as a startling little fact for you, but think about this. The isotopes that you put in the reactor are long-lived isotopes -- radioactive isotopes. Reactors convert them to short-lived radioactive isotopes that die off much more quickly. When you're through at the end of the day, there is a lower radiation load on the environment because of the presence of nuclear reactors. (**0008-103** [Dykes, Ed])

Comment: In terms of going forward in the years to come, obviously we have much to do in the area of disposing of the high level nuclear waste. ... but it's not something we should delay going forward with new construction and wait 20 or 25 years till the technology is developed. We should do it in parallel. (**0008-111** [McCormick, Mr.])

Response: *These comments do not provide new information relevant to the environmental impact analysis and therefore will not be evaluated further.*

D.2.17 Transportation

Comment: Transportation, how will the materials and the waste come in and out of this community? (**0007-24** [Smith, Tom])

Comment: [F]or us in San Antonio, this also raises other dangers. In 2004 we had 21 derailments in our city, 21 derailments that killed five people; one of them spilling chlorine gas in the community killing four people instantly. So how is this [uranium] being transported? Is it going to be coming through our backyards, of which -- you know, we want to make a clear statement that we would not, and do not, want this type of deadly waste passing through people's backyards. And it's literally passing through people's backyards when you look at the train system in the City of San Antonio. (**0007-65** [Rendon, Genaro])

Comment: [H]ow is the fuel going to be transported into this community? How is waste -- if they ever find a place to put the waste, how is going to be transported out of this community? What we found out in San Antonio after 21 derailments, major derailments, occurred in 2004 is that you can't get any of that information. You can't find out the routes that they're taking. They

won't tell you what's on those trains, and there's no way to know that. So how can we possibly evaluation the risk to our communities when we don't even know where this stuff is going to be transported through, and how to protect it? (**0007-94** [Cushing, Lara])

Response: *The environmental impacts of transporting fuel and waste to and from the STP site will be evaluated, and the results of the analysis will be presented in Chapter 6 of the EIS. The transportation of radioactive material to and from the STP site, including unirradiated fuel, spent fuel, and radioactive waste, will be conducted in accordance with Federal regulations. The U.S. Nuclear Regulatory Commission (NRC) and Department of Transportation (DOT) are the lead Federal agencies in charge regulating the safety of shipments of radioactive materials. The NRC establishes requirements for the design and manufacture of packages for radioactive materials (10 CFR 71, Packaging and Transportation of Radioactive Materials). The Department of Transportation regulates the shipments while they are in transit, and sets standards for labeling and smaller quantity packages (Title 49, Transportation, U.S. Code of Federal Regulations).*

D.2.18 Decommissioning

Comment: Additional radioactive waste is produced in terms of the irradiated structures and equipment in the nuclear plant. A comprehensive examination of the likely method of decommissioning should also be part of the EIS. (**0002-26** [Sinkin, Lanny])

Response: *Decommissioning will be discussed in Chapter 5. The environmental impact from decommissioning a permanently shutdown commercial nuclear power reactor is discussed in Supplement 1 to NUREG-0586, Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, which was published in 2002. For most environmental issues, the impact from decommissioning activities is considered small.*

D.2.19 Cumulative Impacts

Comment: And very important when we're looking and talking about the environmental impact statement, is that we also take into effect, into consideration, the cumulative impacts that folks have to deal with when we talk about pollution, when we talk about environmental contamination. ...And if you look at the Gulf Coast of Texas, it's littered with chemical plants, it's littered as well with refineries and ports, and huge inland ports as well that are situated for ships to be able to come in. So if we're looking at ourselves here and in San Antonio, what is the whole of the impact that we've being exposed to? (**0007-62** [Rendon, Genaro])

Comment: [I]f we look at the State of Texas, we rank number seven amongst countries in pollution. As one state, we're surpassing what countries are producing in pollution. So we have to be looking at reducing that amount of pollution here within the State of Texas, reducing the impacts that communities are feeling by living around these polluting industries. (**0007-63** [Rendon, Genaro])

Response: *NEPA requires the analysis of cumulative impacts in an environmental impact statement. The cumulative impacts associated with the construction and operation of the proposed Units 3 and 4 will be evaluated and the results of this analysis will be presented in Chapter 7 of the EIS.*

Comment: [T]he analysis of the Matagorda [STP] site never acknowledges or assesses the degree to which siting a new nuclear plant next to an existing plant might present potential problems. Thus, what might the impact of a leak or problem at the existing STP No. 1 and 2 present during the construction or operation of No. [3] and 4? Could a problem at the new plant lead to a shut down or problem with the existing plants? (**0003-21** [Reed, Cyrus])

Comment: Is there an environmental impact by placing so much power, and so much waste in the same physical location, subject to an increased likelihood that a natural, operational or terrorist attack could have an even larger impact than if a nuclear plant were to be located, for example, at the site in Limestone County? Is it safer, in other words, to separate an aging and new plant? (**0003-22** [Reed, Cyrus])

Comment: When you consider that this plant would be -- if it goes through -- having construction right next door to an operating nuclear plant, you're introducing circumstances that haven't been seen before. (**0007-32** [Hadden, Karen])

Comment: I think that FEMA should be present for a safety hearing and the Department of Homeland Security. And I would like to hear how all of those agencies are, in fact, working together to assure safety. This is no small thing to have a construction site next to an operating nuclear plant. It deserves close scrutiny. (**0008-54** [Hadden, Karen])

Comment: We did not see anything that had to do with coincidental unit problems. If we have a problem on Unit 1 and 2 during construction on 3 and 4 what's going to happen about that? If we have a problem on 3 and 4 during the operation of Unit 1 and 2 and it affects Unit 1 and 2, what will happen with that? This works very strongly in things like low-pressure turbines coming apart. They just rebuilt the low-pressure turbines. Why? They obviously weren't really happy with its performance at that point, and that was done as a preventive measure. (**0008-67** [Wagner, William])

Response: *These comments address issues related to co-location of two or more nuclear power plants. Several aspects of these issues will be addressed in the DEIS. The DEIS will address the doses to construction workers from the existing units, and from Unit 3 after it starts operation. The DEIS will also address cumulative radiological impacts of normal operation and cumulative risks of severe accidents. Other aspects of these issues, which are addressed in the emergency plan that has been submitted as part of the application, are out of the scope of the environmental review and will not be addressed in the DEIS.*

D.2.20 Need for Power

Comment: Chapter 8 - the need for power - analyzes Texas-based information about the need for additional power in ERCOT, which covers the majority of Texas. While Sierra Club does not object to the use of ERCOT reports cited on 8.4-6 or 8.4-7, we would note the list is incomplete because it does not list reports which discuss other scenarios for the growth in overall and peak summer demand. Because we believe that ERCOT's evaluation of power needs in Texas in itself is incomplete, we would suggest that the EIS conduct a much more balanced full-scale independent analysis. Specifically, the ERCOT evaluations cited by the applicant do not take into account significant regulatory and statutory changes which will increase the use of load demand management and energy efficiency as a result of legislative action taken in 2007 [i.e. HB3693]. [I]t is quite likely that the future of peak and load demand will look quite differently then that presented by the applicant. (**0003-9** [Reed, Cyrus])

Response: *The determination for the need for power within a given area is not under the NRC's regulatory purview. When another agency has the regulatory authority over an issue, NRC defers to that agency's decision. The NRC staff reviews the need for power analysis to determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found to be acceptable, no additional independent review by the NRC is needed.*

Comment: In addition to these legislative and regulatory changes that will affect the need for power, several studies have come out over the last 18 months which should be assessed, as they present alternative demand scenarios based on the use of increased renewable energy, increased efficiency and increased demand response programs. (**0003-10** [Reed, Cyrus])

Comment: NRG and CPS base their need for the plant on forecasts from ERCOT that may overstate the need for power, and therefore the need for STP 3 and 4. Indeed, it should be remembered at the end of 2006, ERCOT was stating that generation capacity would fall below the required reserve capacity of 12.5 percent potentially by 2008, only to later reassess this projection based on a smaller demand as well as the opening of several gas plants. The ER states that by 2016 ERCOT projects there will be a need for between 20,000 and 50,000 MWe, and that the capacity of STP 3 and 4 - as well as many other generation sources - are therefore needed. (**0003-13** [Reed, Cyrus])

Comment: ER Chapter 9 states "NRG anticipates it would not be able to provide competitively priced power if it had to retain an extensive conservation and load modification incentive program" and further implies that demand management is not a form of baseload power. Nevertheless, this two paragraph analysis is not a true analysis of the potential for baseload demand management to provide power or make up for the need for additional power. The analysis of the ability of peak demand plants to replace baseload plants is superficial and does not incorporate the ability of different plants to be used in combination to provide power, such as the conjunctive use of solar, wind and natural gas as a way to provide power through peaking plants operating at different times of the day. (**0003-17** [Reed, Cyrus])

Comment: NRG has to prove there is a need for new energy. Their assessment of need is based on ERCOT projections of future energy demand in Texas. But, 1. The application ignores the effect energy efficiency and renewable energy will have in the future on demand. 2. Recent studies have shown that we could meet between 75-100% of Texas's growth in demand using efficiency and renewable energy ("Role of Energy Efficiency and Onsite Renewables in Meeting Energy and Environmental Needs in the Dallas/Fort Worth and Houston/Galveston Metro Areas". R. Neal Elliott and Maggie Eldridge. American Council for an Energy-Efficient Economy, September 2007 Report Number E078; (**0010-20** [Public Citizen, Texas Office] [Smith, Tom])

Comment: Federal and state-mandated energy efficiency and renewable energy goals do not appear to be factored into the energy needs assessment. The EPACT of 2007 mandated a ban on incandescent bulbs, increased air conditioning efficiency standards and standards of other appliances, and other efficiency reductions that are not counted in NRG's analysis of need. Nor are the provisions of HB 3693, passed by the Texas Legislature in 2007, factored into the energy needs assessment. The bill doubled the goal of the state of reducing by 10% per year the growth in demand for electricity to a minimum of 20%. A study completed during licensing period showed efficiency may result in as much as 50% of the growth in demand. (**0010-21** [Public Citizen, Texas Office] [Smith, Tom])

Comment: As to CPS's need for power the analysis contains an interesting logical flaw. It claims that an analysis of need is required for traditional utilities, such as CPS, but not for merchant companies such as NRG. It then further claims that since CPS has sold power at wholesale, and will continue to do so in the future, it does not have to do a needs analysis. This logic is imperfect. CPS is a municipal utility, and has not opted into competition, and is limited to incidental sales to customers beyond its traditional service area, so it should have completed a need for power analysis. CPS ignores the study done by KEMA in 2004 for CPS San Antonio that shows that over 1220 MW of baseload savings could be obtained at costs less than 2 cents per kilowatt hour (pg 3.1) or far less than the 6.5 cents per kilowatt than the cost of building and operating the plant. (**0010-22** [Public Citizen, Texas Office] [Smith, Tom])

Response: *Affected states or regions may prepare a need for power evaluation and assessment of the regional power system for planning or regulatory purposes. A need for power analysis may also be prepared by a regulated utility and submitted to a regulatory authority, such as a state public utility commission. However, the data may be supplemented by information from other sources. The determination for the need for power is not under NRC's regulatory purview. When another agency has the regulatory authority over an issue, NRC defers to that agency's decision. The NRC staff will review the need for power and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found to be acceptable, no additional independent review by the NRC is needed. The information provided in this comment will be considered to determine whether it significantly affects the forecast on which the applicant relied for its need for power analysis.*

Comment: Sierra Club believes that an EIS must more independently assess these claims [need for power], and also assess other projects currently being planned in Texas, including new wind generation, plans for solar plants, energy efficiency and demand response program, coal plants and new natural gas plants. (**0003-14** [Reed, Cyrus])

Comment: Our assessment, and along with the Energy Reliability Council of Texas basically says we need power, we need generation, we need new generation on line and we need to retire old units that are in operation, we need new power generation in Texas, we need new base load generation in Texas. (**0007-138** [McBurnett, Mark])

Comment: But the fundamental question is, do we need this plant, and will it be completed on time? And this history of this has not been clear. The last time we tried to build a plant in this community, it took eight years longer than necessary. And what we're seeing here in this particular analysis that has been presented to you all, is that the applicant says we need the plant for baseload. And it's impossible to really utilize other resources like energy efficiency and renewable energy as base load. (**0007-27** [Smith, Tom])

Comment: I wanted to make sure that the NRC is aware that legislation was passed last legislative session... that expands the amount of energy that investor-owned utilities, like NRG, are required to get from energy efficiency programs that all of us, frankly, pay for. And so I wanted to make sure that when you do the analysis of whether this power is needed, that we look at those new requirements on energy efficiency, because I think everyone agrees we can save money for our consumers, and generate more power simply by saving energy. (**0007-43** [Reed, Cyrus])

Comment: The Harris and Galveston County Council of Governments, which is 13 counties, including Matagorda County, recently started last year making plans for an additional 2.5 million people coming to our area by year 2015. That's a footprint of Los Angeles, California, coming on a 13-county area. Matagorda County is going to get its share of those people. We're having to plan for it now. But the main thing is the power that's needed for our state in this area is something we've got to work on. (**0008-19** [Morton, Joe])

Comment: I want to congratulate CPS Energy for their forward-looking windtricity and conservation programs. We've heard this afternoon people talk that we need a mix of conservation, energy saving, renewal resources, and CPS Energy is providing that to us in the San Antonio area. ...But even with this, even with the rest of the citizens doing this in San Antonio, I don't think this is surely enough to meet the future needs of electricity in San Antonio and south Texas. (**0008-25** [Kale, Stephen])

Comment: Secondly, the governments of San Antonio and Bexar County are on record that they desire -- strongly desire continued economic growth in the city -- in Bexar County and in the city. CPS Energy has determined that timely additional electrical generation capacity is required for this growth in south Texas. So I submit that the proposed action and alternatives must be able to meet these requirements. (**0008-27** [Kale, Stephen])

Comment: It has not been shown that there is a need for this expansion. (**0009-3** [Lindsey, Joy])

Comment: The governments of San Antonio and Bexar County are on record that they desire continued economic growth for the City and the County. CPS Energy has determined that timely additional electricity generation capacity ls required for economic growth in South Texas. The proposed action and alternatives must be able to meet these requirements. (**0014-2** [Kale, Stephen])

Response: *Affected states or regions may prepare a Need for Power evaluation and assessment of the regional power system for planning or regulatory purposes. A Need for Power analysis may also be prepared by a regulated utility and submitted to a regulatory authority, such as a State Public Utility Commission. However, the data may be supplemented by information from other sources. The determination for the need for power is not under NRC's regulatory purview. When another agency has the regulatory authority over an issue, NRC defers to that agency's decision. The NRC staff will review the Need for Power and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the Need for Power evaluation is found to be acceptable, no additional independent review by the NRC is needed.*

D.2.21 Alternatives - Energy

Comment: The global climate change question discussed above obviously calls into question using any fossil fuel central generators as an alternative. There are numerous other alternatives, however, that are safe and far more benign environmentally. (**0002-29** [Sinkin, Lanny])

Response: *The EIS will be prepared in accordance with 10 CFR 51.75(c). Alternative energy sources will be considered in the EIS and the potential global climate change impacts of fossil fuel generation stations will also be addressed.*

Comment: One of the applicants, CPSEnergy, has reclassified energy conservation as power generation. This essentially treats energy conservation approaches the same as baseload. (**0002-30** [Sinkin, Lanny])

Comment: The alternatives analysis should examine at least the following: 1. Energy efficiency and conservation, such as a. changing building codes that are leading to more energy efficient buildings, b. retrofitting of existing buildings that is lowering their energy consumption c. the redesign of appliances that is leading to replacing older units with more energy efficient units d. the "small is beautiful" alternatives, such as solar powered attic fans e. existing studies by utilities in the service area regarding possible reduction of energy demand through conservation and efficiency. (**0002-33** [Sinkin, Lanny])

Comment: [B]ecause CPS is an applicant, their own study, which shows the potential to economically obtain 1,220 MW of Demand Savings and Technically 1,935 MWs by 2014 alone through a suite of energy efficiency measures - approximately the energy output of one of the units and approximately 40 % of the total capacity of both plants - this ability to obtain the power

they say they need through a cheaper and more alternative must be assessed as part of the EIS. (**0003-11** [Reed, Cyrus])

Comment: A CPS commissioned study, this was mentioned before, the CIMA report, concluded that 1200 megawatts of energy could be saved through stronger building codes and retrofitting programs. That's 80 percent of the half of STP reactors 3 and 4 energy that we are going to be supposedly getting. And that report is nowhere mentioned in this environmental report. So this STP application needs to include a real analysis of alternatives, and all the alternatives for meeting San Antonio's energy needs. (**0007-100** [Cushing, Lara])

Comment: In trying to look through the thousands of pages of this permit application, I realize that the entire scope of the environmental review was based on, and this is a quote, "that the purpose of the project is to sell base-load power on the wholesale market." And the only alternatives to this project that were looked at were alternatives for meeting that mission. But the fact is that that is not CPS Energy's mission. CPS Energy's mission, as a public utility, is to provide for the energy needs of San Antonio, and the other small areas that it covers and serves. (**0007-89** [Acevedo, NK])

Comment: CPS has classified efficiency and conservation measures as a source of generating power. And since it's done that, those need to be given over best analysis in the environmental report. (**0007-90** [Cushing, Lara])

Comment: I believe CPS should be smarter than nuclear power plants, and they believe that we should be the green generation that think about the future and our health, but also the future generations to come. That is why CPS should invest in solar and wind energy. (**0007-98** [Garcia, Sandra])

Comment: CPS's mandate is to serve the energy needs of the greater San Antonio area, and its Strategic Energy Plan identifies energy efficiency as one of its four main tenets. According to its publications, CPS Energy is "so committed to this goal that energy efficiency is treated as a new resource for electrical generation." As such, energy efficiency programs are a directly comparable alternative to the electricity that will be generated from STP 3 & 4 and need to be given full consideration in the EIS. (**0018-3** [Cushing, Lara])

Comment: A 2004 CPS-commissioned study by KEMA Inc. concluded that it was cost effective for CPS to save 1,200 mW through stronger building codes and retrofitting programs, nearly as much as CPS's 1,350 mW share of STP 3 &4's generating capacity, on a comparable if not shorter time scale. Neither this report nor a more recent analysis of efficiency is presented in the permit application. With houses that waste more energy than any other large city in Texas, San Antonio has a huge potential for energy savings from weatherization programs that would contribute to the local economy by lowering family's energy bills and creating "green collar" jobs in San Antonio. (**0018-4** [Cushing, Lara])

Response: *The DEIS will be prepared in accordance with 10 CFR 51.75(c) and will include a discussion of energy alternatives. Energy conservation and efficiency will be discussed as an energy alternative not requiring new generating capacity. Existing conservation programs will also be considered as part of the need for power analysis in Chapter 8 of the DEIS.*

Comment: The alternatives analysis should look at the rate at which alternatives are coming into use and project both what is likely and what is possible. A secondary question to be anwered is: Taking the same funds as will likely be spent on the nuclear plant and investing those funds in direct or subsidized implementation of alternative strategies, could the same amount of energy be saved and/or generated with far less environmental impact? A related question is: Would investment in the alternative technologies buy additional time before new generating capacity would be needed, allowing for still further innovative alternatives and improvements in existing alternatives? (**0002-31** [Sinkin, Lanny])

Comment: Alternative energy, such as a. major breakthroughs in solar energy that are lowering the per watt cost to a level competitive with other sources b. new developments in storage which would permit solar and wind energy to be included as base load plants c. scenarios in which solar, wind, biomass and other sources provide most of the baseload with the available natural gas plants filling in as needed. d. wind energy potential, acknowledging that some environmental impacts, such as the impact on birds, must be addressed e. wave energy f. temperature differential energy extraction (ocean) g. biomass as baseload h. previously suppressed technology, such as Tesla coils This list is far from comprehensive. (**0002-34** [Sinkin, Lanny])

Comment: The most obvious irreversible and irretrievable commitment of resources is the money that will be spent on building the nuclear plants that will not be available for implementation of alternative energy strategies. Once begun, nuclear power plants will demand continuing investment and can be expected to absorb a far higher level than presented when the project is being sold to the utility and public. The analysis of this irreversible and irretrievable commitment of financial resources should evaluate the impact of that commitment on the ability to pursue implementation of alternative energy strategies, such as conservation, efficiency, solar, wind, and biomass. (**0002-36** [Sinkin, Lanny])

Comment: [A]n EIS should not only assess the “no action”, “building nuclear plant at Bay City” or “building it somewhere else,” but assess other projects that NRG and CPS could be pursuing to meet their need to sell wholesale power in the first case, and meet the energy demands of its residents in the second. [T]he 2004 KEMA study commissioned by CPS sets out an alternative path for meeting the 40 percent of the plant that CPS has announced they are seeking a COL for. This should be assessed as part of an EIS. (**0003-15** [Reed, Cyrus])

Comment: If CPS Energy could achieve a better, more cost-effective and environmentally-more-friendly alternative to the proposed nuclear plant, then the EIS should examine that possibility. (**0003-5** [Reed, Cyrus])

Comment: A coal fire power plant spits out more than four times as much radiation as the average nuclear plant does because of contaminants in the coal. In fact, you could generate more power from coal by removing uranium from it and thorium and burning it in nuclear power plants. There's less environmental damage. The EPA estimates that 30,000 Americans die prematurely every year from the effluent from coal-fired power plants. (**0008-104** [Dykes, Ed])

Response: *The no-action alternative, as well as, alternative energy sources will be considered in the EIS. The analysis of alternatives in the EIS will be conducted in accordance with Section 102 of the National Environmental Policy Act and 10 CFR 51.75(c).*

Comment: [E]ach application must be carefully reviewed, and all alternatives to the siting of the plants and indeed to nuclear power itself must be considered as part of the EIS process. (**0003-2** [Reed, Cyrus])

Response: *NRC staff carefully reviews each application it receives by utilizing an acceptance review process to ensure all required components are provided by the applicant. Each application then receives additional scrutiny during the safety and environmental review processes. Examining alternative energy sources and alternative sites is a function of the environmental review process and these topics will be discussed in the EIS.*

Comment: In the case of NRG, nuclear power is not the only option it has as an energy provider. They could - and are - pursuing development of coal plants, but could also be examining demand response and energy efficiency - which because of incentives can earn a provider a profit, on-site and off-site solar, wind, geothermal, biomass and other ways to generate a similar amount of power. (**0003-16** [Reed, Cyrus])

Comment: There is no analysis of energy efficiency programs, and the solar analysis is based upon 2003 estimates of a cost of 0.108 and 0.187 per kilowatt hour, which are well above recently developed solar projects in California and Nevada. Indeed, the City of Austin has been receiving bids for proposed solar off-site plants that are on the low-end of this range, and recent technological improvements forecast lower solar energy costs over the next five years. An EIS must provide a much more extensive analysis of these alternatives than that provided in the ER. (**0003-18** [Reed, Cyrus])

Comment: While Chapter Nine does provide some analysis of coal-fired and natural gas plants, and concludes that they are not preferable to nuclear power because largely of the air quality impacts, such a conclusion does not take into account how that compares with the long-term impacts of uranium mining and radioactive waste. Indeed, there is no real comparison between the three choices other than the conclusion that air quality impacts mean nuclear power is preferable. For example, coal, gas - and the alternatives that are never really considered such as energy efficiency, biomass, solar and wind - or some combination of all - are never assessed for the fact that they do not produce radioactive waste in large quantities. (**0003-19** [Reed, Cyrus])

Comment: In the areas of alternative energy, the EIS should also consider major commitments being made to accelerate the development of alternative, renewable energy. For example, the commitment of Silicon Valley to solar cells is discussed in "Silicon Valley Turns its Face to the Sun" in the New York Times on February 17, 2008. Google intends to spend hundreds of millions of dollars to hire engineers and other experts to develop solar, wind, geothermal, and other renewable resources. Austin Chronicle, February 8, 2008 at 31. (**0004-1** [Sinkin, Lanny])

Comment: Well, let me just say it once again, so it's absolutely clear what we're in favor of. Conservation, renewables and energy efficiency. (**0007-118** [Singleton, Robert])

Comment: I moved to Matagorda County in 1997 and I have lived very peacefully with STP down the road, and I have felt very safe. But my problem is, is that I do have a concern about building more nuclear power plants, as opposed to looking for alternative choices, other green choices. Of course, we have this huge yellow ball in the sky that burns us to death every summer, actually from March until like November, which is an endless source of power. (**0007-132** [Schwank, Eleanor])

Comment: As a matter of fact, yes, we need solar, we need wind, we need conservation, we need nuclear, and we need clean coal. We need all of those to meet our energy demands. Energy is what drives the economy of Texas, it's what drives the economy of the world. It's important, we need to plan for that energy. If we don't, we'll go, as an economy, down the hill. (**0007-139** [McBurnett, Mark])

Comment: Yet there are three studies not referenced in this most recent submission by NRG to you all that have been done in the last several years. One on San Antonio in particular that said we could save more than 1200 megawatts, far more than CPS's share of this plant, if we did energy efficiency at costs less than building this plant. Another by Optimal Energy that said that the state could save 80 percent of the energy -- the growth in demand for energy that this plant is designed to meet. And yet another most recently by AC Triple E indicating that we could save between 75 percent of the growth in demand for energy, and 101 percent of the growth in demand for energy in either the Houston or Dallas areas respectively, by using energy efficiency as our first resource, along with other resources like combined heating and power, and renewable energies. (**0007-28** [Smith, Tom])

Comment: And I also think that if we're going to really analyze the power demands of -- that may be needed by these new plants, we've also got to look at the cities like San Antonio, like Austin, that may be investing in the plant and see -- look at how they meet their energy demands and whether they could be getting their energy in a cheaper, cleaner and faster manner. (**0007-44** [Reed, Cyrus])

Comment: -- let's make sure we look at all the choices. If the choice is this new nuclear plant, or concentrated solar power and efficiency, which really makes the most sense. And I hope, frankly, that NRG and the other investors are looking at all the options that are out there on the table, some of which I think could be used in Matagorda County. (**0007-58** [Reed, Cyrus])

Comment: Now I understand that our energy needs here in Texas are growing. However, there are alternatives to nuclear power here in Texas, which are cleaner, more affordable, and more sustainable ways of powering our needs for the future. Alternatives include energy efficiency, solar power, wind, combined heat and power, and more. In addition, just not too long ago Optimal Energy discovered that 80 percent of our energy needs could be met by these technologies. (**0007-87** [Castro, Geoffrey])

Comment: We can also talk about alternative power and how there's no disposal plant for solar collectors. It might surprise a lot of you to understand that the incredible chemical mix that's in solar panels, including arsenic. The burden on the environment with arsenic, which, by the way, has an infinite half-time -- not a 100,000 years, but infinite. (**0008-105** [Dykes, Ed])

Comment: If you look at the carbon footprint of the life cycle of the nuclear power's life cycle from the mining of the uranium all the way through the disposal of the waste that carbon footprint is the equivalent and the same footprint for solar and for wind and for hydro. (**0008-127** [Shepherd, Joe])

Comment: [T]he land for these reactors [units 3 and 4] exists. Installation of the equivalent capacity [of solar and/or wind alternatives] -- and, again, I think when these alternatives and proposed actions are evaluated they've got to be done on an equivalent basis. So I think that installation of alternatives has got to be the equivocal capacity to what the proposed action for the nuclear plants will be. (**0008-29** [Kale, Stephen])

Comment: I'm thinking primarily of wind and solar [energy alternatives], which would I think require large areas of land -- primarily the agrarian areas -- out in west Texas. I think the EIS needs to determine whether installation of these alternatives -- and I'm thinking about Fort Stockton -- the wind farms out there -- of Big Spring just off of I-20, and if you go up to Sweetwater and over across I-20 to Spider there are hundreds of windmills up there. So the EIS I think needs to evaluate installation of either wind, solar, whatever, and determine if there are any impacts -- primarily impacts on land usage, ecology, wildlife, other natural resources. (**0008-30** [Kale, Stephen])

Comment: And as a third generation Matagorda County resident I understand the concerns and -- that we have about nuclear power. But I also understand the huge drawbacks that we're having today with our continued overuse of fossil energy. We as a county, of course, a state and nation need to look at solar, wind, bio, and, of course, nuclear energy for our future. (**0008-31** [Head, Bobby])

Comment: This area has offshore wind, and there is a small town mayor in west Texas named Sherry Phillips. I heard her say the same things -- that when wind energy came to their community for the first time their kids could come home. They could live and work in the community. They could run cattle underneath the wind turbines. That's a possibility for this community as well. And I urge NRG to seriously consider that path. (**0008-50**)

Comment: Why do we consider such a costly, potentially destructive, and unnecessary project instead of employing more benign solutions such as conservation, wind, and solar? (**0009-7** [Lindsey, Joy])

Comment: I am writing to express my concern about the proposed expansion of the South Texas Nuclear Power plant (Federal Register Vol.72, No. 245/ Friday, December 21, 2007/Notices Page 72775). As a resident of Houston, just to the north of this plant, I would like to know why this expansion has been proposed rather than expansion of our state's enormous potential for wind energy. (**0011-1** [Russell, Nancy])

Comment: Texas needs more non-polluting sources of electricity such as wind and solar. Utilities also should promote energy conservation as a way to avoid new construction of power plants. (**0012-6** [Edwards, Nancy])

Comment: The land for the proposed reactors exists. Installation of the equivalent capacity of solar and/or wind alternatives will require immense areas of agrarian lands in West Texas. The EIS should evaluate whether installation of equivalent capacity of these alternatives would negatively impact land use, ecology. wild life, or other natural resources. (**0014-4** [Kale, Stephen])

Comment: The clear alternative to coal and nuclear power plants is renewables: wind, sun, water, and geothermal. These technologies are on the horizon. Venture capitalists are presently investing in the development of the necessary technology to make these renewable sources of energy practical on a nationwide basis. According to a recent analysis by The National Renewable Energy Laboratory (NREL) - the country's primary research and development facility for renewable technology - "the entire U.S. electricity demand could technically be met by renewable energy resources by 2020. In the longer term, the potential of domestic renewable resources is more than 85 times current U.S. energy use." (**0015-8** [Williams, Mina])

Comment: [A]ccording to the November 5, 2007, U.S. News and World Report cover story, "Power Revolution," one of the most promising renewable energy sources is geothermal, which taps into Earth's steady, reliable warmth. According to this article, recent studies show that techniques developed in the oil industry can be used to release geothermal energy three or more miles underground. (**0015-9** [Williams, Mina])

Comment: We are concerned by the inadequate inclusion of the public in the decision by our public utility CPS Energy to construct two new nuclear reactors at the South Texas project (STP) and the total lack of an assessment of alternative ways to meet San Antonio's energy needs in the Environmental Impact Statement (EIS) as required under the National Environmental Policy Act. As the ratepayers that will finance this project, we have a right to a full and transparent assessment of alternatives. (**0018-1** [Cushing, Lara])

Comment: The EIS needs to include a thorough analysis of alternatives specific to meeting San Antonio's energy needs that includes proactive weatherization and retrofitting programs, stronger building codes, combined heat and power or cogeneration strategies, renewable energy production, and combinations thereof. This analysis needs to receive as much

consideration in terms of technical expertise, time and financial investment as the proposed new nuclear reactors have received. (**0018-5** [Cushing, Lara])

Comment: STP 3 & 4 would be a huge financial investment for San Antonio ratepayers and will with all likelihood greatly overrun initial cost and time projections, preventing CPS from making large scale investments in efficiency and a renewable energy future. We deserve a full analysis of those different futures, free of radioactive waste, the pollution associated with uranium mining and enrichment, weapons proliferation, and the danger to public health and the environment from leaks and accidents at STP, before this project progresses any further. (**0018-6** [Cushing, Lara])

Response: *The EIS will be prepared in accordance with 10 CFR 51.75(c). Alternative energy sources, including energy conservation and renewable energy sources, will be considered in <Chapter 9 of> the EIS.*

D.2.22 Alternatives - System Design

Comment: [T]he large cooling pond you see at South Texas, that 7,000-acre reservoir, is used for cooling the main turbine. It's the main heat sink for the plant as the plant is in operation. Provided in Unit 1 and 2 is a pond for providing for emergency cooling should that be required. Unit 3 and 4 will actually have a cooling tower for emergency cooling for what we call the ultimate heat sink. ... it's not one of these monster hyperbolic towers like you see in all the pictures that one associates with a nuclear plant. These are small towers, more akin to what you see out behind a large commercial building that provided for air conditioning. (**0008-122** [McBurnett, Mark])

Response: *This comment provides some information regarding the cooling system in use for STP Units 1 and 2 and the Ultimate Heat Sink cooling towers proposed for STP Units 3 and 4. No response is needed.*

Comment: They have a giant cooling pond out there. Depending on which part of that COLA you read, they're either going to use cooling towers -- four-strap cooling towers on Units 3 and 4 or they're going to use the cooling pond itself. I'm not sure which one it is. (**0008-73** [Wagner, William])

Comment: Speaking about the cooling link, what part of makeup requirements are going to be for both instances or decide which one you're going to use and tell us that one. (**0008-76** [Wagner, William])

Response: *The Main Cooling Reservoir serves as the heat sink during normal operation of STP Units 1 and 2 and would operate similarly for STP Units 3 and 4. The make-up water for the reservoir is obtained from the Colorado River. The cooling towers for STP Units 3 and 4 would be part of the Ultimate Heat Sink that would provide cooling for safety-related systems and components during normal and accidental conditions. The cooling water required for the Ultimate Heat Sink cooling towers would be stored in basins beneath the towers and make-up water to these basins would be provided by on-site water storage basins that contain 30-day*

supply of make-up water. Make-up water to the on-site water storage basins would be provided by groundwater. A detailed description of the cooling system for STP Units 3 and 4 will be presented in Chapter 3 of the DEIS.

D.2.23 Alternatives - Sites

Comment: The analysis of choosing an alternative site - such as NRG's land owned in Limestone County - concludes that the existing Matagorda County [STP] site is preferable but is based largely on the possibility that additional transmission lines would be needed at the Limestone County site. The analysis seems too simplistic. (**0003-20** [Reed, Cyrus])

Response: *The DEIS <Chapter 9> will include a more detailed analysis of siting the proposed nuclear generating units at alternative sites located within the applicant's region of interest.*

D.2.24 Benefit-Cost Balance

Comment: [B]ecause the City of Austin hired a consultant to study the NRG and CPS proposal and found that the risk of investing in the application process outweighed the benefit because of the potential for the cost of the construction and licensing to exceed the estimates provided by the applicant by $1 billion, this analysis must be included as part of the discussion of alternatives. (**0003-12** [Reed, Cyrus])

Comment: Failure to provide financial information needed for true alternative analysis: the applicant has asked for and the NRC has granted an exemption to disclosing basic financial information about the proposal. Thus, in Chapter 1 of the COL application, tables [1.3-1 through 1.3-9] have been declared proprietary and thus unavailable for public review. The reason that project cost, construction funds, O & M costs and plant performance are an environmental issue is because NEPA requires an analysis of alternatives to the proposed action, and without cost figures and analysis of the construction and O & M costs, it is impossible to know if the energy demand needed could be more cost-effectively be achieved through other means, or with construction of a nuclear plant at another site. (**0003-4** [Reed, Cyrus])

Comment: It is also difficult to assess whether the plant would generate the monies needed for ongoing repairs, the ability to respond to emergency situations, and the ability to provide decommissioning costs without a financial analysis. Even assuming that EPA and NRC have the needed financial information provided by the applicants to assess these issues, it will be difficult as a member of the public to add to the discussion through the draft EIS process without making at least basic financial information disclosed. (**0003-6** [Reed, Cyrus])

Comment: The lack of financial information - at least publicly available - also makes it difficult to assess Chapters 8, 9 and 10 of the applicants Environmental Report. (**0003-8** [Reed, Cyrus])

Comment: [The EIS] also needs to incorporate the true costs of nuclear power. And if it did, there's no way that nuclear power would come out on top. There's reasons why no nuclear reactors -- the construction of nuclear reactors has not been permitted in 29 years, despite that

fact that it's the most government subsidized energy source of all. And one of the reasons why the true costs of nuclear are never evaluated is because NRC only looks at a small price. The fact is that the construction of new generators is -- and the speculation about the construction of new generators, is already driving up the price of uranium, which means communities are fighting tooth and nail right now to prevent new uranium mining permits from being issued in South Texas. That is an environmental impact of the South Texas Project. (**0007-92** [Cushing, Lara])

Comment: We get no cost figures out of that COLA -- none. Everything is proprietary. That's nonsense. I can get cost figures on ones that they haven't even put applications in on. And in some cases they've already decided it costs too much. The one thing that would kill this -- and it won't be guys like me -- is money. And if we don't know what's going on we'll never know, will we? (**0008-86** [Wagner, William])

Comment: Nuclear power is not competitive with other forms of power generation and requires taxpayer dollars to subsidize. (**0009-2** [Lindsey, Joy])

Comment: Nuclear power still requires Federal subsidies to make it competitive with other forms of power generation. (**0012-3** [Edwards, Nancy])

Comment: As one leading advocate for green technology puts it: "Any state that allows the construction of new nuclear power plants in the face of today's global industrial competition and financial turmoil will be committing economic suicide.- (Harvey Wasserman, Testimony to the Public Utilities Commission of the Ohio House, January 30, 2008). (**0015-11** [Williams, Mina])

Comment: Nuclear power plants are not cost effective. Nuclear power plants have required exorbitant cost overruns, are dependent on massive federal subsidies, and need continual expensive maintenance. Cost to taxpayers is extreme. (Southwest Workers' Union April 25, 2007). (**0015-4** [Williams, Mina])

Response: *The applicant is authorized by 10 CFR 2.390 that trade secrets and commercial and financial information be held by NRC as privileged or confidential, subject to certain procedural controls allowing access to the information. The Commission also determines whether the right of the public to be fully apprised as to whether the bases for and effects of the proposed action outweighs the demonstrated concern for protection of a competitive position, and whether the information should be withheld from public disclosure. The NRC has determined that the requested financial information shall be held as confidential. The comparison of alternatives in the DEIS is an environmental comparison, not a financial one.*

Comment: The intergenerational aspect of producing high level waste for every generation coming after us so that we can have supposedly cheaper electricity should be a part of the analysis of unavoidable impacts of pursuing the project. (**0002-25** [Sinkin, Lanny])

Comment: You know, as a young person I wonder why we are putting so many money and energy into this when in the last 50 years the nuclear problems have not even been solved. (**0007-73** [Lopez, Diana])

Response: *The DEIS will discuss the provisions for the long-term storage of spent fuel. The NRC's Waste Confidence Rule, found in 10 CFR 51.23, states: The Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations. The rule covers new reactors and applies to the staff's review of an early site permit or a combined license application. The Atomic Safety and Licensing Board presiding over the proceeding on the Grand Gulf early site permit application affirmed that the Waste Confidence Rule and its subsequent amendments clearly include waste produced by a new generation of reactors.*

Comment: Given that the applicant in the application makes it clear they will rely on the federal Department of Energy guarantees to peak interest in capital investment markets, the financing of the project would seem a reasonable area to be investigated as part of the EIS. If the financing for the project does not work, there is the potential to have the project stalled, which could have environmental impacts. (**0003-7** [Reed, Cyrus])

Response: *The benefit-cost balance for the project will rely on the best available estimate of project timing and duration and will note any uncertainties in the analysis.*

Comment: CPS provides my residential electricity at a cost much lower than the national average. My suspicion is that that's due in a large part to the operation of the nuclear plants. My own residence bill is about $35 a month lower than this national average. 35 bucks a month doesn't sound like much, but over the course of a year I think that's a pretty good piece of change. So I think that the proposed action and the alternatives need to consider this and be able to meet this type of a requirement. If they can't then the EIS should go into the impacts -- the negative impacts – socio-economic impacts on the residents and the businesses in San Antonio. (**0008-28** [Kale, Stephen])

Comment: CPS Energy provides residential electricity at a cost much lower than the national average. My own residence bill is about $35 a month less than the national average. The EIS should evaluate whether the proposed action and alternatives will improve or retain this low cost, and if not evaluate negative socioeconomic impacts. (**0014-3** [Kale, Stephen])

Response: *The purpose of the environmental impact statement is to disclose potential environmental impacts of building and operating of the proposed nuclear power plant. The determination for the impact of building and operating a nuclear power plant on retail power rates is not under NRC's regulatory authority.*

Appendix E

Draft Environmental Impact Statement Comments and Responses

Appendix E

Draft Environmental Impact Statement Comments and Responses

As part of the U.S. Nuclear Regulatory Commission (NRC) review of STP Nuclear Operating Company (STPNOC) application for combined licenses (COLs) for proposed Units 3 and 4 at the South Texas Project Electric Generating Station (STP), the NRC and the U.S. Army Corps of Engineers (Corps) (together referred to as the "review team") solicited comments from the public on the draft environmental impact statement (EIS). The draft EIS was issued in March of 2010. A 75-day comment period began on March 26, 2010, when the U.S. Environmental Protection Agency (EPA) issued a *Federal Register* Notice of Availability (75 FR 14594) of the draft EIS to allow members of the public to comment on the results of the environmental review.

As part of the process to solicit public comments on the draft EIS, the review team:

- Placed a copy of the draft EIS at the Bay City Public Library,
- Made the draft EIS available in the NRC's Public Document Room in Rockville, Maryland,
- Placed a copy of the draft EIS on the NRC website at www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1937/,
- Provided a copy of the draft EIS to any member of the public who requested one,
- Sent copies of the draft EIS to certain Federal, State, Tribal, and local agencies,
- Published a notice of availability of the draft EIS in the *Federal Register* on March 25, 2010 (75 FR 14474),
- Filed the draft EIS with the U.S. Environmental Protection Agency, and
- Held two public meetings on May 6, 2010, in Bay City, Texas.

Approximately 175 people attended the public meetings and numerous attendees provided oral comments. A certified court reporter recorded these oral comments and prepared written transcripts of the meeting. The transcripts of the public meetings were published on May 24, 2010, as part of the public meeting summary (Agencywide Documents Access and Management System [ADAMS] Accession Number ML101540288). In addition to the comments received at the public meeting, the NRC received letters and e-mail messages with comments.

The comment letters, e-mail messages, and transcripts of the public meeting are available in ADAMS. ADAMS is accessible at http://www.nrc.gov/reading-rm.html. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC's Public Document Room reference staff at 1-800-397-4209 or 301-415-4737. The ADAMS accession numbers for the letters, e-mail messages, and transcripts are provided in Table E-1.

E.1 Disposition of Comments

Each set of comments from a given commenter was given a unique correspondence identifier, allowing each set of comments from a commenter to be traced back to the transcript, letter, or e-mail in which the comments were submitted.

After the comment period concluded, the review team considered and dispositioned all comments received. To identify each individual comment, the team reviewed the transcript of the public meeting and each letter and e-mail received related to the draft EIS. As part of the review, the review team identified statements that it believed were related to the proposed action and recorded the statements as comments. Each comment was assigned to a specific subject area, and similar comments were grouped together. Finally, responses were prepared for each comment or group of comments.

Some comments addressed topics and issues that are not part of the environmental review for this proposed action. These comments included questions about NRC's safety review, general statements of support or opposition to nuclear power, and comments on the NRC regulatory process in general. These comments are included, but detailed responses to such comments are not provided because they addressed issues that do not directly relate to the environmental effects of this proposed action and are, thus, outside the scope of the National Environmental Policy Act (NEPA) review of this proposed action. Many comments, however, specifically addressed the scope of the environmental review, analyses, and issues contained in the draft EIS.

Table E-1 provides a list of commenters identified by name, affiliation (if given), comment number, and the source of the comment.

Table E-1. Individuals Providing Comments

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Corres-pondence ID
Arnold, James		Meeting Transcript (ML101450282)	0004-2
Bechdol, Michael	EPA Region 6, Groundwater	Email (ML101540268)	0006
Bludau, Owen	Matagorda County Economic Development Corporation	Meeting Transcript (ML101450282)	0004-1
Bradish, Michael		Meeting Transcript (ML101450282)	0004-2
Celestine, Bryant	Alabama-Coushatta Tribe of Texas	Email (ML101300039)	0001
Chavez, Chance		Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101450284)	0003
Corder, John		Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101450284)	0003
Croft, Roy		Meeting Transcript (ML101450282)	0004-2
Dancer, Susan	Matagorda County Coalition for Nuclear Industry Accountability	Email (ML101610154)	0013
		Meeting Transcript (ML101450282)	0004-2
Dunham, D.C.	Bay City Community Development Corporation	Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101450284)	0003
Fuson, David	Independent inventor	Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101470110)	0007
Gilmore, Cathy	EPA Office of Planning and Coordination	Email (ML101610346)	0016
Grebe, Lynn		Meeting Transcript (ML101450284)	0003
Green, Julie	Fit for Life	Meeting Transcript (ML101450284)	0003
Griffin, Mark	International Brotherhood of Electrical Workers Local 66	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101450284)	0003
Griffith, Mike		Meeting Transcript (ML101450282)	0004-1
Hadden, Karen	Sustainable Energy and Economic Development (SEED) Coalition	Meeting Transcript (ML101450282)	0004-1
Halpin, Ed	STP Nuclear Operating Company (STPNOC)	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101450284)	0003
Head, Bobby		Meeting Transcript (ML101450284)	0003
Head, Scott	STP Project Units 3 & 4	Letter (ML101580094)	0010
Hegar, Glenn	Senator, Texas	Meeting Transcript (ML101450282)	0004-1
Holt, Ben	Heritage Homes	Meeting Transcript (ML101450282)	0004-2
Humphries, Jim		Meeting Transcript (ML101450284)	0003
Hutto, Veronica		Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101450284)	0003

Table E-1. (contd)

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Corres-pondence ID
Johnson, Ken	City of Palacios Economic Development Corp.	Meeting Transcript (ML101470110)	0007
Johnson, Matthew	Public Citizen-Texas Office	Email (ML101610062)	0015
Knapik, Richard	Mayor, Bay City	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101450284)	0003
Kumar, Vatsu		Meeting Transcript (ML101450284)	0003
		Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101470110)	0007
Lucero, Greg	International Brotherhood of Electrical Workers (IBEW) Local 66	Meeting Transcript (ML101450282)	0004-2
Mann, Billy		Meeting Transcript (ML101450284)	0003
Marceaux, Brent		Meeting Transcript (ML101450284)	0003
McBurnett, Mark	STPNOC	Meeting Transcript (ML101450282)	0004-2
McDonald, Nate	Matagorda County	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101450284)	0003
		Meeting Transcript (ML101470110)	0007
O'Day, Mike	Lower Colorado River Authority (LCRA) Advisory Board	Meeting Transcript (ML101450282)	0004-2
Opella, Ernest		Meeting Transcript (ML101450282)	0004-2
Paul, Ron	U.S. Congress, Texas	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101470110)	0007
Purvis, Gail	The Trull Foundation	Email (ML101540218)	0005
Reed, Cyrus	Sierra Club, Lone Star Chapter	Letter (ML101670460)	0017
Roberts, Kaley	Hampton Inn & Suites and Titan Hotels Group	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101450284)	0003
Scurlock, Betty	Matagorda Regional Medical Center Board of Managers	Letter (ML101530429)	0012
Segovia, Valerie	Nuclear Power Institute at Texas A&M	Meeting Transcript (ML101450282)	0004-2
Silva, Allison	Bay City School District	Meeting Transcript (ML101450282)	0004-2
Smith, Steve	Matagorda Regional Medical Center Board of Managers	Meeting Transcript (ML101450282)	0004-1
Smith, Tom	Public Citizen, Texas Office	Meeting Transcript (ML101450282)	0004-1
Spencer, Stephen	U.S. Department of the Interior	Email (ML101600049)	0011
Stanley, Rikki		Meeting Transcript (ML101450282)	0004-2
Thames, Carolyn	Workforce Solutions	Meeting Transcript (ML101450282)	0004-1

Table E-1. Individuals Providing Comments

Commenter	Affiliation (if stated)	Comment Source and ADAMS Accession #	Corres-pondence ID
Thames, Mitch	Bay City Chamber of Commerce	Meeting Transcript (ML101450282)	0004-1
		Meeting Transcript (ML101450284)	0003
Weber, Randy		Meeting Transcript (ML101450282)	0004-1
Wolf, Clayton	Texas Parks and Wildlife Department (TPWD), Wildlife Division	Email (ML101610057)	0019
Yeamans, Joe		Meeting Transcript (ML101450282)	0004-2
		Meeting Transcript (ML101450284)	0003

E.2 Comments and Responses

This appendix presents the comments and responses to them grouped by similar issues as follows:

- Comments Concerning Process – COL
- Comments Concerning Process – NEPA
- Comments Concerning Site Layout and Design
- Comments Concerning Land Use – Site and Vicinity
- Comments Concerning Land Use – Transmission Lines
- Comments Concerning Meteorology and Air Quality
- Comments Concerning Geology
- Comments Concerning Hydrology – Surface Water
- Comments Concerning Hydrology – Groundwater
- Comments Concerning Ecology – Terrestrial
- Comments Concerning Ecology – Aquatic
- Comments Concerning Socioeconomics
- Comments Concerning Environmental Justice
- Comments Concerning Historic and Cultural Resources
- Comments Concerning Nonradiological Waste
- Comments Concerning Nonradiological Health
- Comments Concerning Radiological Health
- Comments Concerning Severe Accidents
- Comments Concerning the Uranium Fuel Cycle
- Comments Concerning Transportation
- Comments Concerning Decommissioning
- Comments Concerning the Need for Power

- Comments Concerning the No-Action Alternative
- Comments Concerning Energy Alternatives
- Comments Concerning Benefit-Cost Balance
- General Comments in Support of the Licensing Action
- General Comments in Support of the Licensing Process
- General Comments of Support of Nuclear Power
- General Comments in Support of the Existing Plant
- General Comments in Opposition to Nuclear Power
- Comments Concerning Issues Outside Scope – Safety
- Comments Concerning Issues Outside Scope – Security and Terrorism
- General Editorial Comments

When the comments resulted in a change in the text of the draft EIS, the corresponding response refers the reader to the appropriate section of the EIS where the change was made. Throughout this final EIS, with the exception of new appendices such as this appendix and Appendix K, substantive revisions to the text from the draft EIS are indicated by change bars (vertical lines) beside the text.

E.2.1 Comments Concerning Process – COL

Comment: The U.S. Department of the Interior has reviewed the subject DEIS. In this regard, we have no comment. (**0011-1** [Spencer, Stephen]

Comment: EPA rates the DEIS as LO, i.e., EPA has a Lack of Objections to the proposed action described in the DEIS. (**0016-2** [Gilmore, Cathy])

Response: *These comments reflect reviews of the U.S. Department of Interior and EPA of the draft EIS. No changes were made to the EIS as a result of these comments.*

E.2.2 Comments Concerning Process – NEPA

Comment: DEIS Section 03.01. External Appearance and Plant Layout. Page 3-1, Line 5: The DEIS states, “In addition to the COL application, STPNOC will need to apply for a permit from the U.S. Army Corps of Engineers (Corps) to conduct activities that result in alteration of waters of the United States.” STPNOC has applied for the required permit; therefore, the sentence should read that “STPNOC **has applied** for a permit.” (Ref. STPNOC Letter U7-C-STP-ACE-100001, dated March 9, 2010 from Scott Head, STPNOC, to U.S. Army Corps of Engineers - Galveston District, Subject: Application for Department of Army Permit.)
(**0010-1-35** [Head, Scott])

Response: *STPNOC's permit application was submitted to the Corps after the draft EIS went into production. Sections 1.0 and 3.0 of the EIS were modified to reflect that the application has now been submitted to the Corps.*

Comment: I received [the STP draft EIS], read thoroughly. The breadth, I was impressed with. The depth is absolutely impressive, the coverage of protagonists and antagonists in their mailing, the coverage of topics in detail. One particularly near to my heart was Native American Indians. Their intimate and effective communication to those groups is something we should all be very proud of. (**0003-5** [Marceaux, Brent])

Comment: Public involvement in this process called licensing of new nuclear power plants, is essential. What it does is it, in the end, helps to bring a better product. And, frankly, it adds a lot of transparency to the process, and also builds public confidence and trust, which is essential. (**0004-1-15** [Halpin, Ed])

Response: *These comments express general support for the NEPA process. No changes were made to the EIS as a result of these comments.*

Comment: The Draft Environmental Impact Statement is not adequate. It does not have adequate scientific analysis on many fronts, and it paints a glossy picture, while minimizing risks. I have come to call it the Don't Worry Be Happy Report. (**0004-1-30** [Hadden, Karen])

Comment: NEPA requires agencies to consider and give effect to the environmental objectives in the act and "not just to file detailed impact studies which will fill governmental archives." Environmental Defense Fund, Inc. v. Corps of Engineers of U. S. Army, 470 F.2d 289 (8th Cir. 1972) application denied 93 S.Ct. 675, 409 U.S. 1072, 34 L.Ed.2d 661, certiorari denied 93 S.Ct. 2749, 412 U.S. 931, 37 L.Ed.2d 160. The DEIS related to this adjudication falls short of this requirement as related to the need for power, water impacts, comparisons of alternative generation modes and climate change. (**0015-1** [Johnson, Matthew])

Response: *These comments express opposition to the draft EIS that is general in nature; therefore, no changes were made to the EIS as a result of these comments.*

Comment: The Environmental Impact Statement uses the categories of small, medium, and large. These are not scientific terms. These are not numbers, and, yet, they are used throughout the EIS without giving corresponding numerical parameters. This is not scientifically valid. This is a judgment call. (**0004-1-39** [Hadden, Karen])

Response: *The SMALL, MODERATE and LARGE significance levels are used by the review team after completing its analyses to communicate the results of its assessment of the environmental impacts of the proposed action and alternatives to the action. The structure for the significance levels was based on Council on Environmental Quality (CEQ) guidance (40*

CFR 1508.27) and on discussions with the CEQ and the EPA when it was first implemented for nuclear power plant licensing actions. Definitions of the three significance levels are provided in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, and are provided in Section 1.1.1.1 of the EIS.

When determining significance levels for environmental impacts, the review team considers two variables: context and intensity. Context is the geographic, biophysical, and social setting in which the impacts would occur. For the STP Units 3 and 4 environmental review, the context varies according to the resource being evaluated. For example, the context for the environmental justice review is the 50-mile region surrounding the STP site. Intensity refers to the severity of the impact, in whatever context it occurs.

CEQ's regulations that implement NEPA (40 CFR 1500-1508) require that EISs be concise, clear, to the point, and supported by evidence that agencies have made the necessary environmental analyses. The NRC uses SMALL, MODERATE, or LARGE to concisely communicate the results of our environmental analyses. Our analyses in the EIS, which follow the environmental review requirements contained in NUREG-1555, Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan, *are contained in the paragraphs preceding the significance determination of SMALL, MODERATE, or LARGE. In compliance with CEQ regulations, the STP Units 3 and 4 EIS identifies the methodologies used in the environmental analyses, and explicitly references sources relied upon for conclusions. For some analyses, a separate appendix is included that contains additional detailed calculations and numerical data.*

The significance levels of SMALL, MODERATE, and LARGE are used to concisely summarize the analyses completed by the review team, and as such, are scientifically valid descriptions of potential environmental impacts. No change was made to the EIS as a result of this comment.

E.2.3 Comments Concerning Site Layout and Design

Comment: DEIS Section 03.02. Proposed Plant Structures. Page 3-6, Line 31: The DEIS states, "The RMPF consists of 18 traveling screens." The statement should be revised to state that the RMPF consists of "24" traveling screens. STPNOC plans to revise the Environmental Report Figure 3.4-5 to indicate the correct number of traveling screens.
(**0010-1-36** [Head, Scott])

Comment: DEIS Section 03.02. Proposed Plant Structures. Page 3-7, Lines 1-2: The DEIS states, the "surface area of the 18 traveling screens is 2430 ft^2." This statement should be revised to state indicate that the number of traveling screens is 24 (see comment on Page 3-6, Line 31, above) and the surface area should be shown as 2400 ft^2 (24 screens x 10 ft wide x 10 ft deep = 2400 ft^2). (**0010-1-37** [Head, Scott])

Comment: DEIS Section 03.02. Proposed Plant Structures. Page 3-8, Lines 30-31: The DEIS indicates that the combustion turbine generators are safety related. Combustion turbine generators are used during off normal conditions as an Alternate AC power source for Station Blackout events and are non-safety-related. (Reference Part 2 Tier 1 Section 2.12.11, and Part 2 Tier 2 Sections 9.5.11.3 and 9.5.13.21). (**0010-1-38** [Head, Scott])

Comment: DEIS Section 03.02. Proposed Plant Structures. Page 3-9, Line 26: The DEIS states, "the existing MDC would need to be relocated." This should read, "the existing MDC has been relocated." (**0010-1-39** [Head, Scott])

Response: *Section 3.2 of the EIS was updated to correct the statements regarding the number of traveling screens, to clarify that the combustion turbine generators are not safety related, and to reflect the correct location of the Main Drainage Channel (MDC).*

Comment: DEIS Section 03.04. Operational Activities. Page 3-23, Line 2: The DEIS states, "activated sludge from existing Units 1 and 2 is currently disposed by land application at a rate of 30,000 to 40,000 gallons per year." The phrase "is currently" in the sentence should be changed to "has previously been." (**0010-1-48** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-23, Line 5: The DEIS states, "The sludge from the new West Sanitary Waste Treatment System (WSWTS) and Nuclear Training Facility (NTF) systems for the existing Units 1 and 2 and proposed Units 3 and 4 would be disposed of by land application." The phrase "by land application" at the end of the sentence should be changed to "off-site." (**0010-1-49** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-24, Line 5: The DEIS states, "Both systems would be replaced by newer systems to accommodate the expansion of the facilities by the addition of Units 3 and 4." The phrase "replaced by newer systems" should read "replaced, or upgraded". (**0010-1-52** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-24, Lines 6-8: The DEIS states: "The new WSWTS will be designed to treat sanitary waste at a rate of 300,000 gallons per day, and the new NTF system will be designed to treat sanitary waste at a rate of 100,000 gallons per day." STPNOC recommends deleting the word "new" preceding "WSWTS" and preceding "NTF" in this sentence consistent with the comment noted on Line 5 of this page. (**0010-1-53** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-26, Table 3-4: The DEIS states, in Table 3-4 that 23,190 gpm is the "full heat load." "Full heat load" should be revised to read "for 100% load factor." (**0010-1-55** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-26, Table 3-4: The DEIS states, in Table 3-4, "21,600 gpm long-term average basis for 93% heat load." This should read, "21,600 gpm long term average basis for 93% load factor." (**0010-1-56** [Head, Scott])

Response: *Section 3.4 and Table 3-4 of the EIS were changed to reflect these comments.*

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-6, Line 37: The DEIS states that "The RMPF contains 18 traveling screens, each of 13.5-ft width." The sentence should be corrected to state that "The RMPF contains 24 traveling screens, each of 10.0-ft width." (**0010-2-6** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-7, Line 12: The DEIS states that "... the area of 18 screens would be 2430 ft^2...." The sentence should be corrected to state that "...the area of 24 screens would be 2400 ft^2...." (**0010-2-7** [Head, Scott])

Comment: DEIS Appendix F. Key Consultation Correspondence. Page F-47, Line 16: The DEIS states: "The area of the 18 screens would be 2430 ft^2." As previously discussed, the Reservoir Makeup Pumping Facility is currently configured for 24 rotating screens. The surface area should be 2400 ft^2. (**0010-2-85** [Head, Scott])

Response: *Section 5.2 was updated to reflect that the Reservoir Makeup Pumping Facility (RMPF) contains 24 traveling screens with a total surface area of 2400 ft^2. Appendix F contains copies of the Biological Assessment and the Essential Fish Habitat Assessment submitted to the National Marine Fisheries Service as part of consultation requirements under the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act, respectively. These are standalone documents that will not be edited in the EIS.*

E.2.4 Comments Concerning Land Use – Site and Vicinity

Comment: DEIS Section 02.02. Land Use. Page 2-7, Lines 20-22: The DEIS states, "There are no mineral resources of known commercial value within the STP site boundary or in the 6-mi vicinity of the site (STPNOC 2009a)." The Environmental Report (Rev. 3) Section 2.2.1.1 indicates the following: "The co-owners of STP also own or control all of the mineral interests within the site boundary and have the power to acquire such outstanding mineral interests in the subsurface estate as may be required for operation of the facility. "The co-owners control the surface minerals and any drilling used to recover minerals. However, the co-owners of STP have agreed to not exercise their right to use any area within the EAB for explorations or recovery of minerals, or convey or lease mineral rights to any third party without proper approval of STP Nuclear Operating Company. There are mineral resources (e.g., sand and gravel, coal, oil, natural gas, and ores) adjacent to (within the 6-mile vicinity) and within the site boundary presently being exploited or of known commercial value. According to the Railroad Commission (RRC) of Texas, there are two petroleum wells within the site property that have been plugged

and abandoned and there are seven petroleum wells within the 6-mile vicinity. There are 26 gas wells and nine oil/gas wells within the 6-mile vicinity (Reference 2.2-1). Reference: Railroad Commission of Texas, 2007. Wells. (**0010-1-2** [Head, Scott])

Response: *Section 2.2.1 of the EIS was revised to reflect the information provided by this comment.*

Comment: DEIS Section 04.01. Land Use Impacts - Construction. Page 4-4, lines 11-15: The DEIS states, "An additional approximately 240 ac would be disturbed for temporary facilities including a concrete batch plant, materials storage areas, laydown areas, heavy haul road, parking areas, borrow areas, and spoils storage (STPNOC 2009a). These activities would result in a temporary land-use change; as STPNOC is committed to restore temporarily disturbed areas after construction completion." However, as stated in DEIS 4.1.1, Page 4-4, Lines 20, 21 and 22, consistent with Rev 3 of the ER, "The heavy haul road would be approximately 2.5 mi long and 50 ft wide (STPNOC 2009a) and would result in a permanent land use change from open space." Lines 11-15 should be revised to indicate that the heavy haul road would be a permanent disturbance. (**0010-1-58** [Head, Scott])

Comment: DEIS Section 04.01. Land Use Impacts - Construction. Page 4-4, Line 15: The DEIS states, "STPNOC is committed to restore temporarily disturbed areas after construction completion." STPNOC believes that "is committed" is not appropriate and that the words should be changed to "plans." This change is important given that parking and other areas could be used after construction. (**0010-1-59** [Head, Scott])

Comment: DEIS Section 04.01. Land Use Impacts - Construction. Page 4-4, Line 24: Replace "committed" with "plans". (**0010-1-60** [Head, Scott])

Comment: DEIS Section 04.01. Land Use Impacts - Construction. Page 4-5, Line 10: Replace "committed" with "plans". (**0010-1-61** [Head, Scott])

Response: *Section 4.1.1 of the EIS was changed to reflect these comments.*

Comment: DEIS Section 07.01. Land Use - Cumulative. Page 7-6, Line 15: The DEIS states, "The review team determined that a 15-mi radius would represent the smallest area that would be directly affected because it includes the primary communities (the largest being Bay City) that would be affected by the proposed project." Based on the context of the statement, smallest area should be revised to largest area. (**0010-2-43** [Head, Scott])

Response: *Section 7.1 of the EIS was revised to reflect this comment.*

Comment: DEIS Section 09.03. Alternative Sites, Page 9-150, lines 1-2: The DEIS names Figure 9-13 as "Trinity 2 Alternative Site and 10-mi Radius." STPNOC believes Figure 9-13 is

the incorrect figure as the figure content does not conform to the figure title. This figure is the same as Figure 9-15 and appears to depict a 50-mile radius rather than the 10-mile radius identified in the figure title. Additionally, the figure is not similar to Figures 9-5 and 9-9 which also depict a 10-mile radius around an alternative site. (**0010-2-66** [Head, Scott])

Response: *Figure 9-13 has been replaced in the EIS with the correct figure showing the location of the Trinity 2 Alternative Site and the 10-mi radius.*

Comment: DEIS Section 10.03. Relationship Between Short Term Uses and Long Term Productivity of the Human Environment. Page 10-13, Line 1: The DEIS only lists the consumption of depletable resources as a result of plant construction and operation as a long-term use. The Environmental Report (Rev. 3.0) also lists the land committed for waste burial as a long-term use (Section 10.3.2). (**0010-2-73** [Head, Scott])

Response: *The land committed for waste disposal is discussed in Section 10.4.1.1 of the EIS; therefore, no change was made to Section 10.3 as a result of this comment.*

Comment: DEIS Section 10.04. Irreversible and Irretrievable Commitments of Resources. Page 10-14; Lines 2-3: The DEIS states that once land is committed to the disposal of radioactive and non-radioactive waste, it cannot be used for other purposes. The Environmental Report (Rev. 3.0) indicates that land used for the disposal of radioactive and non-radioactive waste, while not available for other uses while in use, is not considered irreversible since it could be remediated for future use (Section 10.2.1.1). (**0010-2-74** [Head, Scott])

Response: *An irreversible commitment of a resource refers to primary or secondary impacts which limit future options for that resource. It is the review team's position that the disposal of radioactive and nonradioactive wastes would require an irreversible commitment of land. The treatment, storage, and disposal of spent nuclear fuel, low level waste, hazardous waste, and to a lesser extent, nonhazardous waste, would require the long-term or permanent, irretrievable commitment of land. As an irreversible action, the disposal of such wastes could potentially adversely impact the surrounding ecosystem, rendering it unfit for remediation and future use. Section 10.4.1.1 of the EIS was modified to clarify that waste disposal would require either a long-term or permanent commitment of land.*

E.2.5 Comments Concerning Land Use – Transmission Lines

Comment: DEIS Section 03.02. Proposed Plant Structures. Page 3-10, Line 9: The DEIS states, "Except for upgrading the transition lines from the STP site to Hillje Substation, STPNOC has determined that no additional offsite transmission line corridors or expansion of existing corridors would be required to support Units 3 and 4." The phrase "Except for" in this sentence may be read to imply the need for additional corridors or expansion of corridors. STPNOC

recommends this statement be split into two sentences to clarify that upgrading will be within an existing corridor: "The existing transmission lines from the STP site to the Hillje Substation will be upgraded. STPNOC has determined that no additional offsite transmission line corridors or expansion of existing corridors will be required to support Units 3 and 4."
(**0010-1-40** [Head, Scott])

Response: *In response to this comment, Section 3.2.2.3 of the EIS was revised to delete the following words: "… except for upgrading the transmission lines from the STP site to Hillje 10 Substation."*

E.2.6 Comments Concerning Meteorology and Air Quality

Comment: DEIS Section 5.07. Meteorological and Air Quality Impacts - Operation. Page 5-66, Line 19: The DEIS states in "Table 5-6 (Anticipated Atmospheric Emissions Associated With Operation of Proposed Units 3 and 4)...:

Particulates	2500	44	44,700
Sulfur Oxides	5200	3800	----
Carbon Monoxide	5200	1800	----
Hydrocarbons	6100	120	----
Nitrogen Oxides	57,900	2000	----

emissions (lb/yr) from diesel generators, combustion turbine, and UHS cooling towers, respectively. Environmental Report Rev. 3.0 and supporting documents indicate that these emissions should be:

Particulates	2500	44	22,700

[cooling tower particulate release based on RAI Response 5.3.3.1 (9/14/09), Attachment 7, p. 3 of 32 which gives effluent for two towers = 43101 gal/min * 3.79 l/gal * 525600 min/yr * .005/100 drift rate * 3 cycles of concentration * 800 mg-salt/l * 1/1000 g/mg * 1/454 lb/g = 22,700 lb/yr]

Sulfur Oxides	9200	3800	---
Carbon Monoxide	9200	1800	---
Hydrocarbons	6100	120	---
Nitrogen Oxides	57,900	4000	---

[sulfur oxide, carbon monoxide and nitrogen oxide corrections based on ER Rev 3.0, Section3.6, Table 3.6-3, Page 3.6-8, which gives diesel generator and combustion turbine emissions(lb/yr) per unit]. (**0010-2-22** [Head, Scott])

Response: *The review team determined that the comment is only partially correct. The request for additional information (RAI) response referenced in the comment clearly states that the 43,100 gal/min flow is for each cooling tower. Consequently, the total salt drift for the two cooling towers is about 45,000 lbs/yr, not the 22,700 lbs/yr stated in the comment. Table 5-6 of the EIS was revised as appropriate. The salt drift values in Section 5.3.3.1 of ER Revision 4 are consistent with the values listed above.*

Comment: Since the DEIS was released, at least two significant events have occurred:

The US EPA released a new report on April 27th 2010 entitled "Climate Change Indicators in the United States," which details many ways in which the climate is being disrupted by emissions of greenhouse gasses. (**0015-15** [Johnson, Matthew])

Response: *The EPA report referenced in the comment was released after the draft EIS was published. NRC reviewed the April 2010 report and determined that information contained in the EPA report would not alter any conclusions in the EIS regarding the cumulative impacts of climate change.*

Comment: The DEIS understates the effect of global warming on the cumulative impacts of the operation of STP 3 & 4.

A. The DEIS conclusion that cumulative effects of greenhouse gas emissions are projected to be "noticeable but not destabilizing" is contradicted by the EPA's April 27, 2010 report "Climate Change Indicators in the United States". *Inter alia*, the EPA report finds compelling evidence that composition of the atmosphere and many fundamental measures of climate are changing. By understating the effects of climate change the DEIS effectively minimizes the contributions to the GHG inventory attributable to operation of STP Units 3&4. This has the further effect of minimizing the importance of selecting the lowest GHG alternatives to generate electricity. A full accounting for all stages of the UFC shows that nuclear power has significantly greater GHG burdens than wind, solar power or geothermal. The DEIS did not make any such comparison, however. (**0015-3** [Johnson, Matthew])

Comment: The DEIS fails to compare the CO_2 emissions of the UFC to the CO_2 emissions of wind and solar power.

Appendix I of the DEIS discusses the CO_2 footprint of a LWR. However, this discussion omits any direct comparison to similar emissions related to alternatives such as wind, solar, geothermal, etc. The only reference to a comparison is the study by B.K. Sovacool. This study consists of a survey of relevant literature and concludes that alternatives such as wind, solar and geothermal have much smaller CO_2 footprints than nuclear powered generation. However, the DEIS otherwise makes no attempt to compare the CO_2 footprints of alternative generation modes. Additionally, comparisons of CO_2 emissions related to alternatives are not covered in

other contexts of the DEIS. The closest that the DEIS comes to a meaningful discussion of a comparison of CO_2 impacts is an attenuated reference in the environmental impacts of alternatives where it is conceded that wind, solar and hydropower have minor CO_2 impacts. But this reference does not quantify any comparisons and erroneously concludes that the nuclear option has the lowest emission of GHG of viable alternatives. ...The failure of the DEIS to discuss CO_2 impacts related to alternative generation modes is particularly noteworthy considering the DEIS's recognition that GHG increases and effects of climate change have profound environmental impacts. Moreover, the omission of any discussion of the lower GHG profiles for renewable generating sources compared to the UFC has the effect of distorting the putative advantages of nuclear powered generation. (**0015-8** [Johnson, Matthew])

Comment: After reviewing the draft, it is my professional judgment that the NRC Staff has committed numerous errors of omission in their analysis of global climate change including:

- The significance of climate change on the environment,
- the methods of calculating the global climate change emissions from the proposed nuclear generating facility,
- the significance of the emissions from this plant compared to alternatives,
- the impact of climate change on the operations of this plant (**0015-13** [Johnson, Matthew])

Comment: The DEIS is flawed because it failed to do a thorough analysis of the significance of climate change. In their summary the NRC Staff concludes: 7.6.2 Greenhouse Gas Emissions - The review team concludes that the cumulative impacts of greenhouse emissions around the world as presented in the report are the appropriate basis for it's evaluation of cumulative impacts. Based on the impacts set forth in the GCRP report, the review team concludes that the national and worldwide cumulative impacts of greenhouse gas emissions are noticeable but not destabilizing. (p. 7-43, 44) This conclusion is contradicted by the newest EPA study entitled "Climate Change Indicators in the United States" released April 27, 2010 which concludes: The indicators in this report present compelling evidence that the composition of the atmosphere and many fundamental measures of climate in the United States are changing. These changes include rising air and water temperatures, more heavy precipitation, and, over the last several decades, more frequent heat waves and intense Atlantic hurricanes. Assessment reports from the Intergovernmental Panel on Climate Change and the U.S. Global Change Research Program have linked many of these changes to increasing greenhouse gas emissions from human activities, which are also documented in this report. Analysis of the indicators presented here suggests that these climate changes are affecting the environment in ways that are important for society and ecosystems. Sea levels are rising, snow cover is decreasing, glaciers are melting, and planting zones are shifting (see Summary of Key Findings on p. 4). Although the indicators in this report were developed from some of the most complete data sets currently available, they represent just a small sample of the growing portfolio of potential indicators. Considering that future warming projected for the 21st century is very likely to be greater than observed warming over the past century,1 indicators of climate change should only become

more clear, numerous, and compelling. It also notes that: Temperature is a fundamental component of climate, and it can have wide-ranging effects on human life and ecosystems, as many of the other indicators in this report demonstrate. For example, increases in air temperature can lead to more intense heat waves, which can cause illness and death in vulnerable populations. Temperature patterns also determine what types of animals and plants can survive in a particular place. Changes in temperature can disrupt a wide range of natural processes, particularly if these changes occur abruptly and plant and animal species do not have time to adapt. Its hard to conclude that changes in temperature that "can disrupt a wide range of natural processes and "cause illness and death in vulnerable populations" are not destabilizing. (**0015-25** [Johnson, Matthew])

Response: *On December 15, 2009, the Administrator of EPA issued 74 FR 66496, her determination under her authority under the Clean Air Act that:*

> *… greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare…. The Administrator reached her determination by considering both observed and projected effects of greenhouse gases in the atmosphere, their effect on climate, and the public health and welfare risks and impacts associated with such climate change.*

In addition to the finding, the bases for the finding provide insights on the extensive efforts within the Federal government to weigh and balance science and public policy issues when considering greenhouse gas (GHG) emissions and the effects of climate change; GHG emissions is treated as a surrogate for the potential effects on climate. In the following, the excerpted text from EPA's determination was considered by the NRC staff in shaping its consideration of GHG emissions and the effects of climate change as part of its NEPA reviews of new reactor applications and its preparation of EISs:

> *The Administrator recognizes that human-induced climate change has the potential to be far-reaching and multidimensional, and in light of existing knowledge, that not all risks and potential impacts can be quantified or characterized with uniform metrics.*
>
> *The Administrator has considered how elevated concentrations of the well-mixed greenhouse gases and associated climate change affect public health by evaluating the risks associated with changes in air quality, increases in temperatures, changes in extreme weather events, increases in food- and water-borne pathogens, and changes in aeroallergens.*
>
> *The Administrator has considered how elevated concentrations of the well-mixed greenhouse gases and associated climate change affect public welfare by evaluating numerous and far-ranging risks to food production and agriculture, forestry, water*

resources, sea level rise and coastal areas, energy, infrastructure, and settlements, and ecosystems and wildlife.

The Administrator is defining the air pollutant that contributes to climate change as the aggregate group of the well-mixed greenhouse gases. The definition of air pollutant used by the Administrator is based on the similar attributes of these substances. These attributes include the fact that they are sufficiently long-lived to be well mixed globally in the atmosphere, that they are directly emitted, and that they exert a climate warming effect by trapping outgoing, infrared heat that would otherwise escape to space, and that they are the focus of climate change science and policy.

The release of the U.S. Global Climate Research Program (GCRP) [formerly the Climate Change Science Program (CCSP)] report on impacts of climate change in the United States in June 2009 … synthesized information contained in prior CCSP reports and other synthesis reports, many of which had already been published … [and undergo a rigorous and exacting standard of peer review by the expert community, as well as rigorous levels of U.S. government review and acceptance.… The review processes … provide EPA with strong assurance that this material has been well vetted by both the climate change research community and by the U.S. government.]. These assessments therefore essentially represent the U.S. government's view of the state of knowledge on greenhouse gases and climate change. For example, with regard to government acceptance and approval of IPCC [Intergovernmental Panel on Climate Change] assessment reports, the GCRP Web site states that: "When governments accept the IPCC reports and approve their Summary for Policymakers, they acknowledge the legitimacy of their scientific content." It is the Administrator's view that such review and acceptance by the U.S. Government lends further support for placing primary weight on these major assessments.

EPA has no reason to believe that the assessment reports do not represent the best source material to determine the state of science and the consensus view of the world's scientific experts on the issues central to making an endangerment decision with respect to greenhouse gases. EPA also has no reason to believe that putting this significant body of work aside and attempting to develop a new and separate assessment would provide any better basis for making the endangerment decision, especially because any such new assessment by EPA would still have to give proper weight to these same consensus assessment reports.

The latter represents an endorsement by the EPA of the GCRP. The review team's assessment of the current affected environment (either in Chapter 2 for the site region or in Chapter 9 for the alternative sites) reflects conditions entirely consistent with the EPA Administrator's finding. If the Administrator determined that an immediate action was necessary to improve public health

conditions in the affected environment (e.g., the closure of GHG-emitting facilities), then the review team may have considered an impact more reflective of a destabilized environment.

With regard to the EPA report referenced in the comment, the report was released after the draft EIS was issued. The review team finds that it corroborates and aligns well with the material provided in the draft EIS and provides useful data to inform decision-makers taking Federal actions. The sources of data used in the EPA report are similar to, and in many respects identical to, the sources of data that were used by the GCRP. More current data have not changed the trends that were considered in the GCRP; that report was considered for the important resources areas, including health effects, ecology, air and water issues, that could be affected by GHG emissions and this proposed action.

The proposed action involves the generation of baseload electrical power in the amount of 2700 MW(e). Insofar as certain energy alternatives do not reasonably meet the purpose and need for the action (i.e., they are not reasonable alternatives for generating 2700 MW(e) of baseload power), they are not reasonable alternatives to the proposed action. NEPA requires that the environmental impacts of the proposed action be compared to reasonable alternatives and does not require a comparison with alternatives not considered to be reasonable. The long-term effects of GHG emissions among the reasonable energy alternatives are focused on the operational impacts discussed in Section 9.2.5. To avoid even the appearance of efforts to "minimize" the GHG effects of producing electrical energy from nuclear power, the review team also considered the environmental air quality effects from the fuel cycle and GHG emissions from worker transportation over the operating life of the facility. The review team did not consider analogous fuel cycle and worker GHG emissions from the other viable baseload energy alternatives because it would not alter the review team's conclusions.

Appendix I presents the review team's estimate solely of the carbon dioxide (CO_2) footprint of the nuclear power generation alternative; a discussion of other energy alternatives in Appendix I would not be consistent with the purpose of the appendix. The comparison of CO_2 footprints of nuclear power and reasonable alternatives is presented in Section 9.2.5. Expanding the comparison of the CO_2 footprint of nuclear power and renewable generation alternatives individually would be an academic exercise that does not serve the purpose of NEPA because the review team determined that the renewable generation alternatives would not reasonably meet the need for baseload power generation in the required amount. During preparation of the final EIS, the review team did update the Table I-3 estimate from the Uranium Fuel Cycle (UFC) to be 1.7×10^7 MT and the total to be 1.8×10^7 MT consistent with NRC staff guidance on the evaluation of GHG emissions; this update was also reflected in Sections 4.7.1, 6.1.3 and 9.2.5.

Comment: The DEIS analysis of STP 3 & 4 construction impacts related to GHG emissions assumes appropriate mitigation measures would be adopted but fails to discuss what mitigation measures would be available to minimize GHG emissions during construction.

The DEIS acknowledges that construction activities include those with GHG impacts. And then the DEIS dismisses any need to analyze such because it assumes appropriate mitigation would be implemented. But the DEIS makes no attempt to determine what mitigation measures/alternatives are available let alone what actual effects on GHG emissions would be realized by such. The DEIS suggests no specific alternatives or GHG mitigation measures related to earthmoving, concrete batch plant operations or any other construction related activity. This assumption/ leap of faith is contrary to 10 CFR 51.70(b) that requires the DEIS to be analytic in its discussion of impacts. (**0015-9** [Johnson, Matthew])

Response: *Consistent with 10 CFR Part 51, Appendix A, data and analyses in an EIS are to be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. Applying this principle to the draft EIS, the review team concluded that because of the relatively small carbon footprint from construction and preconstruction activities as compared to the total U.S. annual CO_2 emission rate, "atmospheric impacts of greenhouse gases from construction and preconstruction activities would not be noticeable and additional mitigation would not be warranted." The review team reaches this same conclusion in the final EIS. However, Section 4.7 of the EIS was revised to highlight that measures to mitigate the impacts of construction activities on air quality will also reduce GHG emissions.*

E.2.7 Comments Concerning Geology

Comment: DEIS Section 02.08. Geology. Page 2-157, Lines 35-37 and Page 2-158, Lines 1-2: The DEIS states: "For the purposes of considering the hydrogeological setting in the vicinity of the STP intake structure on the Colorado River, an apparent feature is the incision in the sediments by the river to an elevation of approximately 14 ft below MSL (STPNOC 2009a). At the nearby STP site, this would imply direct communication between the Colorado River and the Upper Shallow Aquifer (STPNOC 2009a)." The DEIS statements should be clarified to reference Environmental Report (Rev. 3.0) Subsection 2.3.1.2.5.2 and Table 2.3.1-23, which presents the estimates of travel time to various receptors, including the Colorado River, to avoid any misunderstanding that a release at the site would immediately be observed in the river. (**0010-1-33** [Head, Scott])

Response: *These topics are addressed in Sections 4.2 and 5.2 of the EIS, where spills during building and operating the proposed Units 3 and 4 are postulated, and pathways and travel times are presented for groundwater. Therefore, no change was made to Section 2.8 as a result of this comment.*

E.2.8 Comments Concerning Hydrology – Surface Water

Comment: But I guess one of the main -- one of the things that I really like about STP is they are a good steward of their water. Being a rice farmer, that's important to me. They only pump

their water during floods. That's great. There is no loss. When the river is low, when the lakes are low, STP is not pulling it out. They have already got their water. They have already thought about that. (**0003-34** [Mann, Billy])

Comment: I'm on the LCRA Advisory Board. I know how the plant takes their water. Mark did a very good job of explaining it. They take their water when the river is high. They also take their water from below the fresh water barrier, so the water they're taking is more brackish than we would use for any of the other issues that we use, especially for public consumption. (**0004-2-16** [O'Day, Mike])

Comment: The main cooling reservoir in South Texas, as our source of cooling, that reservoir, basically, is a storage facility. We pump water out of the Colorado, store it in that reservoir, and use it for cooling. Over time, it evaporates, and we have to add more water to it. We pump water out of the Colorado River when the river is flowing. In fact, this last year the reservoir was at a low level towards the latter part of last year due to the dry conditions, so we hadn't pumped water in a long time. Just when the rain started, we basically had filled that reservoir back to full capacity now. We fill it, basically, off the run of the river. The rain that's sent between, basically, Columbus and Bay City, has provided sufficient water to refill that reservoir. And that's been our normal practice. That's really how that reservoir is kept full. So, we store it for times. If we have sufficient storage quantity in there for times of drought, such that we don't have to draw from the river during times of drought. And then there's provisions to deal with those circumstances, as well. (**0004-2-2** [McBurnett, Mark])

Response: *These comments provide general information in support of STPNOC's application for COLs. No changes were made to the EIS as a result of these comments.*

Comment: We have concerns with ... the consumption of vast quantities of water. (**0004-1-35** [Hadden, Karen])

Comment: Water use, again, is of a great concern. The Draft EIS points out that in 26 of 60 recent years, the Colorado had lowered river flow. It was 75 percent of the average flow during those years. The lowest the river has gotten down to is 20 percent of the average flow, so while STP may be allowed to use up to 100,000 acre feet per year, there is no guarantee that that water will be there. Last September, the water in the main cooling reservoir got quite low, and extensive pumping was needed to refill it in a time of serious drought. The proposed reactors, Units 3 and 4, would use over 23,000 gallons per minute, per minute. That is filling 1,440 swimming pools in one day, backyard swimming pools. So, this vast consumption of water raises the question of how will other users get water if there is a drought, the water needed for rice farming and ranching, the water needed for recreation. Together with all four reactors, the site would use 42,604 gallons per minute. (**0004-1-41** [Hadden, Karen])

Comment: I'm also concerned about water usage. (**0004-2-9** [Dancer, Susan])

Response: *The review team analyzed the proposed water use of STP Units 3 and 4 in Section 5.2.2.1 of the EIS. During an average year, existing STP Units 1 and 2 use approximately 2 percent and all four STP units would use 4 percent of the Colorado River discharge. The Main Cooling Reservoir (MCR) is used to store cooling water withdrawn from the Colorado River during periods of relatively high discharge. The MCR has a sufficient storage capacity so that it can supply necessary cooling water to all four units without makeup water for an extended duration. STPNOC stated that the projected firm water demands for stored water in the upstream Colorado River currently is still less than the total firm water available; therefore, it is an extremely remote possibility that firm water rights would be reduced even under extreme drought conditions and that, if the conditions are worse than the drought of record, backup water would be released from firm stored water or any other sources of water originating upstream of the Bay City Dam (ER Section 5.2.1). Safe plant shutdown will not depend on the ability to pump river water to the MCR because engineered ultimate heat sink water storage tanks provide water for safe shutdown. If and when the MCR water level drops below its lowest operating level, STPNOC would shut down Units 3 and 4 (ER 3.4.1.3.3). No changes were made to the EIS as a result of these comments.*

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-16, Lines 22-24: The DEIS indicates that Lake Buchanan has a storage capacity of 875,566 ac-ft and that Lake Travis has a storage capacity of 1,131,650 ac-ft. Since storage volumes vary with water depths, it is therefore suggested that the two statements be revised to "Lake Buchanan has a storage capacity of 875,566 ac-ft at normal operating level and ....", and "Lake Travis has a storage capacity of 1,131,650 ac-ft at normal operating level and ...." (**0010-1-3** [Head, Scott])

Response: *Section 2.3.1.1 of the EIS was changed in response to this comment to more clearly convey the storage capacities of the highland lakes.*

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-18, Lines 25-26: The DEIS states: "Water is pumped into the MCR from the Colorado River to maintain the water quality below 3000 µS/cm for specific conductivity (STPNOC 2009a)." The DEIS statement is not completely accurate based on Environmental Report Reference 5.2-4, the Amended and Restated Contract by and between the Lower Colorado River Authority and STP Nuclear Operating Company, effective January 1, 2006. To eliminate any misunderstanding the statement should be simplified to read, "Water is pumped into the MCR from the Colorado River (STPNOC 2009a)." (**0010-1-4** [Head, Scott])

Response: *The LCRA and STPNOC water contract (LCRA-STPNOC 2006) states that "… reservoir blowdown will commence as necessary to maintain MCR water at an average of 3000 µS/cm" (see Note 2 below Water Delivery Plan, page 26). The review team clarified Section 2.3.1 of the EIS to state that the MCR will likely have periodic discharges to the Colorado River, as well as withdrawals from the river.*

Lower Colorado River Authority and STP Nuclear Operating Company (LCRA-STPNOC). 2006. Amended and Restated Contract By and Between The Lower Colorado River Authority and STP Nuclear Operating Company. Effective as of January 1, 2006.

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-19, Lines 3-5: The DEIS states: "The powerblock area of the existing Units 1 and 2 is drained by gravity toward the northwest to a point west of the existing switchyard where the existing Main Drainage Channel (MDC) starts (Figure 2-12)." The power block for existing Units 1 and 2 drains by gravity to the east via the Plant Area Drainage Ditch or via drainage around the Essential Cooling Pond. Environmental Report (Rev. 3.0) Section 6.3.1.3 addresses storm water outfalls and Figure 6.3-3 shows these outfalls. The STP Units 1 and 2 powerblock area drains to Outfall A to the southeast. (**0010-1-5** [Head, Scott])

Response: *Section 2.3.1 of the EIS was updated to indicate the correct drainage paths from the power-block area of existing Units 1 and 2. The description of the MDC was updated also.*

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-19, Line 32: The DEIS states: "The RMPF contains 18 traveling screens, each 13.5 ft in width (STPNOC 2009a)." Environmental Report (Rev. 3.0) Figure 3.4-5 shows 18 screens. The correct number of traveling screens is 24, with each 10 ft in width, as shown in the Unit 1 and 2 Operating License Environmental Report, Figures 3.4-2 and 3.4-4. A revised figure will be included in the next revision of the COLA. (**0010-1-6** [Head, Scott])

Response: *Section 2.3.1 of the EIS was updated to state that the RMPF contains 24 traveling screens each 10 ft in width.*

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-21, Figure 2-12: The Main Drainage Channel has been relocated as part of pre-construction activities. In DEIS Figure 2-12, "Current Location of MDC" should read "Previous Location of MDC" and "Main Drainage Channel (MDC)" should read "Relocated Main Drainage Channel (MDC)". The title of DEIS Figure 2-12 should be reworded to read, "Current and Previous Locations of the Main Drainage Channel (STPNOC 2009b)." (**0010-1-7** [Head, Scott])

Response: *Figure 2-12 of the EIS was updated to reflect the current location of the MDC.*

Comment: DEIS Section 02.03.02. Water - Water Use. Page 2-34, Lines 11-13: The DEIS states: The STPNOC currently holds a water right for 102,000 ac-ft of water per year (determined as a 5-year rolling average) from the Colorado River and is authorized to divert water at a maximum rate of 1200 cfs. Although there is a provision in the existing STPNOC-LCRA water contract that the river permit can be amended to allow diversion of 102,000 ac-ft of water per year on average over any five consecutive years, this provision is not currently in effect. Therefore, the DEIS statement should be clarified to delete the text (determined as a 5-

year rolling average), to be consistent with the Environmental Report (Rev. 3.0) Table 2.3.2-3, which identifies 102,000 ac-ft of water per year as the STPNOC-LCRA permit limit without any discussion on rolling averages. (**0010-1-13** [Head, Scott])

Response: *The review team interpreted Amendment 1(b) on page 18 of the LCRA and STPNOC water contract (LCRA-STPNOC 2006), to mean that the maximum withdrawal of 102,000 ac-ft of water per year on a five-year rolling average basis is currently in effect and may be modified at a later date by mutual agreement and amendment of the contract. Following this STPNOC comment, the review team confirmed, using the LCRA-STPNOC water contract that the subject amendment is not currently in effect. Section 2.3.2 of the EIS was updated in response to the comment.*

Comment: DEIS Section 02.03.02. Water - Water Use. Page 2-34, Lines 15-17: The DEIS states that STPNOC also has access to a maximum of 20,000 acre-feet of water for operation of Units 1 and 2. Although the DEIS is not inconsistent with STPNOC's Lower Colorado River Authority (LCRA) Water Contract, which states that the LCRA will make available firm water totaling no more than 20,000 acre-feet/year (rolling five-year average) for 2-unit operation or 40,000 acre-feet/year (rolling five-year average) for any additional generation capacity, using the 40,000 acre-feet per year value provided in ER Rev. 3 (Section 2.3.1.1.2) would be more applicable to STP Units 3 and 4. (**0010-1-14** [Head, Scott])

Response: *The review team disagreed with this comment. 20,000 ac-ft/yr of firm water for Units 1 and 2 is available to STPNOC at the STP site as described in Section 2.3.2.1 of the EIS. Water use for STP Units 3 and 4, including their firm water supply, is discussed in Section 5.2.2.1. Reporting 40,000 ac-ft/yr as a value applicable to Units 3 and 4, as suggested by the commenter above, would be overstating the firm water available to Units 3 and 4 per the LCRA-STPNOC water contract. Therefore, no changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 02.03.02. Water - Water Use. Page 2-35, Lines 10-13: The DEIS states that STPNOC reported that the existing consumptive water use from the Colorado River is approximately 37,100 acre-feet per year. ER Rev. 3 Table 2.3.2-8 states that the consumptive water use is 34,821 acre-feet per year. The 37,100 acre-feet per year value is an average of the amount of water diverted from the Colorado River from 2001 to 2006. (**0010-1-15** [Head, Scott])

Response: *Section 2.3.2.1 of the EIS was updated to show a consumptive water use of 34,821 ac-ft/yr.*

Comment: DEIS Section 02.03.03. Water - Water Quality. Page 2-45, Line 2: The DEIS states, "Stormwater runoff discharge from the STP site is monitored at eight outfalls...." This is incorrect. Only those outfalls associated with industrial activity require monitoring. Only 3 of the

eight outfalls are associated with industrial activity and thus are the only ones monitored. (**0010-1-17** [Head, Scott])

Response: *The statement referred to by the commenter occurs in Section 2.3.4 of the EIS. Based on Section 6.3.1.3 of STPNOC's environmental report (ER) Revision 4, EIS Section 2.3.4.2 was updated to state that stormwater runoff discharge from the STP site is monitored at four outfalls.*

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-4, Lines 26-27: The DEIS states that "... the MCR normal maximum water surface elevation would be raised from 47 to 49 ft mean sea...." The DEIS should also state that the 49 MSL is the original design maximum operating level (STPNOC is not changing the design). (**0010-2-2** [Head, Scott])

Response: *Section 5.2.1 of the EIS was modified to add the following explanatory sentence, "The normal maximum operating elevation for the original MCR design is 49 ft above MSL."*

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-6, Lines 2-3: The DEIS states that "STPNOC would have access to 20,000 acre-feet of firm water for operation of Units 3 and 4". Although the DEIS is not inconsistent with STPNOC's Lower Colorado River Authority (LCRA) Water Contract, which states that STPNOC also has rights to an additional 20,000 acre-feet per year of rolling water rights for a two unit operation, and 40,000 acre-feet per year for a four-unit operation any additional generation capacity. STPNOC recommends using the 40,000 acre-feet per year value provided in ER Rev. 3 (Section 2.3.1.1.2). (**0010-2-3** [Head, Scott])

Response: *Firm water availability for STP Units 1 and 2 is described in Section 2.3.2.1, and the sentence referred to in Section 5.2.2.1 mentions additional firm water that would be available for the proposed Units 3 and 4. There is no inconsistency, and addressing firm water availability for all four units would be confusing because in Section 5.2.2 incremental impacts of Units 3 and 4 water use is described. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 05.02 Water-Related Impacts - Operation. Page 5-6, Lines 21-23: The DEIS states that, "... the current STP water use for Units 1 and 2 during normal operations is 2 percent (37,100 ac-ft/yr of use with 1,903,000 ac-ft/yr)…." According to the Table 2.9S-1 of Environmental Report (Rev. 3.0), the value of 37,100 ac-ft/yr is the average withdrawal from the Colorado River for the calendar years 2004 to 2006. Lines 23-25 of the DEIS states that, "... the proposed STP water use for the existing and proposed units during normal operations would be 4 percent (37,100 plus 34,405 ac-ft/yr of use with 1,903,000 ac-ft/yr)...." The 34,405 ac-ft water use for Units 3 & 4 should be corrected as 37,405 ac-ft, which is consistent with value shown on Line 7 of the DEIS. The 37,405 ac-ft is the projected long-term average MCR evaporation loss from Units 3 & 4 at full load condition (STPNOC 2009f). Because the water use values provided

in the DEIS for the existing units and the proposed units were derived on different basis, it is suggested that the DEIS statement in Lines 23-25 be revised as follows to include the definitions of the two values: "... (37,100 ac-ft/yr, based on a 3-year average (STPNOC 2009a), plus 37,405 ac-ft/yr, based on the projected long-term average MCR evaporation at full load operating condition (STPNOC 2009f) of use with 1,903,000 ac-ft/yr) of available surface water resource." (**0010-2-5** [Head, Scott])

Response: *Section 5.2.2.1 of the EIS was updated in response to this comment.*

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-15, Lines 22-23: The DEIS states that STPNOC would discharge when the specific conductivity of the water in the MCR exceeds 3000 µS/cm. Based on response to RAI 02.0306 (Reference STPNOC 2009d - STPNOC Letter U7-C-STP-NRC-090006, dated January 22, 2009), there are other concurrent requirements identified in RAI 02.03-06 as stipulated in the STPNOC-LCRA water contract for blowdown to be performed. This is MCR Blowdown Rule # 4 from RAI 02.03-06. (**0010-2-13** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-15, Lines 24-27: The DEIS states that "The MCR discharge would cease when the conductivity of the water in the MCR falls to 2100 µS/cm. Discharge from the MCR could also occur during large rainfall events when the MCR water surface elevation exceeds the spillway crest elevation." Based on response to RAI 02.03-06 (Reference STPNOC 2009d - STPNOC Letter U7-C-STP-NRC-090006, dated January 22, 2009), there are also other rules as specified in the STPNOC-LCRA water contract for blowdown to cease. The DEIS should be clarified to include these other blowdown rules. (**0010-2-14** [Head, Scott])

Response: *Section 5.2.3.1 of the EIS was updated to clarify that there are other concurrent requirements for discharge from the MCR.*

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-10, Lines 13-15: The DEIS states that: "The expected consumptive surface-water use of proposed Units 3 and 4 would be 37,373 ac-ft per year (23,170 gallons per minute [gpm] during normal operations and 37,788 ac-ft per year (23,427 gpm) during maximum demand conditions." Per response to RAI 05.02-08, please revise the statement accordingly: "The expected consumptive surface-water use of proposed Units 3 and 4 would be 37,430 ac-ft per year (23,190 gallons per minute [gpm]) during normal operations and 38,050 ac-ft per year (23,570 gpm) during maximum demand conditions". (**0010-2-44** [Head, Scott])

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-10, Line 18: The DEIS states that: "...under normal operations and 69,004 act-ft per year...." Although not stated in this paragraph, the maximum annual value for Units 1 & 2 is stated in the response to RAI

05.02-07 as 37,200 ac-ft per year. Thus, this would be 38,050 + 37,200 = 75,250 ac-ft per year. (**0010-2-48** [Head, Scott])

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-10, Lines 18-19: The DEIS states that: "... per year (42,780 pgm)...." Although not stated in this paragraph, the maximum annual value for Units 1 & 2 is stated in the response to RAI 05.02-07 as 37,200 ac-ft per year, which equates to 23,063 gpm. Thus, this would be 23,570 + 23,063 = 46,633 gpm.) (**0010-2-49** [Head, Scott])

Response: *Section 7.2.1.1 of the EIS was updated in response to these comments.*

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-10, Lines 16-17: The DEIS states that: "... from the Colorado River from 2001 through 2006 (STPNOC 2009a)." Please revise the statement accordingly: "... from the Colorado River from 2001 through 2004 (STPNOC 2009c)." As corrected in the response to RAI 05.02-07 with markups in response to RAI 05.10-4, the Units 1 & 2 average consumptive use value used here is not a 6-year average, but rather is a computed 3-year (2004, 2005, and 2006) average value cited in COL 3 & 4 ER Table 2.9S-1. An average long term consumptive use was calculated to be 33,200 acre-ft per year for Units 1 and 2 per the response to RAI 05.02-07. (**0010-2-45** [Head, Scott])

Response: *In ER Revision 4, Table 2.3.2-8, STPNOC states that the average amount of water diverted from the Colorado River is 37,804 ac-ft/yr. The sentence on draft EIS page 7-10, lines 16-17, described the water diverted from the Colorado River during 2001 to 2006. The final EIS was updated to correct the typographical error.*

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-10, Lines 17-18: The DEIS states that: "Together, all four STP units would consume approximately 68,714 ac-ft per year...". The 3-yr average for all four units would be 74,513 ac-ft/yr. (**0010-2-46** [Head, Scott])

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-10, Line 18: The DEIS states that: "...per year (42,600 gpm)...". The 3-yr average for all four units would be 46,180 gpm. (**0010-2-47** [Head, Scott])

Response: *The review team is not using three-year average values on draft EIS page 7-10, lines 17-18. For the cumulative impact assessment, the long-term average water use is being used. Section 7.2.1.1 of the final EIS was updated to clarify the review team's assessment.*

Comment: DEIS Section 09.04. System Design Alternatives. Page 9-208, Line 23: The DEIS states that UHS system discharges account for approximately 500 gpm of groundwater discharged to the MCR. The UHS discharge is estimated at 283 gpm (see stream 5 in ER Table 3.3-1, Figure 3.3-1) under normal operations. The total discharge to the MCR (stream 10)

is 530 gpm, or approximately 500 gpm as stated in the DEIS, but that estimate includes sanitary waste, liquid radwaste, and wastewater retention basin effluents in addition to the UHS system discharges. Clarify that the discharge of 500 gpm to the MCR is not solely a result of UHS system discharges. (**0010-2-68** [Head, Scott])

Response: *Section 9.4 of the EIS was revised to update the description of the ultimate heat sink (UHS) discharge in response to this comment.*

Comment: The EIS is deficient in its evaluation of surface water issues which are especially important in Matagorda County as keeping sufficient freshwater inflow to our delicate bay and estuary system assures the success of not only the commercial and recreational fishing industries, but also overall health of the Gulf which are all dependent on the aquatic reproduction based at or near Matagorda County. The LCRA-SAWS (Lower Colorado River Authority-San Antonio Water System) is touted as being one solution to the shortage of river water; desalinization is another. The LCRA-SAWS project was officially canceled long before the draft EIS was released and should not, therefore, be considered part of the solution for the water shortage (http://www.lcra.org/water/facts.html). The predicted rise in sea level due to climate change will push brackish water even further inland, exacerbating the effects of loss of freshwater inflow (Draft NUREG-1937, 2-15). (**0013-2** [Dancer, Susan])

Response: *The review team evaluated the impact of proposed STP Units 3 and 4 water use in Section 5.2.2.1 of the EIS. The review team considered the cumulative impacts of the LCRA-SAWS project and global climate change (GCC) in Section 7.2.1.1. The review team considered the LCRA-SAWS water project to export water out of the Lower Colorado River Basin as a possible future cumulative impact and not as a solution to water shortage. Although the LCRA-SAWS water project is currently on hold because of ongoing legal proceedings, no announcement of project cancellation has been made. The review team used available instream flow requirements for bays and estuaries in its assessment. No changes were made to the EIS as a result of this comment.*

Comment: In the case of ... surface water issues, the EIS asserts that because Texas has rights of ownership which STP has already purchased, the issues are resolved. This is not a thorough or sufficient visitation or resolution of these issues. To claim that STP has purchased water that, by its own admission doesn't exist (Draft NUREG-1937, 2-33, 2-133) is preposterous. Secondly, no sense of social justice can be preserved when a community is being told that it can rely on a defunct inter-municipal agreement (LCRA-SAWS) combined with undeveloped, super expensive futuristic technology (desalinization) to meet its most base needs such as drinking water. (**0013-5** [Dancer, Susan])

Response: *The review team considered the effect of increased water use by the proposed STP Units 3 and 4 on the available water resource of the Colorado River in Chapter 5 of the EIS. The review team considered the effects of water use for all four units and the water use for*

other existing, proposed, and reasonably foreseeable future actions in Chapter 7 of the EIS. The review team considered the LCRA-SAWS water project to export water out of the Lower Colorado River Basin as a possible future cumulative impact and not as a solution to water shortage. Section 7.2.1.1 describes that after accounting for known and reasonably foreseeable future water usage, Region K would have surplus water supply with implementation of all water management strategies described in the 2007 State Water Plan by 2060. Therefore, the review team concluded that the impact of the water usage by known and reasonably foreseeable future projects on surface water resources of Region K would be noticeable, but not destabilizing. No changes were made to the EIS as a result of this comment.

Comment: The DEIS acknowledges that a rising sea level caused by climate change could cause salt water to flow farther up the Colorado River towards the Reservoir Makeup Pumping Facility but does not consider the increased salinity of the water on plant operations. Increased salinity of water from the Colorado River could have adverse effects on plant operations. (**0015-4** [Johnson, Matthew])

Response: *The review team considered the impact from construction and operation on the environment in the EIS. Any adverse effects on the new units caused by events in the environment are evaluated in the NRC's Safety Evaluation Report. This comment is beyond the scope of the environmental review and therefore no changes were made to the EIS as a result of this comment.*

Comment: The review team failed to analyze the impact of increased ambient air and cooling water temperatures on operations. Nor did it analyze the impact of the increase thermal loading resulting from the discharge. Both of these impacts were raised during public comments on these plants. The failure of the NRC's staff to analyze these impacts is a serious omission. (**0015-30** [Johnson, Matthew])

Comment: The DEIS fails to consider the effect of global warming on operations of STP Units 3 & 4 related to 1) water availability and 2) increased ambient temperatures of air and the effect of higher cooling water temperatures. The failure to consider these adverse impacts has the effect of omitting material information concerning water usage and temperature thereof and effects on plant operations. This omission has the effect of overstating relative advantages of nuclear power and understating environmental impacts. (**0015-6** [Johnson, Matthew])

Response: *The review team considered effects related to GCC in Section 7.2 of the EIS. Based on available information, the review team concluded that GCC could result in decreased precipitation and increased temperatures in the lower Colorado River basin. These forecasted changes have the potential to reduce surface runoff and increase evapotranspiration and may result in reduction in the surface water resource in the region. To the extent that these comments are focused on adverse effects on the new units caused by events in the environment rather than effects on the environment from construction and operation of the new*

units, the comments are beyond the scope of the environmental review. The concluding statements in Sections 7.2.1.2 and 7.2.2.2 now draw the distinction between global and local effects of climate change. The review team stated in Section 7.2 that while the changes from GCC may not be insignificant nationally or globally, the review team has not identified anything that would alter the conclusions presented regarding surface water use and quality in the geographical area of interest.

Comment: The DEIS analysis of surface water availability fails to account for the sale of 19,356 acre ft/yr from the Colorado River to the Las Brisas coal-fired power plant.

The David Power Report notes that the water resources for Units 3 & 4 operations has been diminished by the recent sale of 19,356 acre ft/yr from the Colorado River for use by the Las Brisas coal-fired power plant. The DEIS does not discuss this transaction nor the effects thereof on the assumed volume of water available from the Colorado River for Units 3&4 operations. This is a material omission from the DEIS discussion of surface water impacts and is significant, particularly in low-flow periods, when STP units will be competing for scarce water resources with other power plants. (**0015-12** [Johnson, Matthew])

Comment: Since the DEIS was released, at least two significant events have occurred:

The Corpus Christi, Texas, City Council has approved the sale of water to the proposed Las Brisas coal plant. The City will be piping water from the Colorado River to the serve the needs of this plant. This new plant will could withdraw as much as 19,356 acre feet a year from the Colorado, thus decreasing water flow to STP Units 3 and 4. (**0015-16** [Johnson, Matthew])

Comment: Additional Water Demands Not Addressed in the DEIS: Two new proposed coal plants will use significantly more water than is currently withdrawn from the Colorado River. Since the DEIS was written, the Corpus Christi City Council has authorized the City Manger to negotiate a contract to sell water from the Colorado River to the Las Brisas Energy Center. That means a total of nearly 39,000 acre feet of Colorado water will consumed before it reaches the STP water intake, thus reducing the availability of make-up water.
(**0015-29** [Johnson, Matthew])

Response: *The last of the three proceeding comments (0015-29) mentions two coal plants but names only the Las Brisas Energy Center. The review team assumed that the commenter meant the second one of these to be the White Stallion Energy Center near Bay City, Texas. The impact of White Stallion Energy Center's 22,000 ac-ft/yr water use was described in Draft EIS Section 7.2.1.1.*

According to the minutes of the May 11, 2010 (City of Corpus Christi 2010), meeting of the City Council of the City of Corpus Christi, the water that it has agreed to provide to the Las Brisas Energy Center will be supplied from its current water supplies and not from the Colorado River.

This assessment is consistent with the fact that the City has no water supply pipeline from the Lower Colorado River and no plans to have one by the time Las Brisas Energy Center is expected to begin operations in 2013. Based on this information (which contradicts much of the information in the comments), the review team concluded that the Las Brisas Energy Center would not contribute to the cumulative impacts of the proposed action to build two new nuclear units at the STP site and therefore Las Brisas Energy Center is not discussed in the body of this EIS. However, the review team notes that the City of Corpus Christi does own water rights amounting to 35,000 ac-ft/yr in the Lower Colorado River and that it retains the option to use this water via the construction of Phase II of the Mary Rhodes pipeline (City of Corpus Christi 2009). According to the City, the water would be used to meet growing demand when needed, with an operational date currently estimated in the 2020 to 2030 timeframe (City of Corpus Christi 2009).

In response to the comments, Sections 2.3 and 7.2 of the EIS were updated to include a description and an evaluation of the impact of the City's use of its 35,000 ac-ft/yr Colorado River water rights.

City of Corpus Christi. 2009. Garwood Pipeline Project, Project Update 2009. October 2, 2009. Water Department, Corpus Christi, Texas. Available at http://www.cctexas.com/files/g17/GarwoodCouncilPresentation100209.pdf.

City of Corpus Christi. 2010. Minutes: City of Corpus Christi, Texas, Regular Council Meeting, May 11, 2010 – 12:00 p.m. May 11, 2010. City of Corpus Christi, Texas. Available at http://www.cctexas.com/files/g40/051110min5.pdf.

Comment: The review team also found: "the projected change in precipitation from the "recent past" (1961-1979) to the period 2080 to 2099 is a decrease of between 10 to 30 percent (Karl et al. 2009)." (page 125 note 117). An additional recent study for the Texas Water Development board found: "The recent drought in the Southeastern U.S. during 2007 has drawn attention to the vulnerability of electric power production to low stream flows. In the Fall of 2007, the governor of Alabama wrote a letter to President Bush regarding a proposed Georgia water conservation strategy that threatened to shut down the Farley Nuclear Plant in Alabama due to a limited supply of cooling water [Riley, 2007]. As water consumption in other sectors increases over the next 50 years, the power sector, Central and West Texas in particular, will become increasingly vulnerable to drought. Drought can threaten the ability to cool a steam-electric power plant if insufficient water is available for diversion and/or withdrawal." (**0015-28** [Johnson, Matthew])

Response: *The review team described the current operation of STP Units 1 and 2 in Chapter 2 of the EIS and that of the proposed STP Units 3 and 4 in Chapter 5. The MCR stores cooling water and is filled during relatively high flows in the Colorado River. During an extended*

drought, if all water rights available to STPNOC have been used and if the water stored in the MCR is not sufficient to support plant operations and to comply with all permit requirements, the units would not be expected to remain in operation; provisions may exist to allow the plant to continue to operate in energy emergency situations. The review team considered the effects of prolonged droughts, including the most severe historical droughts, in its analysis in Chapters 5 and 7. Section 7.2.1.1 describes that after accounting for known and reasonably foreseeable future water usage, Region K would have surplus water supply with implementation of all water management strategies described in the 2007 State Water Plan by 2060. Therefore, the review team concluded that the impact of the water usage by known and reasonably foreseeable future projects on surface water resources of Region K would be noticeable, but not destabilizing. No changes were made to the EIS as a result of this comment.

Comment: DEIS Section 10.02. Unavoidable Adverse Environmental Impacts. Page 10-8, Lines 7-8 and Table 10-2: The DEIS states that water use and quality would be affected during operations due to potential increases in sedimentation to surface waters and potential surface and groundwater contamination from spills. The Environmental Report (Rev. 3.0) makes no mention of sedimentation issues to surface water during operation. The Environmental Report (Rev. 3.0) indicates that groundwater quality could be affected by radioactive spills during a severe accident (Section 7.2.2.3). The consequences of a radioactive spill were evaluated in COLA Part 2, FSAR Subsection 2.4S.13 and the results show that if radioactive liquids were released directly to groundwater, the isotopic concentrations would be below 10 CFR 20 effluent limits before they reached a drinking water receptor. This does not seem to be the issue being addressed in Chapter 10 of the DEIS; therefore, it is unknown what drives this statement. Inadvertent spills are not listed as a water use or quality impact from operations in the ER. (**0010-2-72** [Head, Scott])

Response: *Any active industrial site could result in sedimentation from stormwater runoff. These effects are controlled and managed by best management practices and permitted under Texas Pollutant Discharge Elimination System (TPDES). Any nonradioactive spills that occur at the site also would be addressed by the TPDES permit and required to be cleaned up as soon as possible. No changes were made to the EIS as a result of this comment.*

Comment: The DEIS also failed to analyze the impact of increased ambient air and cooling water temperatures on operations. Nor did it analyze the impact of the increase thermal loading resulting from the discharge.

In its review the NRC staff found: The review team determined that the forecasted changes could affect water supply and water quality in the Colorado River Basin during operation of the proposed STP Units 3 and 4. For the water use and water quality assessments discussed below, the review team considered forecasted changes to temperature and precipitation for the entire Colorado River watershed. The projected change in temperature from “present day”

(1993-2008) to the period encompassing the licensing action (i.e., the period of 2040 to 2059 in the GCRP report) for the Colorado River watershed is an increase of between 0 to 5[degrees]F.

GCC could result in decreased precipitation and increased temperatures in the lower Colorado River basin. These forecasted changes have the potential to reduce surface runoff and increase evapotranspiration. The changes may result in reduction in the surface water resource in the region. (p.7-13) The review team failed to examine the impact of increased ambient temperature on the temperature of the cooling water reservoir. Large coal and nuclear plants have been limited in their operations by reduced river levels caused by higher temperatures and thermal limits on water discharge. (**0015-27** [Johnson, Matthew])

Response: *In Section 7.2.1.1 of the EIS, the review team determined, based on its independent review of the recent compilation of the state of knowledge by the GCRP that GCC could result in decreased precipitation and increased temperatures in the lower Colorado River Basin. These forecasted changes have the potential to reduce surface runoff and increase evapotranspiration. The changes may result in reduction in the surface water resource in the region. While these changes from GCC may not be insignificant nationally or globally, the review team has not identified anything that would alter its conclusions that the cumulative impact on surface water use in the geographical area of interest is noticeable. Furthermore, volume and temperature of discharges from the STP units are and would be controlled under a TPDES permit. Based on the review team's assessment described in Chapters 5 and 7 of the EIS, there is sufficient available operational flexibility in the MCR-Colorado River system to accommodate discharges from the MCR with all four STP units operating. No changes were made to the EIS as a result of this comment.*

E.2.9 Comments Concerning Hydrology – Groundwater

Comment: They [STPNOC] are a good steward of their underground water also. (**0003-35** [Mann, Billy])

Response: *This comment expresses general support for STPNOC, specifically their use of groundwater; therefore, no changes were made to the EIS as a result of this comment.*

Comment: The U.S. Environmental Protection Agency Region 6 Ground Water Center has reviewed the Draft Environmental Impact Statement for Combined Licenses for South Texas Project Electric Generating Station Units 3 and 4. The document was reviewed mainly from the perspective of how the project will affect ground water. It appears that, based on the information contained in the report, the project should not have a significant impact on the regional ground water resources. ... Recent trends show a decline in use of ground water the area. Using the permitted 3000 ac/ft/yr average withdrawal rate analysis demonstrated that the drawdown would be substantially less than the confining pressure in the Deep Aquifer and have a minimal regional affect to the ground water resource. The EPA Region 6 Ground Water

Center agrees with the project review team's conclusion that impacts to the ground water resource will be small. (**0006-1** [Bechdol, Michael])

Comment: The report indicates the South Texas Plant Electric Generating Station (STP) site already has 3000 ac/ft/yr of ground water allocated to it, while none of the other alternative nuclear locations or other types of energy plants are as efficient in the use of water resources. (**0006-2** [Bechdol, Michael])

Response: *These comments reflect EPA Region 6 Ground Water Center's review of the draft EIS, specifically groundwater. No changes were made to the EIS as a result of these comments.*

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-26, Lines 24-26: The DEIS states: "The bottom of the MCR is unlined and acts as a local recharge source for the Upper Shallow Aquifer, and it appears to cause some mounding in the Upper Shallow Aquifer and possibly the Lower Shallow Aquifer (STPNOC 2008c, 2009c)." Although the cited reference STPNOC 2008c, dated December 18, 2008 (response to ER RAI 02.03-07), did indicate that "...postulated mounding in the aquifer is plausible due to the influence of the MCR," the results of subsequent analyses as discussed in the response to FSAR RAI 02.04.12-28 (STPNOC 2009c, dated September 21, 2009) determined that there are "...no obvious mounding impacts to the Lower Shallow aquifer from the MCR." Thus, the DEIS statement should be clarified to delete the following portion of the sentence "...and possibly the Lower Shallow Aquifer". (**0010-1-8** [Head, Scott])

Response: *Section 2.3.1.2 of the EIS was revised to include reference to Updated Final Safety Analysis Report (UFSAR) Figures 2.4.13-17 and 2.4.13-17A (UFSAR STP Units 1 and 2). The influence of the MCR on the Lower Shallow Aquifer cannot be ruled out based solely on the STPNOC responses to RAIs 02.04.12-20 (December 30, 2008) and 02.04.12-28 (September 21, 2009) because of the apparent change in the piezometric contours within the Lower Shallow Aquifer since pre-site conditions. STPNOC stated in response to RAI 02.04.12-30 (September 21, 2009) that observed tritium concentrations in the Upper and Lower Shallow Aquifers support a downward vertical gradient. STPNOC concluded in the above-mentioned RAI response that "… due to the pervasive downward vertical hydraulic gradient, releases to the Upper Shallow aquifer will flow downward to the Lower Shallow aquifer where the hydraulic conductivity of the material separating the aquifers is conducive to downward flow" and that the finding supports the site conceptual model. Because of the presence of downward vertical gradient at the STP site, water seeping out of the unlined bottom of the MCR would pass through the Upper Shallow Aquifer and may eventually migrate to the Lower Shallow Aquifer. Therefore, STPNOC's data and assessment based on this data support the EIS conclusion that some mounding in the Lower Shallow Aquifer is possible.*

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-27, Lines 10-12: The DEIS states: "In the vicinity of the proposed and existing STP units, where the confining unit has been removed, the hydraulic gradient between Upper and Lower Shallow aquifers is downward, and groundwater movement is known to occur between them (see ER Section 2.3.1.2.5.1)." The cited Environmental Report (Rev. 3.0) subsection, does not make explicit statements that "groundwater movement is known to occur" between the two aquifers. Thus, without direct evidence, such as might be obtained from a tracer test, groundwater movement between the Upper and Lower Shallow aquifers can only be interpreted (or hypothesized) to occur. To eliminate any misunderstanding, the DEIS statement should be clarified to read, "In the vicinity of the proposed and existing STP units, where the confining unit has been removed, the hydraulic gradient between Upper and Lower Shallow aquifers is downward, and groundwater movement is interpreted to occur between them (see ER Section 2.3.1.2.5.1)." (**0010-1-9** [Head, Scott])

Response: *Section 2.3.1.2 of the EIS was revised to include reference to STPNOC's response to RAI 02.04.12-30 (September 21, 2009), which describes monitoring of a tritium leak in the vicinity of STP Units 1 and 2. This leak is essentially a tracer test and direct evidence of downward groundwater movement between the Upper and Lower Shallow aquifers.*

Comment: DEIS Section 02.03.01. Water- Hydrology, Page 2-27, Lines 13-15: The DEIS states: "Potentiometric measurements completed in September 2008 in the vicinity of Kelly Lake indicate an upward groundwater gradient between Lower and Upper Shallow aquifers, and a hydraulic equilibrium between the Upper Shallow Aquifer and Kelly Lake (STPNOC 2008g)." The response to FSAR RAI 02.04.12-20 (STPNOC 2008g) states: "September 2008 groundwater levels measured in new observation wells near the lake indicate an upward flow potential from the Lower to Upper Shallow aquifer and a piezometric surface in the Upper Shallow Aquifer essentially equal to the water level in the lake. These findings suggest that groundwater from the nearby Shallow Aquifer discharges to Kelly Lake." The following text in the DEIS statement "...a hydraulic equilibrium...." suggests that neither discharge from nor recharge to the groundwater system from the lake is occurring, which is distinctly different from the statements provided in the RAI response. (**0010-1-10** [Head, Scott])

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-27, Lines 33-34: The DEIS states: "Groundwater production wells located along the northern perimeter of the MCR withdraw...." Environmental Report (Rev. 3.0) Figure 2.3.2-4, shows Production Well No. 8 located on the east side of the existing plant site, which is not directly located along the northern perimeter of the MCR. The DEIS statement could better state, "Groundwater production wells located north of the MCR withdraw...." (**0010-1-11** [Head, Scott])

Comment: DEIS Section 02.03.01. Water - Hydrology, Page 2-28, Lines 7-8: The DEIS states: "Groundwater reversal is occurring locally to the STP production wells with groundwater being drawn to the wells from the northwest and southeast." Environmental Report (Rev. 3.0)

Subsection 2.3.1.2.3.4 states: "The onsite Deep Aquifer potentiometric surface suggests a reversal of the regional flow direction in the southern portion of the map, where flow is north toward the site pumping wells, rather than toward the southeast." As indicated in the ER, groundwater is being drawn to the production wells in approximately a radial pattern, not just from the northwest and southeast. Thus, the DEIS statement should be clarified to eliminate any misunderstanding. (**0010-1-12** [Head, Scott])

Response: *Section 2.3.1 of the EIS was revised based on information provided in these comments.*

Comment: DEIS Section 03.02. Proposed Plant Structures. Page 3-11, Line 3: The DEIS states, "Groundwater wells are planned to dewater deep excavations in the power block region." For clarity, STPNOC recommends the phrase "Groundwater wells" be replaced with "Dewatering wells." (**0010-1-41** [Head, Scott])

Comment: DEIS Section 03.03. Construction and Preconstruction Activities. Page 3-15, Line 2: The DEIS states, "The slurry wall would be installed into the Upper Aquifer in the power block area." To be consistent with terminology in Environmental Report (Rev. 3.0) Subsection 2.3.1.2.3.1, STPNOC recommends this statement be revised to state: "The slurry wall would be installed into the Shallow Aquifer in the power block area." (**0010-1-42** [Head, Scott])

Comment: DEIS Section 03.03. Construction and Preconstruction Activities. Page 3-15, Line 17: The DEIS states, "Wells would be drilled using standard drilling practices into the Upper Aquifer." To be consistent with terminology in Environmental Report (Rev. 3.0) Subsection 2.3.1.2.3.1, the statement should be clarified to state: "Wells would be drilled using standard drilling practices into the Shallow Aquifer." (**0010-1-44** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-19, Line 3-4: The DEIS states, "STP estimates that the two proposed units would require approximately 1242 gpm of groundwater during normal operation and 4108 gpm during shorter-term peak demand periods." STPNOC's response to NRC Request for Additional Information (RAI) 05.10-4, identifies the correct number during normal operation of 975 gpm, and the correct number during shorter-term peak demand periods of 3434 gpm. STPNOC recommends that the DEIS be revised to reflect the current estimates provided in STPNOC's response to RAI 05.10-4 (STPNOC Letter U7-C-STP-NRC-090164 dated September 28, 2009). (**0010-1-47** [Head, Scott])

Response: *Sections 3.2, 3.3, and 3.4 of the EIS were revised based on information in these comments.*

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-8, Line 21: The DEIS states that there is no permit limit on short-term groundwater demands. The term permit

limit should be replaced with available groundwater withdrawal capacity. (**0010-1-62** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-8, Line 30: The DEIS states that "... the distance allowed by CPGCD between groundwater production wells." Please insert the text "unless the wells are owned by the same person(s)" at the end of the sentence above. (**0010-1-63** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-8, Lines 35-36: The DEIS states that existing STPNOC production wells are pumped at 500 gpm and extend down to approximately 700 ft bgs. ER Rev. 3 Section 2.3.2.2.1 and Table 2.3.2-17 indicates that the production wells range in depth from 600 to 700 ft bgs with design pumping capacities ranging from 200 to 500 gpm. However, the wells are pumped at much less than their design capacity: As summarized in ER Rev. 3 Section 2.3.2.2.1 and Table 2.3.2-18, the average pumping rate of the wells collectively between 2001 and 2006 ranged from 745 to 863 gpm (note: only several of the five wells are pumped simultaneously). (**0010-1-64** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-9, Line 11: The DEIS states that "At a distance of 2500 ft from the production well, the nearest allowed well location per CPGCD rules...". STPNOC recommends that the sentence be modified accordingly: "At a distance of 2500 ft from the production well, the nearest allowed well location per CPGCD rules for wells that are not owned by the same person(s)...." (**0010-1-65** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-10, Lines 3-4: The DEIS states that " ... and 2 operations, and may install and operate one or more additional well to decrease pumping rates..." STPNOC recommends that the sentence be modified as follows: " ... and 2 operations, and may install and operate one or more additional wells to decrease pumping rates to ensure sufficient withdrawal capacity to serve the total site water use under the existing groundwater permit (STPNOC 2009c)." (**0010-1-66** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-10, Line 7: The DEIS states that " ... CPGCD requires that wells be no closer than 2500 ft apart." STPNOC recommends that the sentence be modified as follows: " ... CPGCD requires that wells be no closer than 2500 ft apart, unless the wells are owned by the same owner(s)." (**0010-1-67** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-10, Line 12: The DEIS states that "Since building the proposed new units would use an estimated 1062 gpm ...." STPNOC recommends that the sentence be modified as follows: "Since building and operating the proposed new units would use an estimated maximum of 1062 gpm ...." (**0010-1-68** [Head, Scott])

Comment: DEIS Section 04.02. Water-Related Impacts - Construction. Page 4-10, Line 15: The DEIS states that " ... one impact of developing the proposed units is a reduction of 1062 gpm ...." STPNOC recommends that the sentence be modified as follows: " ... one impact of developing the proposed units is a reduction of up to 1062 gpm....." (**0010-1-69** [Head, Scott])

Response: *Section 4.2 of the EIS was revised based on information provided in these comments.*

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-12, Lines 7-8: The DEIS states that "Drawdown is evaluated at the property line and at a point 2500 ft from the well because that is the minimum distance allowed by the CPGCD between groundwater production wells (CPGCD 2009)." The statement is not true for wells owned by the same owners. STPNOC suggests that the sentence be changed accordingly: "Drawdown is evaluated at the property line and at a point 2500 ft from the well because that is the minimum distance allowed by the CPGCD between groundwater production wells not owned by the same owner. (CPGCD 2009)." (**0010-2-10** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts 1 Operation. Page 5-12, Line 25: The DEIS states that "At a distance 2500 ft from the production well, the nearest allowed well location per CPGCD rule...." The statement is not true for wells owned by the same owners. STPNOC suggests that the sentence be changed accordingly: "At a distance 2500 ft from the production well, the nearest allowed well location per CPGCD rule for groundwater production wells that are not owned by the same person(s) ...." (**0010-2-11** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-12, Line 28: The DEIS states that "...the location 2500 ft from an STP production well is the ...." STPNOC suggests that the sentence be modified accordingly: "...the location 2500 ft from an STP production well is assumed to be the ..." (**0010-2-12** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-18, Lines 36-38: The DEIS states that the bottom of the existing STPNOC production wells are at 700 ft bgs with pumping capacities of 500 gpm. ER Rev. 3 Section 2.3.2.2.1 and Table 2.3.2-17 indicates that the production wells range in depth from 600 to 700 ft bgs with design pumping capacities ranging from 200 to 500 gpm. (**0010-2-15** [Head, Scott])

Response: *Section 5.2 of the EIS was revised based on information provided in these comments.*

Comment: DEIS Section 07.02. Water Use and Quality - Cumulative. Page 7-15, Lines 5-6: The DEIS states that: "... annual average normal operation of groundwater requirement of 1860 gpm (3000 ac-ft/yr), which is the maximum usage allowed under the groundwater use...." Please modify the statement accordingly: "... normal operation of groundwater requirement of

9000 ac-ft over the approximately 3-year term of the groundwater use permit, which is the maximum usage allowed under the groundwater use....” (**0010-2-50** [Head, Scott])

Response: *Section 7.2 of the EIS was revised based on information in this comment.*

Comment: DEIS Section 09.04. System Design Alternatives. Page 9-208, Line 28: The DEIS states that groundwater wells at the STP site must be separated by 2500 ft from neighboring Deep Aquifer wells. The Coastal Plains Groundwater Conservation District rules do not specify a minimum well spacing for wells owned by the same owner. Add text “owned by different owners” after “...neighboring Deep Aquifer wells.” (**0010-2-69** [Head, Scott])

Comment: DEIS Section 09.04. System Design Alternatives. Page 9-208, Lines 31-33: The DEIS concludes it would not be possible to locate the required number of wells on the STP site. This conclusion is not supported since the analysis in the DEIS is based on a minimum well spacing of 2500 ft. The Coastal Plains Groundwater Conservation District rules do not impose minimum well spacing requirements for wells owned by the same owner.
(**0010-2-70** [Head, Scott])

Response: *Section 9.4 of the EIS was revised based on information provided in these comments.*

Comment: DEIS Section 10.02. Unavoidable Adverse Environmental Impacts. Page 10-4, Table 10-1: The DEIS states that an Unavoidable Adverse Impact to Water Quality would be “inadvertent spills that seep into aquifers and saltwater intrusion”. The Environmental Report (Rev. 3.0) indicates that only shallow aquifers would be affected (Section 4.2.3.2). Additionally, the wording could be misunderstood as if the spills would be caused by carelessness with no attempt to prevent or remediate. It should be re-worded to say “Seepage into aquifers from spills that are unable to be contained or remediated ...” Saltwater intrusion is not listed as a water quality impact in the ER. (**0010-2-71** [Head, Scott])

Response: *Section 10.2 of the EIS was revised based on information provided in this comment.*

Comment: DEIS Section 03.03. Construction and Preconstruction Activities. Page 3-17, Table 3-2: The DEIS states, the “Value” of the “Hydrology-Groundwater” is “95 ft below grade.” This value should be changed to 100 ft, for consistency with the STP Units 3 and 4 Final Safety Analysis Report. (**0010-1-45** [Head, Scott])

Response: *In Revision 3 of the Final Safety Analysis Report (FSAR), Section 2.5S.4.5.2.1, the deepest excavation is identified as 94 ft below the proposed rough grade, and in FSAR Revision 3, Section 2.5S.4.5.4.1, dewatering is identified as 3 ft below the excavation and 5 ft*

below slope faces. Table 3-2 of the EIS was clarified to show "… 94 ft below plant grade" and "… Excavation depth for which dewatering would be required."

Comment: The EIS is deficient in addressing ground water issues as well. Much rhetoric is available in the document about Texas' ground water ownership and STP's having already purchased enough to supply their needs, but it is also clear that more future water rights have been sold than will be physically available. (**0013-3** [Dancer, Susan])

Comment: In the case of ... ground water ... issues, the EIS asserts that because Texas has rights of ownership which STP has already purchased, the issues are resolved. This is not a thorough or sufficient visitation or resolution of these issues. To claim that STP has purchased water that, by its own admission doesn't exist (Draft NUREG-1937, 2-33, 2-133) is preposterous. (**0013-4** [Dancer, Susan])

Response: *The review team also is concerned with use of the groundwater resource during building and operation of the proposed units. These comments on Chapter 2 of the EIS, subsections on water use and public services, are interpreted to apply to Section 2.3.2.2 Groundwater Use. Section 2.3.2.2 does make it clear that permits issued by the Coastal Plains Groundwater Conservation District (CPGCD) for the period 2008 through 2010 exceed the amount of groundwater available in the county (see Table 2-4). Note, groundwater rights are not purchased in Texas; rather the groundwater conservation district allocates the groundwater resource through its permits according to its published rules. Note also that the allocated quantity has not been produced in Matagorda County. Production is governed by the infrastructure that is in place to produce groundwater. The CPGCD-estimated quantity of groundwater produced is well below both the managed available groundwater quantity and the allocated quantity (see Table 2-4). Therefore, while over-allocated, the groundwater resource is not over-produced. Because the full STPNOC permit is included in both the allocation total and the estimate of groundwater that can be produced, the groundwater needed to supply the proposed units represents a future demand that can be produced within the estimated quantity of the groundwater resource available in the county. The thorough discussion of potential impacts on groundwater use and quality with regard to building and operation of the proposed units can be found in Sections 4.2 and 5.2, respectively. To clarify the groundwater resource availability and use issue, Section 2.3.2.2 of the EIS, Groundwater Use, has been revised in response to these comments to provide a more complete statement of the groundwater available, allocated, and produced within the CPGCD. No changes were made to Section 2.5.2.6 of the EIS, Public Services, because the evaluation of issues related to groundwater use and quality during building and operation of the proposed Units 3 and 4 appear in Sections 4.2 and 5.2.*

Comment: The DEIS conclusion that impacts caused by changes in global climate change "may not be insignificant" fails to meet the requirements of 10 CFR 51.70(b) to be "clear and analytic".

The DEIS describes climate change impacts related to groundwater as “not insignificant”. Despite this somewhat ambiguous conclusion, the DEIS determined no alterations to its conclusions regarding groundwater ... were warranted. As a result of this conclusion, the cumulative impacts on groundwater ... were characterized as “small”. The DEIS findings that certain impacts are “not insignificant” is inconsistent with conclusions that are considered “small”. In effect, the DEIS concedes the impacts are significant but then reaches an inconsistent conclusion that the effects thereof are “small”. In this regard, the DEIS fails to satisfy 10 CFR 51.70(b) that requires the document to be, *inter alia*, clear and analytic. This requirement is not satisfied because the DEIS makes no attempt to reconcile its findings of significant impacts with conclusions that such have only minimal effects. Instead the DEIS makes the unsupported and contradictory analytic leap that significant impacts yield only small effects. One court has described the EIS adequacy criteria as follows: (1) whether the agency in good faith objectively has taken a hard look at the environmental consequences of a proposed action and alternatives; (2) whether the EIS provides detail sufficient to allow those who did not participate in its preparation to understand and consider the pertinent environmental influences involved; and (3) whether the EIS explanation of alternatives is sufficient to permit a reasoned choice among different courses of action. The DEIS has failed to take a “hard look” at impacts it determines are “not insignificant” and instead merely concludes such have small effects. This failure does not provide sufficient detail to understand how the conclusions were reached. As a result, the public and decision makers are unable to make reasoned choices among competing alternatives. (**0015-10** [Johnson, Matthew])

Response: *Climate change is a global phenomenon. The global atmospheric concentration of GHGs, which drives the climate change discussed in the EIS, will not be detectably altered by the building or the operation of the proposed units. The change to groundwater resources mentioned in the EIS (i.e., not insignificant) are those associated with climate change and not the incremental changes expected with the withdrawal of groundwater for the building and operation of the proposed units. Water resource managers are accustomed to adapting to historical climate variability. The review team considers the groundwater resource broadly to reflect the ability of the resource to meet multiple water demands and historical variability. The review team acknowledges that the global and local baseline of groundwater resources may change in a manner that is “not insignificant.” However, the review team did not identify a reasonably foreseeable baseline condition of the groundwater resources after the climate has changed that would alter the team’s conclusion regarding the impact of the proposed units. The review team recognized that climate change has the potential to affect groundwater in the region of interest, but the team’s overall conclusions on cumulative impacts were not altered. Regarding the commenter’s claim that the EIS “… does not provide sufficient detail to understand how the conclusions were reached,” the EIS does explain the review team’s conclusions regarding the impacts of climate change in the region of interest. The review team analyzed data in the EIS in a level of detail that was commensurate with the importance of the impact, with some less important material summarized, consolidated, or simply referenced. The*

concluding statements in Sections 7.2.1.2 and 7.2.2.2 now draw the distinction between global and local effects of climate change.

Comment: The DEIS is flawed because it failed to do a thorough analysis of the impact of climate change on the operation of STP Units 3 and 4. In its review the NRC staff found: 7.3.2 Aquatic Ecosystem Impacts, GCC could lead to decreased precipitation, increased sea levels, varying freshwater inflow, increased temperatures, increased storm surges, greater intensity of coastal storms, and increased nonpoint source pollution from runoff during these storms, in the water bodies in the geographic area of interest (Nielsen-Gammon 1995; Montagna et al. 1995; Karl et al. 2009). Such changes could alter salinity, change freshwater inflow, and reduce dissolved oxygen, which could directly affect aquatic habitat. Rising sea water due to global climate change could affect water levels in the lower Colorado River and Matagorda Bay and subsequently change the water quality associated with the mixing of freshwater and estuarine waters (Montagna et al. 1995; Karl et al. 2009). (p.7-33,4) The staff further noted: While the GCRP has not incrementally forecasted the change in precipitation by decade to align with the licensing action, the projected change in precipitation from the "recent past" (1961-1979) to the period 2080 to 2099 is a decrease of between 10 to 30 percent (Karl et al. 2009). (page 125 note 117) The NRC staff also notes that: As stated in Section 2.3.1.1, it is reasonably foreseeable that sea level rise may exceed 3 ft by the end of the century due to GCC (Karl et al. 2009). Actual changes in shorelines would also be influenced by geological changes in shoreline regions (such as sinking due to subsidence). The increase in sea level relative to the Colorado River bed, coupled with reduced streamflow (also due to GCC), could result in the salt water front in the Colorado River moving up towards the Reservoir Makeup Pumping Facility (RMPF). p.7-18 The Karl study the NRC selectively cited notes, "Sea level rise is expected to increase saltwater incursion into coastal freshwater aquifers, making some unusable without desalinization," (Karl page 47-note 146) However, even with these concerns being explicitly stated, no analysis has been conducted in the DEIS on the impact of the salt water incursion into the Reservoir Makeup Pumping Facility or the increased salinity of the groundwater used for makeup. If the salinity increases the current fresh water based cooling system will be subject to corrosion and may become inoperable or need to be replaced by a desalinization facility. (**0015-26** [Johnson, Matthew])

Response: *The review team focused on the remarks related to saltwater effects on the cooling system. Even under the commenter's postulated scenario, wherein the cooling system would temporarily become inoperable while repairs took place to mitigate corrosion impacts, the local environmental impacts from not operating the units would be less than operating the units. Although increased saltwater in the Colorado River is likely, the need for or use of a desalinization facility at STP is speculative and not currently proposed by the applicant, therefore the review team does not believe it necessary to evaluate the impacts of a desalinization facility. No changes were made to the EIS as a result of this comment.*

E.2.10 Comments Concerning Ecology – Terrestrial

Comment: STP also provides a protected habitat for several threatened species, including bald eagles, white-tailed hawks, and alligators. (**0003-28** [Chavez, Chance]; **0004-2-24** [Chavez, Chance])

Response: *These comments provide general information related to STPNOC's application for COLs. No changes to the EIS were necessary as a result of these comments.*

Comment: You will hear STP officials pledge their concern for the physical environment, and they do have responsibility for a huge chunk of our county, about 12,000 acres, I think. But who is this land's husbandry entrusted to, the lowest bidder. Things like toxic herbicide and pesticide applications, and wildlife management are handled by some of the lowest paid, least well-trained contractors on site, not inhouse employees. Our state's wildlife and fur bearing animals laws are regularly broken as underpaid, inexperienced staff kill protected species, relocate infectious disease specimens, and kill off honeybee swarms necessary for pollination of our food crops. I have personally spoken with some of the contractors, and the STP personnel in charge of them on multiple occasions. I'm a state-licensed wildlife rehabilitator, and regularly teach classes on peaceful and safe coexistence with our native species. When I offered to teach, or provide other instructors or free resources during the last wildlife crisis at STP, I was told, and I quote, "We're not ready to take it to that level." What does that say to you about STP's real commitment to the environment where the rubber meets the road? (**0004-2-7** [Dancer, Susan])

Response: *Management and protection of wildlife in Matagorda County is under the jurisdiction of the Texas Parks and Wildlife Department (TPWD). This comment expresses opposition to STPNOC but does not identify any new issues to be addressed in the EIS. The NRC and Corps carefully reviewed the application according to their regulations that are intended to protect the environment. Enforcement of state laws is the sole responsibility of the State. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 04.03. Ecological Impacts. Page 4-17, Line 10: To make this statement more precise, replace "the new roadway" with "construction of the new sections of the heavy haul road and for upgrade of existing site roadways." (**0010-1-70** [Head, Scott])

Response: *Section 4.3.1 of the EIS was modified to include the proposed text.*

Comment: Three of the proposed road crossings have existing culverts that would be replaced, three additional culverts would be needed to span existing drainages, and one culvert would be added as part of preparing a new drainage area. This section of the DEIS does not clarify if the proposed haul road and associated wetland impacts from the barge-slip to the construction site is a new road or an expansion of the existing road. (**0019-3** [Wolf, Clayton])

Response: *Section 4.3.1 of the EIS was amended to clarify that construction of the heavy haul road includes upgrades to the existing roadway and new road sections.*

Comment: Regarding potential wetland impacts, EPA suggests that all wetland sites be clearly marked, posted, flagged and/or fenced prior to construction. Such actions should prevent accidental or operator error impacts during construction. Once the project is completed, EPA recommends that a post construction review be held to ensure wetland impacts were avoided. (**0016-1** [Gilmore, Cathy])

Response: *Section 4.3.1 of the EIS was amended to include STPNOC's description of installation and use of exclusion fencing around wetland boundaries to avoid potential impacts and the potential for post-construction review as part of the conditions of the Section 404 permit from the Corps.*

Comment: The acreage identified above is less than 300 acres of permanent impacts. According to the DEIS, an additional 56 acres of unidentified habitat type will be disturbed. Request: TPWD requests that the Nuclear Regulatory Commission and STPNOC provide a description of the habitat type of the approximately 56 acres of permanent impacts that are not outlined in the DEIS. In addition, TPWD requests that the category "Other" be defined as a specific habitat type(s). (**0019-1** [Wolf, Clayton])

Response: *Section 4.3.1 and Table 4-2 of the EIS were amended to provide updated information clarifying the type and amount of terrestrial habitat that would be affected by construction.*

Comment: According to the DEIS, STPNOC has committed to the restoration of areas temporarily disturbed by construction activities through grading, landscaping and replanting of these areas. Recommendation: TPWD recommends that all temporary construction impacts be restored to preconstruction contours and conditions and that STPNOC prepare a restoration plan and provide this plan to TPWD for review and comment. (**0019-2** [Wolf, Clayton])

Response: *This comment by TPWD is directed to STPNOC, NRC does not have the statutory authority to require submission of a restoration plan to a state agency for its review. However, Sections 4.3.1.5 and 4.3.2.5 were revised to reflect TPWD's recommendations for mitigation and that the review team's impact determination is SMALL, with or without the implementation of TPWD's recommendation.*

Comment: DEIS Section 09.03. Alternative Sites, Page 9-63, lines 13-15: The DEIS states: "Building impacts would affect up to 2500 ac of land resulting in the permanent loss of terrestrial habitat. Three-hundred ac would be required for permanent structures and facilities, and up to 1700 ac would be required for a new reservoir." STPNOC believes that the value of 2500 ac of permanent loss of habitat is in error, and the correct value should be 2000 ac of permanent loss

of habitat consistent with the breakout of impacts between permanent structures and a reservoir in the second sentence. (**0010-2-64** [Head, Scott])

Response: *Section 9.3.2.3 of the EIS was amended to indicate that 2000 ac would be permanently lost of the 2500 ac of terrestrial habitat impacted by construction and operation.*

Comment: DEIS Section 09.03. Alternative Sites, Page 9-163, lines 15-22: The DEIS states: "Up to seven bat species living in eastern Texas, can occur in Freestone County (Davis and Schmidly 1994; STPNOC 2009b). Some are mostly year-round residents (i.e., non-migratory), such as the big brown bat (*Eptesicus fuscus*), the eastern pipistrelle (*Pipistrellus subflavus*), and evening bat (*Nycticeius humeralis*). Migratory bats that could occur at the site include the hoary bat (*Lasiurus cinereus*), the silver-haired bat (*Lasionycteris noctivagans*), the eastern red bat (*Lasiurus borealis*), and the Mexican free-tailed bat (*Tadarida brasiliensis*). The Mexican free tailed bat is either migratory or non-migratory depending on where it resides; the migratory status of bats occurring in Freestone County is currently unknown (STPNOC 2009b)." The DEIS does not mention the southeastern myotis bat, which also may be found in the vicinity of the Trinity 2 site (ER Section 9.3.3.4.4). (**0010-2-67** [Head, Scott])

Response: *With regard to the potential occurrence of the southeastern myotis bat (Myotis austroriparius) in Freestone County, the review team found a single record noting occurrence of this species in Freestone County in the U.S. Geological Survey (USGS) Bat Population Database (USGS 2010). Information from Mammals of Texas (Davis and Schmidly 1994) indicate this bat species typically is found to the east of the Trinity 2 site; however, TPWD lists the southeastern myotis bat as potentially occurring in the area (TPWD 2010). Section 9.3.4.3 of the EIS was modified to indicate that the southeastern myotis bat may potentially occur in the region.*

Davis, W.B. and D.J. Schmidly. 1994. The Mammals of Texas – Online Edition. *Texas Parks and Wildlife Department, Austin, Texas. Accessed October 15, 2009 at http://www.nsrl.ttu.edu/tmot1/Default.htm.*

Texas Parks and Wildlife Department (TPWD). 2010. TPWD Endangered Species: Southeastern myotis bat. Accessed July 15, 2010 at http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx?tabindex=0&tabid=9&type=map&cname=Southeastern%20myotis%20bat&desc=roosts%20in%20cavity%20trees%20of%20bottomland%20hardwoods,%20concrete%20culverts,%20and%20abandoned%20man-made%20structures&parm=AMACC01030&sname=Myotis%20austroriparius&usesa=&sprot=[tpwd_southeastern_myotis_distribution.pdf].

U.S. Geological Survey (USGS). 2010. USGS Bat Population Database for the United States and Trust Territories. Accessed July 15, 2010 at http://www.fort.usgs.gov/BPD/ .

Comment: DEIS Appendix H. Authorizations, Permits, and Certifications. Page H-4: Table H-1 lists the status of the USACE Section 404 (first permit on the page) as "Permit Determination Request submitted 06/04/2009, Second Permit Determination Request Submitted 10/28/2009" The following should be added at the end of these status items "Individual Permit Application Submitted 03/09/2010". (**0010-2-94** [Head, Scott])

Response: *Table H-1 was updated to reflect the current status of authorizations, permits, and certifications.*

E.2.11 Comments Concerning Ecology – Aquatic

Comment: DEIS Section 02.04. Ecology. Page 2-76, Line 13-14: The DEIS states, "However, they also noted that the high numbers of cyanobacteria and crytomonads were probably due to the water quality changes associated with the heavy rainfall that year (STPNOC 2009a)." Environmental Report (Rev. 3.0) indicates that the correct term is "cryptomonads" and does not mention rainfall (Section 2.4.2). The ER states the following: "The 1974 ER also observes that stressful conditions (i.e., high-water temperatures) appeared to produce increases in numbers of "opportunistic" groups such as Cryptomonads and blue-green algae (cyanobacteria). Blue-green algae, in particular, are often associated with degraded water quality, specifically with nutrient enrichment and eutrophication." (**0010-1-18** [Head, Scott])

Response: *The sentence, "However, they also noted that the high numbers of cyanobacteria and crytomonads were probably due to the water quality changes associated with the heavy rainfall that year (STPNOC 2009a)." was deleted from Section 2.4.2.1 of the EIS based on information provided in this comment.*

Comment: DEIS Section 02.04. Ecology. Page 2-91, Line 20: The DEIS states, "There are no bag or possession limits for harvesting black drum; however they must be from 14 to 30 in. in length (TPWD 2009o)." Please revise as follows: "There are no bag or possession limits for the commercial harvest of black drum; however they must be from 14 to 30 in. in length. The recreational bag limit for black drum is 5 fish per day between 14 and 30 in. in length. However, one fish over 52 in. may be retained per day as part of the bag limit (TPWD 2009o)" (**0010-1-20** [Head, Scott])

Comment: DEIS Section 02.04. Ecology. Page 2-95, Lines 20-21: The DEIS states "However, mating females and those brooding eggs are only common outside of the bay." The Environmental Report (Rev. 3.0) states that mating blue crabs are common in the tidal fresh portions of the bay (Table 2.4-3). Patillo et al. (1997) confirms this. (**0010-1-21** [Head, Scott])

Response: *Section 2.4.2.3 of the EIS was revised to reflect the information provided by the comments.*

Comment: DEIS Section 04.03. Ecological Impacts. Page 4-27, Line 9: To make this statement more precise, replace "roadway" with "portions of the heavy haul road and upgrades to existing site roadways." (**0010-1-71** [Head, Scott])

Response: *Section 4.3.2.1 of the EIS was revised to reflect the information provided by this comment.*

Comment: DEIS Section 04.03. Ecological Impacts. Page 4-31, Line 31: The DEIS states, "Taxa such as *Corbicula*, giant salvinia (*Salvinia moesta*), and *Hydrilla* were not reported in the onsite water bodies and have not been found in high densities in the Colorado River in the vicinity of STP (STPNOC 2009a)." The Environmental Report (Rev. 3.0) states, "As of 2003, no rooted Hydrilla had been found in the Colorado River downstream of the Austin-area impoundments." (ER Section 2.4.2.3.1.2) The Environmental Report (Rev. 3.0) states, "It (the Asiatic clam) was first documented in the Colorado River in the 1970s. A number of specimens were discovered in the MCR in 1981 (Reference 2.4-26). Routine biofouling inspections conducted since initial operation have not identified any corbicula in STP 1 & 2 plant systems. Additional specimens were collected in the Colorado River drainage between the STP site and Bay City in the mid-1980s (Reference 2.4-57). By 2005, Corbicula had been reported from 162 lotic and 174 lentic water bodies in Texas." (ER Section 2.4.2.3.1.2) The DEIS should be revised as follows: "Taxa such as *Corbicula*, giant salvinia (*Salvinia molesta*), and *Hydrilla* were not reported in the onsite water bodies. *Corbicula* was collected from the MCR in 1981, and is known to occur in the Colorado River (STPNOC 2009a)." (**0010-1-72** [Head, Scott])

Response: *Section 4.3.2.3 of the EIS was revised to reflect the information provided by this comment.*

Comment: DEIS Section 05.03. Ecological Impacts - Operation. Page 5-41, Lines 31-38 and Page 5-42, Lines 1-2: The DEIS states "Taxa such as *Corbicula*, giant salvinia (*Savinia moesta*), and *Hydrilla* have not been found in high densities in the Colorado River in the vicinity of STP (STPNOC 2009a). In 2008, the review team observed *Corbicula* shells on the shoreline of the river above the site but did not see any nuisance organisms at the RMPF in the screen racks or in the fish bypass system. The 2007-2008 survey of the MCR did not report any nuisance organisms in the reservoir or during impingement and entrainment studies at the CWS for existing Units 1 and 2 (ENSR 2008a). It is unlikely that the MCR discharge would become a contributor of nuisance organisms in the Colorado River because these species have not been reported in surveys of the MCR (ENSR 2008a), and the MCR discharge is likely to be infrequent." The Environmental Report (Rev. 3.0) states, "As of 2003, no rooted *Hydrilla* had been found in the Colorado River downstream of the Austin-area impoundments." (ER Section 2.4.2.3.1.2) "The Asiatic clam, *Corbicula fluminea*, is a problematic invasive mollusk from southeastern Asia. It is a small bivalve that is typically found at high densities and has a relatively high growth rate (Reference 2.4-55). Because of its tolerance of a wide variety of aquatic conditions and its high reproductive rate, it has developed into a pest that clogs ditches

and interferes with pipes and heat exchangers of power plants. The first reported collection of *Corbicula* in Texas occurred in the Neches River in 1958 (Reference 2.4-56). *Corbicula* were next discovered near El Paso, in 1964, suggesting that the species was invading Texas from both east and west. It was first documented in the Colorado River in the 1970s. A number of specimens were discovered in the MCR in 1981 (Reference 2.4-26). Routine biofouling inspections conducted since initial operation have not identified any Corbicula in STP 1 & 2 plant systems. Additional specimens were collected in the Colorado River drainage between the STP site and Bay City in the mid-1980s (Reference 2.4-57). By 2005, *Corbicula* had been reported from 162 lotic and 174 lentic water bodies in Texas." (ER Section 2.4.2.3.1.2) The ER did not mention giant salvinia. Please note that the correct scientific name of this plant is *Salvinia molesta*. The DEIS should be revised as follows: "Taxa such as *Corbicula*, giant salvinia (*Salvinia molesta*), and *Hydrilla* have not been found in high densities in the Colorado River in the vicinity of STP (STPNOC 2009a). In 2008, the review team observed *Corbicula* shells on the shoreline of the river above the site but did not see any nuisance organisms at the RMPF in the screen racks or in the fish bypass system. The 2007-2008 survey of the MCR did not report any nuisance organisms in the reservoir or during impingement and entrainment studies at the CWS for existing Units 1 and 2 (ENSR 2008a), although *Corbicula* were collected from the MCR in 1981. It is unlikely that the MCR discharge would become a contributor of nuisance organisms in the Colorado River because these species have not been reported in surveys of the MCR (ENSR 2008a)." (**0010-2-18** [Head, Scott])

Response: *Section 5.3.2.1 of the EIS was revised to reflect the information provided by this comment.*

Comment: The review team's determination of the impact category levels is based on the assumption that the mitigation measures identified in the Environmental Report (ER) or activities planned by various state and county governments, such as infrastructures upgrades (discussed throughout this chapter), are implemented. Failure to implement these upgrades might result in a change in the impact category. Possible mitigation measures of adverse impacts, where appropriate, are presented in Section 4.11. However, none of the mitigation measures and controls includes compensatory mitigation for the project's proposed impacts to fish and wildlife habitat including waters of the United States.

Recommendation: TPWD recommends that STPNOC formulate a compensatory mitigation plan for all impacts to fish and wildlife habitat, including wetlands and shallow water habitat for the proposed project. This would include impacts to species and habitats covered under federal law and state resource habitat types not covered by state or federal law. At a minimum, TPWD recommends a replacement ratio of 1: 1 for state resource habitat types. TPWD requests the opportunity to review and comment on the compensation plan. (**0019-4** [Wolf, Clayton])

Response: *The comment is directed to STPNOC, and NRC does not have the statutory authority to require submission of a compensation plan to a state agency for its review.*

However, Sections 4.3.1.5 and 4.3.2.5 were updated to reflect TPWD's recommendations for mitigation and state that the review team's impact determination is SMALL with or without implementation of TPWD's recommendations.

Comment: DEIS Section 05.03. Ecological Impacts - Operation. Page 5-45, Lines 6-22: The DEIS states "As described in the EFH assessment in Appendix F, operation of the proposed Units 3 and 4 could affect EFH for juvenile king mackerel; all life stages of Spanish mackerel, gray snapper, red drum, and Gulf stone crab; and larvae and juveniles of brown, pink, and white shrimp.... Operation of Units 3 and 4 would likely affect Spanish mackerel, gray snapper, and red drum similarly. The eggs and larvae of Spanish mackerel, gray snapper, and red drum could be entrained during pumping at the RMPF, and the organisms would be lost from the river environment. Discharge of MCR water could create thermal and chemical characteristics of the river water and affect the viability of the eggs and larvae of these species.... The juvenile and adult Spanish mackerel, gray snapper, and red drum and their prey could avoid the affected areas of the Colorado River during operation of the RMPF and discharge structure as well as during maintenance dredging." The Environmental Report (Rev. 3.0) states that the red drum spawns offshore. No red drum eggs occur near the STP RMPF (ER Table 2.4.3). The ER did not include Spanish mackerel or gray snapper as important species because they rarely occur in the area. The only life stage of the Spanish mackerel that occurs in the Matagorda Bay is the juvenile, and it is listed as rarely occurring (Patillo et al. 1997). It is highly unlikely that juvenile Spanish mackerel would occur at the RMPF. Likewise, only adult and juvenile gray snapper occur in Matagorda Bay, and only rarely. Eggs and larvae of the gray snapper do not occur near the STP site (Patillo et al. 1997). The DEIS should be revised as follows: "As described in the EFH assessment in Appendix F, operation of the proposed Units 3 and could affect EFH for juvenile king mackerel; all life stages of red drum, and Gulf stone crab; and larvae and juveniles of brown, pink, and white shrimp.... Operation of Units 3 and would likely affect red drum similarly. The eggs and larvae of red drum could be entrained during pumping at the RMPF, and the organisms would be lost from the river environment. Discharge of MCR water could create thermal and chemical characteristics of the river water and affect the viability of the eggs and larvae of the red drum .... The Spanish mackerel, gray snapper, and red drum and their prey could avoid the affected areas of the Colorado River during operation of the RMPF and discharge structure as well as during maintenance dredging." (**0010-2-19** [Head, Scott])

Comment: DEIS Section 10.04. Irreversible and Irretrievable Commitments of Resources. Page 10-14, Line 25: The DEIS states that designated essential fish habitat (EFH) in the Colorado River would be adversely affected. The Environmental Report (Rev. 3.0) only lists categories of essential fish habitat in the lower Colorado River and Matagorda Bay that could be impacted. The ER further states that the lower Colorado River is not a unique nursery area for estuarine-marine organisms and species most affected by operations at STP were ubiquitous and abundant along the Texas and Gulf coasts (Section 2.4.2.4). (**0010-2-75** [Head, Scott])

Response: *The EIS summarizes the consultation with NMFS in accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act. Appendix F includes the EFH assessment. The review team followed NMFS guidance in writing the EFH assessment in support of the consultation; all designated EFHs in the area were considered. The habitat for the species and their life stages that are summarized in the EIS are consistent with the description in the EFH assessment. In a letter dated April 20, 2010, the NMFS concurred with the review team's EFH assessment. No changes were made in the EIS as a result of this comment.*

Comment: DEIS Section 07.03. Ecology – Cumulative. Page 7-31, Lines 1-3 and Page 7-33, Lines 28-32: The DEIS states on page 7-31 "STPNOC plans on moving and constructing additional drainages and culverts to manage the flows after precipitation events, which could increase due to GCC." DEIS states on page 7-33 "GCC could lead to decreased precipitation, increased sea levels, varying freshwater inflow, increased temperatures, increased storm surges, greater intensity of coastal storms, and increased nonpoint source pollution from runoff during these storms, in the water bodies in the geographic area of interest (Nielsen-Gammon 32 1995; Montagna et al. 1995; Karl et al. 2009)." These two statements make contradictory predictions about the effect of global climate change (GCC) on precipitation at the site. (**0010-2-51** [Head, Scott])

Response: *While overall precipitation is expected to decrease, the frequency and intensity of coastal storms is predicted to increase. The precipitation events that are mentioned in the draft EIS on page 7-31, lines 1-3, refer to these events and could include coastal storms that could be of greater intensity because of GCC. If that were the case, then STPNOC's plans to address stormwater management during those coastal storm events would be important to minimizing any impacts from the storms. Section 7.3 of the EIS was revised based on this comment.*

E.2.12 Comments Concerning Socioeconomics

Comment: It is important we really take advantage of these opportunities that have been described in this review, and, first of all, to capture the great job opportunities. ... Next is to capture the new employees coming into our community. We have been working very hard to bring in developers, to bring in new subdivisions, and housing, as well as apartments. Earlier today you did hear about some of the developers building subdivisions and housing. Apartments are soon to follow. (**0003-16** [Dunham, D.C.])

Comment: I think that not only will it help my own business, but other small businesses in the area. And a lot of that revenue that comes in through the local businesses that are not franchises stays within the community. And that leads to more taxes and more programs that we can offer the public. So those benefits are going to be huge in terms of all parts of our population. (**0003-18** [Green, Julie])

Comment: STP's Units 3 and 4 will produce approximately 4- to 6,000 construction jobs, which will be staffed by the AFL-CIO, Building and Construction Trades Department, who currently represent over two million skilled crafts professionals in both the United States and Canada. The construction phase of this project will also impact several billions of dollars into our local economy. Once these units are completed, they will also create an additional 800 well-being jobs, full-time, many of which will be again skilled union craftsmen and craftswomen, which I will help represent. In addition, the potential for as many as 12- to 1,300 new hires exist between 2011 and 2017 to compensate for the loss of retirees at our current units. ... This project would produce well-paying jobs with solid benefit packages and stability to the local area for decades to come. (**0003-20** [Griffin, Mark])

Comment: This expansion will be great for our community in that it will provide even more jobs for our citizens we currently have, as well as bring more people into our community. (**0003-25** [Hutto, Veronica])

Comment: I will say that having 800 jobs and many more that ancillary businesses would bring, and many more that the ancillary retail and quality of life provisions and businesses would provide. (**0003-8** [Marceaux, Brent])

Comment: With our unemployment rate higher than the national rate, and the Texas State rate, we need these jobs, we need these people to come to our community. (**0004-1-12** [Thames, Carolyn])

Comment: [W]e create jobs, as was mentioned. Thousands of construction jobs will be created with Units 3 and 4, an additional 800 or so permanent in-house jobs at the station. (**0004-1-17** [Halpin, Ed])

Comment: STP is the largest employer in Matagorda County, with more than 1,200 employees. The new units will add an additional 800 permanent jobs to the local economy. (**0004-1-44** [Smith, Steve])

Comment: STP Units 3 and 4 will produce approximately 4-6,000 construction jobs, which will be staffed, primarily, by the AFL-CIO, the Building and Construction Trades Department, who currently represent over 2 million skilled crafts persons in both America and Canada. The construction phase will also inject several billion dollars into this local community. Once these units are complete, they will create an additional 800 well-paying full-time jobs, many of which, again, will be filled by skilled union craftsmen. In addition, the potential for as many as 12-1300 jobs will be created between 2011 and 2017 to compensate for the loss of retirees at the current units. ... This project will produce well-paying jobs, with solid benefit packages, and stability to the local area for decades to come. (**0004-1-49** [Griffin, Mark])

Comment: The expansion of STP will create hundreds of well-paid permanent positions, as well as thousands of contractor jobs during plant construction, and will add several billion dollars to the local and state economies, several billion dollars. STP is already Matagorda County's largest employer with more than 1,200 employees. The company will need an additional 800 well-trained and highly-skilled technicians, engineers, operators, and other personnel to staff its planned new units. ... STP has committed to attracting and training that workforce locally. (**0004-1-5** [Hegar, Glenn])

Comment: [I]t's important that we take advantage of the [economic] opportunities that are put before us, and that are actually explained in this review in this document, ... First, is to capture the great job opportunities that are going to be coming. ... And then next we've got to capture the new employees coming in. ...We are developing subdivisions. We do have new housing going in. (**0004-2-20** [Dunham, D.C.])

Comment: This expansion will be great for our community in that it will provide even more jobs for our citizens we currently have, as well as bring more people into our community. (**0004-2-28** [Hutto, Veronica])

Comment: These employees are all well paid employees, and I do believe that a majority of my employees do live in Matagorda County. So I do believe that the majority of them that would be hired are going to live in Matagorda County. ... The jobs and the wages that they do make, like I said, are a fair wage. ... But it does help -- not just the good pay, but also the health and welfare. These employees all get insurance. They all have a retirement. Not necessarily do they have to leave and go elsewhere when they do finish working at that plant. They can stay right here and spend that money right back at home. It is a trickle-down from the lower class, I guess you would say. It's where these employees do make the money, right here, and they spend it right here. (**0004-2-32** [Lucero, Greg])

Comment: I am excited that new units 3 & 4 will provide new permanent jobs and temporary construction jobs for citizens in our area! ... The additional tax base support that will come with the creation of units 3 & 4 will provide a critical infusion of support to every aspect of life in the county. (**0005-2** [Purvis, Gail])

Comment: STP is the largest employer in Matagorda County with more than 1,200 employees. The new units will add an additional 800 permanent jobs to the local economy. (**0012-2** [Scurlock, Betty])

Response: *These comments generally express support for the proposed STP Units 3 and 4, based on the potential positive socioeconomic impacts they would be expected to bring to the region. Socioeconomic impacts of construction and operation are discussed in Chapters 4 and 5 of the EIS. No changes were made to the EIS as a result of these comments.*

Comment: Socioeconomically, STP proponents say that the expansion is good for our area, yet 30 percent of the children in the districts closest to STP live below the poverty level, and Matagorda County's unemployment is the highest in the state. Is that STP's fault? No, of course not, but they do play a role. The only way for us to get out of our economic slump is to acknowledge how we got here, and in that STP does have a role. Here's how it works. You get a big construction project going on. You get an influx of people from around the country, and in this case even from around the world. And each professional who comes seeking job brings with him an un- or under-skilled spouse, 2.3 children, and encourages others to come with him, as well. Each of these others come into the scenario and compete with locals, who are already here, for the menial jobs they already have. Unemployment here skyrockets. ... Meanwhile, infrastructure costs are borne mostly by existing locals for classrooms, hospitals, roadways, law enforcement efforts go through the roof, so people already established here get a double whammy. ... the truth is that a very large percentage of the current 1,200 employees, and likely 800 to come live elsewhere. A huge chunk of STP's upper managers live in neighboring Brazoria County, leaving Matagorda County the risk, the infrastructure burden, and the economic backlash that worsens the very issues it proposes to remedy.
Another undeniable factor in STP's inability to be the answer to our economic woes is that STP's upper management positions appear to be only open to white males. ... The fact of the matter is that STP 1 and 2 did not bring prosperity to our community by any economic indicator one may use, child poverty, unemployment, et cetera. The fact of the matter is the local people look realistically at indicators via the EIS process, expanding the nuclear plant seems to only worsen our situation. (**0004-2-8** [Dancer, Susan])

Response: *This comment does not dispute that economic opportunities would increase with the building and operation of STP Units 3 and 4, and does not specifically recommend a change in the analysis or conclusions. The commenter is concerned about the distribution of local impacts. The actual level and distribution of local socioeconomic impacts will depend to a significant degree on a number of factors, including the number of imported workers needed for the project, where they choose to live, the number of dependents accompanying the workers, and mitigation strategies developed by local and higher governments and project developments. These matters are discussed in EIS Sections 4.4 and 5.4. Based in part on estimates from STPNOC, on known plans by local government and private sector entities for job training and infrastructure, and on patterns of settlement related to the existing STP facility, the review team believes that a number of STP jobs would be open to local residents and that they would be qualified to compete for them. For example, Section 2.5.2.6 briefly discusses the local education program to train new nuclear energy workers. Local government and private economic development groups in Matagorda County are actively planning for the infrastructure requirements presented by the construction and permanent operational workforces for Units 3 and 4. STPNOC and local government bodies also are working on the proposed construction schedule and related issues, and they plan to continue these communications. See, for*

example, Section 4.4.4.3. Because this comment did not provide any new information, no changes were made to the EIS as a result of this comment.

Comment: DEIS Section 02.05. Socioeconomics. Page 2-113, Lines 14-16: The DEIS provides a list of the types of people that are considered transients in this analysis, but does not identify three of them: those residing in schools, hospitals and nursing homes, and correctional facilities. Nor, does the DEIS provide an explanation for their omission. The Environmental Report (Rev. 3.0) provides a list of all of the types of transients and provides an explanation for the omission of some of them. This information should be included in the DEIS for completeness. (**0010-1-24** [Head, Scott])

Response: *Section 2.5 of the EIS was revised in response to this comment to include an updated list and abbreviated explanation.*

Comment: DEIS Section 02.05. Socioeconomics. Page 2-119, Table 2-22: The DEIS Table 2-22 data do not match the data in Table 2.5-7 of the Environmental Report (Rev. 3.0). The Table 2-22 data are not for 2005. The reference listed at the bottom of the table says "BEA 2008". The table title should be changed to that later year. (**0010-1-26** [Head, Scott])

Response: *The citation is to a 2008 version of the U.S. Bureau of Economic Analysis (BEA) website shown in the references to the chapter. The correct year for the title is 2006. The title of Table 2-22 of the EIS was changed to reflect this fact.*

Comment: DEIS Section 02.05. Socioeconomics. Page 2-121, Table 2-24: DEIS Table 2-24 and ER (Rev. 3) Table 2.5-9 both purport to report the same data. However, there are some discrepancies between the two tables, even though they report the data for the same years. It is unclear whether 1) the years listed for the data are incorrect, or 2) the data have been revised. The ER table reference is BLS 2007 while the DEIS reference is BLS 2008. The data in Table 2-24 may need to be reconciled or the dates of the data may need to be changed. (**0010-1-27** [Head, Scott])

Response: *The local data for 2005 were revised in BLS 2008. The table is correct as it stands. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 04.04. Socioeconomic Impacts – Construction. Page 4-50, Line 7: The DEIS states STPNOC estimated the total daily groundwater usage at the STP site during building.... This sentence should be revised to state STPNOC estimated the total maximum groundwater usage at the STP site during construction, initial testing, and operation of Units 3 and 4.... (**0010-1-73** [Head, Scott])

Comment: DEIS Section 04.04. Socioeconomic Impacts – Construction. Page 4-50, Line 7: The DEIS references 1.7 MGD for groundwater use. This value was deleted in response to RAI

05.10-04. Language should be inserted that states groundwater use will remain below the existing site groundwater permit limit. (**0010-1-74** [Head, Scott])

Comment: DEIS Section 04.04. Socioeconomic Impacts – Construction. Page 4-50, Lines 8-9: The DEIS states "During peak development, water usage by STPNOC could exceed its annual permitted amount." STPNOC will operate within established groundwater-use permit limits. The current groundwater permit does not have an annual permitted amount; instead it establishes maximum usage for the permit term which is approximately three years. (**0010-1-75** [Head, Scott])

Response: *Section 4.4.4.4 of the EIS was revised based on these comments to reflect the updated water balance for STP Units 3 and 4.*

Comment: DEIS Section 04.04. Socioeconomic Impacts – Construction. Page 4-50, Lines 29-31: The building-related population increase, 10,445, and the estimated water treatment increase, 940,050, are inconsistent with DEIS Section 4.4.2, lines 24 and 25. In order to be consistent with DEIS Section 4.4.2, lines 24 and 25, the building-related population increase should be 10,338. The estimated water treatment increase should be 930,458. (**0010-1-76** [Head, Scott])

Response: *The suggested change has been made to Section 4.4.4.4 of the EIS. Estimates for the population increase and the increased wastewater treatment capacity are 10,338 people and 930,458 gpd, respectively.*

Comment: DEIS Section 05.04. Socioeconomic Impacts – Operation. Page 5-58, Line 27-29: This paragraph should be replaced with the following text: "The STP site has two private wastewater treatment facilities for the existing units. As part of the new units' development project, these would be replaced or expanded to support the additional units. Therefore, operations would not impact the existing wastewater treatment facility." STPNOC will provide this clarification in the ER in Revision 4.0 of the COLA (**0010-2-21** [Head, Scott])

Response: *The proposed rewording provides additional clarification. Section 5.4.4.4 of the EIS was modified to reflect this comment.*

Comment: DEIS Section 07.04. Socioeconomic and Environmental Justice – Cumulative. Page 7-37, Lines 3-4: The DEIS states, "Exelon has since stated its intent to submit an Early Site Permit (ESP) application". It should be noted that Exelon submitted an ESP application to the Nuclear Regulatory Commission in March 2010. (**0010-2-52** [Head, Scott])

Comment: DEIS Section 07.04. Socioeconomic and Environmental Justice – Cumulative. Page 7-37, Lines 4-7: This section should be redrafted in light of Exelon's withdrawal of the Combined License Application (COLA) and submission of an ESP application. The anticipated

schedule associated with an ESP renders the construction impacts immaterial since they may be deferred up to 20 years. (**0010-2-53** [Head, Scott])

Response: *Section 7.4.1 of the EIS was revised to reflect these comments. The discussion of the overlapping impacts with STP Units 3 and 4 has been revised to note that Exelon has no plans for onsite activity at the Victoria County Station (VCS) site after issuance of an early site permit, and that VCS could be delayed as much as 20 years, resulting in no construction period impact and much delayed impact of any kind in Matagorda or Brazoria Counties.*

Comment: The Draft EIS is deficient in its evaluation of socioeconomic impacts regarding employment rates, poverty, and benefits for the local community. The construction of units 1 and 2 did not have the positive effects on our community alleged in the EIS in Section 4. There is no consideration or acknowledgment of the additional social stressors associated with a large-scale construction project in a small community such as increased crime rates, insufficient jail space, increased need for law enforcement personnel, classroom space, and hospital beds and increased demand on social services such as housing assistance and other welfare programs necessary to accommodate a large transient worker population. Each of these negative impacts were experienced during construction of units 1 and 2 and the influx of unemployed persons, largely spouses and family of new employees, caused Matagorda County's unemployment rate to skyrocket throughout the construction period and should be anticipated for the construction period of units 3 and 4 as well. (**0013-1** [Dancer, Susan])

Response: *Acknowledging that the size of transitory impacts on community services will depend on the extent of population growth during the construction and operations periods, Sections 4.4.4.4 and 5.4.4.4 of the EIS discuss the potential impacts on Matagorda County, in particular during construction, and say that impacts on police and fire staffing and education facilities could be noticeable. The comment did not provide information on the historical period to demonstrate that overall impacts of the existing STP Units 1 and 2 were not favorable because of crime increases and lack of education and medical facilities. No changes were made to the EIS as a result of this comment.*

E.2.13 Comments Concerning Environmental Justice

Comment: DEIS Section 02.06. Environmental Justice. Page 2-148, Lines 5-6: The DEIS is missing a figure for the six block groups that have significant "some other race" populations. (**0010-1-30** [Head, Scott])

Response: *The "some other race" figure was omitted on purpose from the EIS for the sake of brevity. The information contained in the figure was not considered to be critical to the discussion because the six block groups with "some other race" populations were already encompassed by total minorities or one of the other racial and ethnic minorities. No change was made to the EIS as a result of this comment.*

Comment: DEIS Section 02.06. Environmental Justice. Page 2-151, Line 34: This sentence is missing "some other race" populations. (**0010-1-31** [Head, Scott])

Response: *The phrase "some other race" has been added to the list in this sentence.*

Comment: DEIS Section 02.06. Environmental Justice. Page 2-148, Figure 2-27: Figure 2-27 of the DEIS is incorrect. The correct figure is attached to this review document. (**0010-1-32** [Head, Scott])

Response: *Figure 2-27 has been replaced with a corrected figure created by the review team, instead of the revised Figure 2-27 provided by STPNOC.*

E.2.14 Comments Concerning Historic and Cultural Resources

Comment: Our review did not identify any known impacts to religious, cultural, or historical assets of the Alabama-Coushatta Tribe of Texas in conjunction with the preferred option. However, in the event of inadvertent discovery of human remains and/or archaeological artifacts, activity in proximity to the location must cease and appropriate authorities, including our office, notified without delay. If an alternative site take precedence, further consultation with our office may be necessary. (**0001-1** [Celestine, Bryant])

Response: *STPNOC has developed a procedure for addressing unanticipated discoveries of cultural resources or human skeletal remains that includes provisions for halting work activities and notifying appropriate agencies, including the State Historic Preservation Office at the Texas Historical Commission as well as affected tribe(s) or other parties, to determine the steps to be taken prior to resuming work. In the event that an alternative site is chosen for the proposed project, NRC and the Corps would continue to consult with the Alabama-Coushatta Tribe of Texas in accordance with Section 106 of the National Historic Preservation Act of 1966 and NEPA. Sections 2.7, 4.6, 5.6, 7.5, and 9.3 of the EIS were revised as a result of this comment to indicate that consultation in the event of an inadvertent discovery could include affected tribe(s).*

E.2.15 Comments Concerning Nonradiological Waste

Comment: STP ships a variety of materials to be reprocessed for reuse, including oil, lead, acid batteries, and more than a dozen tons of paper annually. With this being said, it is clear that STP takes pride in being an ecofriendly plant, protecting threatened species, and recycling a variety of material -- all positive characteristics that make STP the world class plant that it is. (**0004-2-25** [Chavez, Chance])

Response: *This comment expresses general support for STPNOC's recycling program. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 04.10. Nonradiological Waste Impacts - Construction. Page 4-75, Lines 3-4: The DEIS states that two wastewater treatment facilities would be replaced to accommodate increased waste generation during project activities. However, the West Sanitary Waste Treatment System will be replaced; the Nuclear Training Facility Sanitary Waste Treatment System will be upgraded to increase its capacity. STPNOC suggests modifying the wording to " ... facilities would be replaced <u>or upgraded</u> to ...." (**0010-1-81** [Head, Scott])

Response: *Section 4.10.2 of the EIS was changed to reflect the information in this comment.*

Comment: DEIS Section 05.10. Nonradiological Waste Impacts - Operation. Page 5-92, Lines 34-35: The DEIS states that activated sludge from onsite wastewater treatment facilities is currently disposed of at both onsite and offsite locations. The onsite land disposal permit was allowed to expire. There are no plans to reactivate it. The statement should be revised to state that the activated sludge from the onsite sanitary waste treatment facilities is disposed of at an offsite location. (**0010-2-28** [Head, Scott])

Comment: DEIS Section 05.10. Nonradiological Waste Impacts - Operation. Page 5-93, Lines 1-2: The DEIS states that the increased activated sludge from the operation of two additional units would require a new or revised permit from the TCEQ. The onsite land disposal permit was allowed to expire and there are no plans to reactivate it. This statement should be revised to exclude any reference to such a permit. (**0010-2-29** [Head, Scott])

Comment: DEIS Section 05.10. Nonradiological Waste Impacts - Operation. Page 5-93, Lines 9-10: The DEIS states that effluents containing chemicals or biocides would be discharged to the MCR and the Colorado River. No biocides are discharged to the Colorado River. Total Residual Chlorine per the TPDES permit must be <0.05 mg/l to discharge to the Colorado River. STPNOC recommends deleting and the Colorado River from this sentence. (**0010-2-30** [Head, Scott])

Comment: DEIS Section 05.10. Nonradiological Waste Impacts - Operation. Page 5-93, Line 14: The DEIS states that the existing facilities would be replaced with two new wastewater treatment facilities. However, the West Sanitary Waste Treatment System will be replaced; the Nuclear Training Facility Sanitary Waste Treatment System will be upgraded to increase its capacity. This sentence should be revised to state that existing wastewater treatment facilities would be replaced or upgraded to serve all four units. (**0010-2-31** [Head, Scott])

Response: *Section 5.10 of the EIS was revised based on the information provided by these comments.*

E.2.16 Comments Concerning Nonradiological Health

Comment: DEIS Section 04.08. Nonradiological Health Impacts - Construction. Page 4-65, Line 13: The DEIS states that the population within a 10-mile radius is approximately 6400, citing the ER as a source. Table 2.5-2 of Rev 3 of the ER states the 2000 population to be 6314 (including transients) and the 2010 population to be 6692. Although the DEIS is not inconsistent with the table, using a value from the ER (e.g., the 2010 value) would improve traceability. (**0010-1-78** [Head, Scott])

Comment: DEIS Section 04.08. Nonradiological Health Impacts - Construction. Page 4-66, Lines 17-18: The DEIS states that the average construction workforce for Units 3 and 4 would be approximately 3300 during a 67-month period. The data in Table 3.10S-2 indicate that the 67-month average is 4038. If one averages from month minus 24 through plus 67, the average is 3281 - in agreement with the DEIS. The DEIS should be changed to either 1) indicate that the average is over the 91-month period or 2) change the 67-month average to 4038. (**0010-1-79** [Head, Scott])

Response: *Section 4.8.1.2 of the EIS was revised to reflect the information provided by these comments.*

Comment: The DEIS describes climate change impacts related to ... nonradiological as “not insignificant”. Despite this somewhat ambiguous conclusion, the DEIS determined no alterations to its conclusions regarding ... nonradiological health were warranted. As a result of this conclusion, the cumulative impacts on ... nonradiological health were characterized as “small”. The DEIS findings that certain impacts are “not insignificant” is inconsistent with conclusions that are considered “small”. In effect, the DEIS concedes the impacts are significant but then reaches an inconsistent conclusion that the effects thereof are “small”‘. In this regard, the DEIS fails to satisfy 10 CFR 51.70(b) that requires the document to be, *inter alia*, clear and analytic. This requirement is not satisfied because the DEIS makes no attempt to reconcile its findings of significant impacts with conclusions that such have only minimal effects. Instead the DEIS makes the unsupported and contradictory analytic leap that significant impacts yield only small effects. One court has described the EIS adequacy criteria as follows: (1) whether the agency in good faith objectively has taken a hard look at the environmental consequences of a proposed action and alternatives; (2) whether the EIS provides detail sufficient to allow those who did not participate in its preparation to understand and consider the pertinent environmental influences involved; and (3) whether the EIS explanation of alternatives is sufficient to permit a reasoned choice among different courses of action. The DEIS has failed to take a “hard look” at impacts it determines are “not insignificant” and instead merely concludes such have small effects. This failure does not provide sufficient detail to understand how the conclusions were reached. As a result, the public and decision makers are unable to make reasoned choices among competing alternatives. (**0015-11** [Johnson, Matthew])

Response: *Climate change is a global phenomenon. The global atmospheric concentration of greenhouse gases, which drives the climate change discussed in the EIS, will not be detectably altered by the building or the operation of the proposed plants. The change to nonradiological health resources mentioned in the EIS (i.e., not insignificant) are those associated with climate change and not the incremental changes expected with the release of waste heat during the operation of the proposed plants. Federal and State regulators authorizing discharges into the aquatic environment are accustomed to adapting to historical climate variability. The review team considers the institutional controls to be protective of water resources in a manner that would not, for example, increase the presence of thermophilic organisms that could adversely affect human health. The review team acknowledges that the global and local baseline environment that could increase the presence of etiological agents may change in a manner that is "not insignificant." However, the review team did not identify a reasonably foreseeable baseline condition after the climate has changed – for example, as a result of an increase in rainfall and temperature – that would alter the review team's conclusion regarding the impact of the proposed plants. The review team recognized that climate change has the potential to affect the presence of etiological agents in the region of interest, but the review team's overall conclusions on cumulative impacts were not altered. Regarding the commenter's claim that the EIS "…. does not provide sufficient detail to understand how the conclusions were reached…..," the EIS does explain the review team's conclusions regarding the impacts of climate change in the region of interest. The review team analyzed data in the EIS in a level of detail that was commensurate with the importance of the impact, with some less important material summarized, consolidated, or simply referenced. The concluding statement in Section 7.7 now draws the distinction between global and local effects of climate change.*

E.2.17 Comments Concerning Radiological Health

Comment: We have concerns with ... radiation risks for the general population, and for workers. (**0004-1-33** [Hadden, Karen])

Comment: I'm also concerned about ... tritium, other radionuclide contamination. (**0004-2-10** [Dancer, Susan])

Response: *Chapter 5 of the EIS addresses radiation risks to the general public and occupational doses to plant workers. These comments are general in nature and required no change to the EIS.*

Comment: [T]here would be ground water use of 1,860 gallons per minute, and I would recommend, and I don't see it in the EIS, that the water be tested to make sure that there's no radioactivity, since that will be drinking water. The aquatic organisms have been identified in the Environmental Impact Statement, which is great. .. What they did not do was take any of these organisms into a laboratory and find out, is there radioactivity already here? Is there tritium already here? And they should. ... Why were these organisms not tested, fish, snakes,

invertebrates, birds, shell fish, blue crabs, oysters, and even the larger aquatic mammals. No testing, and we recommended this from day one. In terms of that, the EIS acknowledges the shortcoming in data, and they simply say STPNOC does not conduct any routine monitoring of aquatic resources of the site. Regulatory agencies have not required ecological monitoring of the STP site, and it hasn't been done, even with this Draft Environmental Impact Statement looking to build two more reactors. According to the Environmental Impact Statement, there were over 122,000 people living within 50 miles of the South Texas Project site. They could, according to the document, be exposed to 2.5 millirem per year from the two proposed units. No mention was made at the same time of exposure from the existing units, and what the cumulative impact is, nor any kind of real estimate of what the health risks are from this level of exposure. (**0004-1-42** [Hadden, Karen])

Response: *As discussed in Section 5.2.2.2, groundwater use at the STP site is planned for makeup to UHS basins, fire protection systems, potable water supply, sanitary uses, and service water needs; it is not all intended for drinking. Drinking water for the site is obtained from deep aquifer wells, which are monitored quarterly, and no tritium has been detected in this water. As discussed in Sections 2.11 and 5.9.6, surface water, fish, invertebrates, and sediments are routinely monitored in the Radiological Environmental Monitoring Program (REMP). The results of the REMP are presented in the Annual Environmental Operating Report. Cumulative doses to the maximally exposed individual from Units 1 and 2 plus the proposed Units 3 and 4 are discussed in Section 5.9.3 and Appendix G. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 05.09. Radiological Impacts of Normal Operations. Page 5-82, Line 13: The DEIS states, "STPNOC calculated liquid pathway doses to the MEI as shown in ER Table 5.4-4" STPNOC's liquid pathway doses to the MEI are shown in Table 5.4-5 of Environmental Report Rev. 3.0 (Section 5.4, p. 5.4-11). (**0010-2-23** [Head, Scott])

Comment: DEIS Section 05.09. Radiological Impacts of Normal Operations. Page 5-89 Line 3 (Table 5-13): The DEIS states, "STPNOC's dose estimates to the surrogate species from the liquid and gaseous pathways are shown in Table 5-13"

Invertebrate	5.30	0	5.85
Algae	0.54	0	0.68...."

Liquid, gaseous and total dose, respectively, from Units 3 & 4. Environmental Report RAI 05.09.05-01(Letter U7-C-STP-NRC-090137, Attachment 8, page 2 of 3, 9/14/09) indicate that these doses are:

Invertebrate	5.30	0	5.30
Algae	0.54	0	0.54....

The doses given in the DEIS for these two species are the sum of the doses from the MCR (RAI 05.09.05-01) and Little Robbins Slough (Environmental Report Rev. 3.0, Section 5.4, Table 5.4-10, page 5.4-15). The DEIS correctly reports these doses in DEIS Appendix G, Table G-7, p. G-22. (**0010-2-24** [Head, Scott])

Comment: DEIS Section 05.09. Radiological Impacts of Normal Operations. Page 5-90 Line 2 (Table 5-14): The DEIS states, "Table 5-14 compares STPNOC's estimated total body dose to the biota from the proposed Units 3 and 4 to the IAEA chronic dose rate values for aquatic and terrestrial biota"

Fish	6.8 x 10-4	1000
Invertebrate	1.6 x 10-2	1000
Algae	1.9 x 10-4	1000
Muskrat	3.0 x 10-2	100
Raccoon	3.1 x 10-2	100
Heron	3.0 x 10-2	100
Duck	3.1 x 10-2	100",

total dose in mrad per day from Units 3 & 4. These values should be (DEIS Table 5-13, as corrected in the previous comment, total dose in mrad per year divided by 365 to get mrad per day):

Fish	6.8 x 10-3	1000
Invertebrate	1.5 x 10-2	1000
Algae	1.5 x 10-3	1000
Muskrat	3.0 x 10-2	100
Raccoon	3.1 x 10-2	100
Heron	3.0 x 10-2	100
Duck	3.6 x 10-2	100 (**0010-2-25** [Head, Scott])

Comment: DEIS Section 05.09. Radiological Impacts of Normal Operations. Page 5-91, Lines 15-20: The DEIS states, "and lower values before and since (STPEGS 2008). During 2005, the REMP sampled six onsite wells and found one above tritium detection limits (260 pCi/L). A tritium concentration of 1200 pCi/L was observed (STPNOC 2009a). During 2006, 16 shallow aquifer, STPNOC-controlled wells surrounding the MCR (and located outside the Protected Area of existing STP Units 1 and 2) were sampled (STPNOC 2009a; STPEGS 2007)." This should be edited to, "and lower values before and since (STPEGS 2008). During 2005, the REMP collected six samples from an onsite well all of which exceeded the tritium detection limit (260 pCi/L). A tritium concentration of 1200 pCi/L was observed (STPNOC 2009a). During 2006, a special study of 16 shallow aquifer STPNOC-controlled wells surrounding the MCR and

located outside the Protected Area of existing STP Units 1 and 2 was conducted (STPNOC 2009a; STPEGS 2007). Review of the Annual Radiological Environmental Operating Report showed the tritium concentrations ranged from less than 260 pCi/L to a little over 5000 pCi/L (STPEGS 2007)." (**0010-2-26** [Head, Scott])

Comment: DEIS Section 05.09. Radiological Impacts of Normal Operations. Page 5-91, Line 29: The units "Ci/L" should be changed to "Ci/yr". (**0010-2-27** [Head, Scott])

Comment: In the case of tritium ... The important thing here is we know what's there, we measure, we monitor it. And, by the way, it is not in the drinking water, not in the deep aquifer. It is also -- what we have in our reservoir is actually below the Environmental Protection Agency limit, significantly below the Environmental Protection Agency limits for drinking water. (**0004-2-1** [McBurnett, Mark])

Response: *The level of tritium in the MCR is discussed in Section 5.9.6 of the EIS. This comment presented information consistent with that discussion and therefore required no change to the EIS.*

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-21, Lines 25-26: The DEIS states, "staff's dose analysis confirmed the liquid pathway doses to biota shown in Table 5-13 and Table G-7." Note that Table 5-13 (DEIS p.5-89) contains two table entry errors (invertebrate total dose and algae total dose); those entries are correct in Table G-7 (DEIS p.G-22). STPNOC also comments on this in DEIS Section 5.09. (**0010-2-93** [Head, Scott])

Response: *These dose estimates have been revised in Section 5.9 and Appendix G. These revisions did not affect conclusions reached in the EIS.*

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-20 Line 4 (Table G-5):

The DEIS states

"Total Body	0.0042	0.0072	0.011 ...
Thyroid	0.0041	0.0099	0.14 ...
Bone	0.00077	0.00079	0.0016 ..."

for STP Units 1 and 2, liquid, gaseous and total dose, respectively. Rev. 3.0 of the Environmental Report (Section 5.4, Table 5.4-8, p. 5.4-14) indicates that these doses are:

Total Body	0.0042	0.0080	0.012 ...
Thyroid	0.0041	0.0097	0.014 ...
Bone	0.00077	0.0011	0.0019 ..." (**0010-2-90** [Head, Scott])

Response: *Table G-5 in Appendix G of the EIS was updated with the values indicated. The revisions do not affect the conclusions reached in the EIS.*

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-20, Line 9: The DEIS states, "Table G-5 is the same table as ER Table 5-12." Table G-5 is the same table as DEIS Table 5-12. The analogous table in Rev. 3.0 of the Environmental Report (Section 5.4, Table 5.4-8, page 5.4-14) indicates differences as noted in the previous comment (re Page G-20, Line 4). (**0010-2-91** [Head, Scott])

Response: *Table G-5 in the EIS was updated with the values indicated; the change is also reflected in parallel Table 5-12. The revisions do not affect the conclusions reached in the EIS.*

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-18, next to last line of Table G-4: The DEIS states, "Doses from the milk pathway were not calculated because there are no dairies within 50 mi of the STP site." Rev. 3.0 of the Environmental Report (Section 5.4, Table 5.4-2, page 5.4-10) indicates that STP includes doses from the milk pathway, based on the presence of milk cows in four counties at least partially within 50-miles of STP (including Matagorda County which is wholly within 50-miles of STP). The milk pathway makes up < 2% of the total body dose calculated for the ER. (**0010-2-89** [Head, Scott])

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-20, Lines 15-16: The DEIS states, "Doses from the milk pathway were not calculated because there are no dairies within 50 mi of the STP site." However, Table G-4 on page G-18 has an entry, "Milk Production within 50 mi of STP site," which states that milk production is 2,130,000 liters per year. STPNOC calculated milk doses and reported them in Table 5.4-6 of Rev 3 of the ER. Also, DEIS page G-16, lines 10-11 state, "Milk consumption was not considered because there are no milk animals within 5 mi of the site." While, the ER Section 5.4.2.2 states that there are no dairies within 5 miles of the STP site, we believe that NRC may have intended 50 miles instead of 5 miles. (**0010-2-92** [Head, Scott])

Response: *The sentence, "Doses from the milk pathway were not calculated because there are no dairies within 50 mi of the STP site." was deleted from Section G.2.3 in Appendix G of the EIS. Doses calculated for the maximum individual do not include the milk pathway because there are no milk cows within 5 mi of the STP site, but the collective doses do include milk as indicated in Table G-4. This correction does not change the conclusions of the EIS.*

E.2.18 Comments Concerning Severe Accidents

Comment: If there was a serious accident at South Texas Project, hopefully, there never will be, it could impact the whole State of Texas, not just Bay City. A 1982 report that was done for the NRC by Sandia Labs found that there could be 18,000 early deaths if there was a meltdown.

That would be followed by thousands of cancers, and they would not be limited to Bay City. These are risks that Texans don't need, risks that we don't need to take. (**0004-1-37** [Hadden, Karen])

Response: *As discussed in Section 5.11 of the EIS, the NRC staff estimated the probability-weighted risks associated with severe accidents at the proposed new units, and concluded that risks are low. No changes were made to the EIS as a result of this comment.*

E.2.19 Comments Concerning the Uranium Fuel Cycle

Comment: DEIS Section 06.01. Fuel Cycle Impacts and Solid Waste Management. Page 6-12, Line 3. The DEIS states that the estimated whole body population doses from gaseous effluents, liquid effluents, radon-222, and technetium-99 total approximately 4300 person-rem per year. Values for gaseous releases (1280 person-rem per year), liquid releases (640 person-rem per year) radon-222 (1900 + 36 = 1936 person rem per year) and technetium99 (320 person-rem per year) presented in Section 6.1.5 of the DEIS total to 4176 or approximately 4200 person-rem per year. The calculation of total detrimental health effects (TDHEs) is also affected by this difference. On line 4 of this page, the DEIS reports a value of 2.5 TDHEs annually. The calculation results in 2.4 TDHEs annually (4200 person-rem per year × 570 TDHEs per million person-rem = 2.4 TDHEs per year). (**0010-2-37** [Head, Scott])

Response: *In Section 6.1.5 of the EIS, the NRC staff re-evaluated and revised the dose estimates for radon-222. The new total population dose is approximately 5300 person-rem, and the estimate of the associated detrimental health effects is approximately 3 fatal cancers, nonfatal cancers, and severe hereditary effects annually. The revisions do not affect the conclusions reached in the EIS.*

Comment: DEIS Section 07.10. Fuel Cycle, Transportation, and Decommissioning - Cumulative. Page 7-50, Lines 20-24: The DEIS states that the combination of Units 3 and 4 and Units 1 and 2 would result in a scaling factor of not more than five. The two ABWR units would have an electrical output of 1350 MWe and capacity factor of 95%, result in a scaling factor of 3.2 ((1350 x 95%) x 2) ÷ 800) = 3.2). Units 1 and 2 have an electrical output of 1265 MWe (Table 7-1). Using a capacity factor of 80%, Units 1 and 2 would result in a scaling factor of 2.5 ((1265 x 80%) x 2) ÷ 800) = 2.5). The capacity factor for Units 1 and 2 is likely to be greater than 80%, yielding a higher scaling factor. The combination of all four units would result in a scaling factor of 5.7 (3.2 + 2.5) or greater. The DEIS should be revised to indicate that the combination of the four units results in a scaling factor of not more than six. (**0010-2-54** [Head, Scott])

Response: *Section 7.10 of the EIS was revised to show that the combination of the four units results in a scaling factor of no more than six. These revisions do not affect the conclusions reached in the EIS.*

Comment: We have concerns with ... radioactive waste problems that still have no solution. (**0004-1-34** [Hadden, Karen])

Comment: I'm also concerned about ... waste storage. (**0004-2-12** [Dancer, Susan])

Response: *Section 6.1.6 of the EIS evaluates the impacts of storage and disposal of radiological wastes based on the generic impacts of the fuel cycle codified in 10 CFR 51.51(b), Table S−3, Table of Uranium Fuel Cycle Environmental Data. Section 6.1.6 presents Yucca Mountain as an example of a possible high-level waste repository; the conclusions in Section 6.1.6 do not depend on whether Yucca Mountain, or another site, is ultimately the destination for spent fuel and high-level radioactive waste. Moreover, as indicated at 10 CFR 51.23(a), "The Commission has made a generic determination that, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impacts for at least 60 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor in a combination of storage in its spent fuel storage basin and at either onsite or offsite independent spent fuel storage installations. Further, the Commission believes there is reasonable assurance that sufficient mined geologic repository capacity will be available to dispose of the commercial high-level radioactive waste and spent fuel generated in any reactor when necessary." In addition, 10 CFR 51.23(b) applies the generic determination in section 51.23(a) to provide that "no discussion of any environmental impact of spent fuel storage in reactor facility storage pools or independent spent fuel storage installations (ISFSI) for the period following the term of the . . . reactor combined license or amendment . . .is required in any . . . environmental impact statement . . . prepared in connection with . . . the issuance or amendment of a combined license for a nuclear power reactors under parts 52 or 54 of this chapter." Section 6.1.6 of the EIS has been revised to address this issue.*

E.2.20 Comments Concerning Transportation

Comment: DEIS Section 06.02. Transportation Impacts. Page 6-24, Line 2: The DEIS states that the dose to a person at a truck service station exposed for 49 minutes at a distance of 52 feet from the loaded shipping container would be 0.34 mrem per shipment. Previous NRC analyses (NUREGs 1881, 1815, 1817, 1872) indicated a dose of 0.07 mrem per shipment for this exposure scenario. (**0010-2-38** [Head, Scott])

Response: *After the issuance of NUREGs 1881, 1815, 1817, and 1872, the NRC staff re-examined the basis of the analysis of the dose to an employee at a truck service station described in the Yucca Mountain EIS (DOE/EIS-0250; DOE 2002) and concluded that the dose per shipment should be five times the dose per shipment expressed in the earlier EISs. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 06.02. Transportation Impacts. Page 6-35, Line 23: The DEIS omits a phrase following line 23. The phrase "likely result in no excess health effects" should appear there as it does in a similar discussion on page 6-32, line 23 of the DEIS. (**0010-2-41** [Head, Scott])

Response: *Section 6.2 of the EIS was revised as suggested in the comment.*

Comment: DEIS Section 06.02. Transportation Impacts. Page 6-34, Table 6-10: The DEIS states that spent fuel inventory is obtained from Table 7.4-3 of the STPNOC ER. There is no Table 7.4-3 in the ER. Spent fuel inventory data is obtained from Table 7.4-1 of the ER with the exception noted in footnote (b). The DEIS table also presents the inventory for gaseous Kr-85. That radionuclide is not included in Table 7.4-1 of the ER. Table notes should be revised to identify the source of the information presented in Table 6-10. (**0010-2-40** [Head, Scott])

Response: *The Kr-85 entry in Table 6-10 was deleted for consistency with the ER. It was determined that the Kr-85 contribution to the radiation doses from transportation accidents was negligible, so removing Kr-85 from the accident risk calculations had no effect on the reported results. The footnote in Table 6-10 cited an incorrect table number from the ER. Table 6-10 of the EIS was updated to reflect this comment. These revisions do not affect the conclusions reached in the EIS.*

E.2.21 Comments Concerning Decommissioning

Comment: DEIS Section 06.03. Decommissioning Impacts. Page 6-39, Lines 29-30: The DEIS states: "The regulations governing decommissioning of power reactors are found in 10 CFR 50.75." The decommissioning regulations in 10 CFR 50.75 are for decommissioning funding not decommissioning power reactors. The sentence should be clarified to also reference 10 CFR 50.82, which provides the regulations on license termination for decommissioning power reactors. (**0010-2-42** [Head, Scott])

Response: *Section 6.3 of the EIS was revised to reference 10 CFR 50.82 and the radiological criteria for termination of the NRC license in 10 CFR Part 20, Subpart E. These revisions do not affect the conclusion reached in the EIS.*

E.2.22 Comments Concerning the Need for Power

Comment: I don't think the NRC has done an adequate job in analyzing the need for the plant. And if the plant is not needed, then we, as tax payers, and you, as residents of Matagorda County, may end up with a plant that is never completed. (**0004-1-20** [Smith, Tom])

Comment: The Electric Reliability Council says we need 30,000 megawatts of new energy. We don't think we need anywhere near that ...the folks who are in charge of determining

whether we need power, the Electric Reliability Council of Texas, haven't done their homework. (**0004-1-23** [Smith, Tom])

Comment: The DEIS has also failed in the need for power discussion to adequately consider reductions in demand for power and additional capacity from renewable and energy storage. (**0015-14** [Johnson, Matthew])

Comment: We believe that the demand analysis contained in the DEIS seriously underestimates the reduction in demands and additional resources that will be arriving from energy efficiency, demand response, advanced meters, onsite solar and large-scale renewables resources like wind and solar. In fact, we believe the need for a large 2700 MW baseload plant for hire is questionable at best. Instead, Texas is more likely to need flexible, smaller plants to meet energy needs at peak times, as well as a combination of energy storage and renewable energy and existing plants to meet baseload. (**0017-1** [Reed, Cyrus])

Comment: DEIS ... overestimates energy demand – Based upon our comments, it should be clear that the DEIS fails to consider a number of new developments in the Texas market, including building code adoptions, a new energy efficiency rule, federal stimulus monies, new solar investments, new wind investments, new clean energy, plans from San Antonio and Austin municipal utilities, and PACE financing districts. All of these developments will lessen the need for additional power from the expansion of the South Texas Nuclear Power Plant. (**0017-13** [Reed, Cyrus])

Response: *These comments express general opinions concerning the need for power, but do not make specific recommendations or offer alternative analyses. The final comment makes a general point about developments in the Texas electricity market that may reduce the need for power. All of the suggested sources of savings were considered, and where appropriate, the forecast in Chapter 8 was revised. Even with these revisions, the review team continues to conclude that there is sufficient baseload demand for power in the 2015 to 2020 time period to accommodate STP Units 3 and 4.*

Comment: The Electric Reliability Council of Texas, or ERCOT, projects that the state's demand for electricity will increase more than 30 percent in the next two decades. (**0004-1-3** [Hegar, Glenn])

Comment: For the last 30 years, STP has called Matagorda County home, and supplies 2 million Texas homes with power, 2 million Texas homes with power. That'll double, if we get the other two units, they'll be able to supply 4 million Texas homes. And with 50 million people slated to be in Texas by the year 2040, 2050 at the latest, we're going to need some power. (**0004-1-7** [Weber, Randy])

Response: *These comments generally support the idea that there is a need for the power to be produced by the proposed STP Units 3 and 4; therefore no changes were made to Chapter 8 as a result of these comments.*

Comment: A number of studies done for the PUC and others indicate that we can meet 101 percent of our demand for electricity in the I-35 corridor, and about 76 percent of the growing demand over that same period of time through energy efficiency. We will need some new power plants in the industrial belt along the coast, but not nearly as many as the Electric Reliability Council of Texas has indicated we will. (**0004-1-26** [Smith, Tom])

Response: *This comment did not provide documentation for the two numerical estimates given in the comment. While the rest of the comment goes on to provide specific estimates for the potential impacts of some of the energy efficiency programs in Texas, which are addressed individually elsewhere in this section, the review team was not able to determine what studies were used and what assumptions the commenter was relying on to account for the level of energy savings cited in the comment. More generally, based on the review team's evaluation, the overall savings are likely to be far lower than anticipated in this comment. The review team's reviews of the latest Public Utility Commission of Texas (PUCT) analyses and Electric Reliability Council of Texas (ERCOT) forecasts can be found in Chapter 8.*

Comment: They haven't really looked at the amount of wind we've got, potentially, or amount of energy efficiency, haven't added in all the coal plants that have been permitted, or are close to being permitted. For example, they assume that wind only blows 8.7 percent of the time. I've been to your coast. I know it's a hell of a lot stronger than that. The numbers on the coast seem to be around 40 percent of the time, high 30s in the evenings and night out in the West Texas wind areas. (**0004-1-25** [Smith, Tom])

Response: *This comment appears to assume that the 8.7 percent effective load carrying capacity (ELCC) is based purely on the percent of the time that the wind blows. The 2007 ERCOT-ordered study that resulted in this figure was far more sophisticated because it takes into account not only the wind resource but all reasons for potential loss of generation when needed to meet firm demand. A new ERCOT study has since been completed of the loss of load expectations and reserve margin and was considered by the ERCOT Board of Directors at their November 16, 2010 meeting. As a result of their review of the new study the ERCOT Board of Directors explicitly voted to continue to use 8.7 percent for ELCC and to increase the target reserve margin to 13.75 percent. These values were explicitly used in ERCOT's December 2010 update to the May 2010 Capacity, Demand, and Reserves report and in the review team's sensitivity test of the 2010 ERCOT forecast in Chapter 8.*

Comment: We think we can save 1,100 megawatts with the new building codes that are now required in Texas, 154 megawatts with better appliances, 3,300 megawatts with the programs that the Public Utilities Commission is putting in there. There are 1,900 megawatts of new

permitted coal that aren't in the NRC report that you saw up here, and we think there's another 2,400 likely to get permitted within the next six months. We think that there is about another 3,500 megawatts of geothermal that's likely, and other non-wind resources that could be put on line in the same period of time at a fraction of the cost. And that the real number is probably about 8,000 megawatts of wind on peak, off peak, serving as baseload with storage. And 15,000 megawatts of combined heating and power that could economically be put into place. The bottom line is, that entire capacity hole under the worst case scenario of 30,000 megawatts and leaves another 5,000 on the table leftover, spare. There's not a market for this power plant. There's no real need for the power plant. And we don't think the NRC did a good enough job at looking at the need for the power plant. ... and we believe that the NRC needs to go back and take a good hard look at the basis of the assessment for the analysis of need.
(**0004-1-28** [Smith, Tom])

Response: *The energy savings discussed in this comment are speculative and depend on the success of a number of market factors, public policies and incentives that are not or may not be accurate in the current Texas electricity marketplace. For example, the savings suggested above depend to a significant extent on the implementation of public policies that are not in current Texas law (including state appliance standards), assumed extensive deployment of technologies such as smart thermostatic controls and (so far, unproven) commercial success of low-cost energy storage methods currently announced at the pilot stage that would significantly "firm up" wind generation. It further assumes factors about the marketplace such as the assumed rate of construction of new housing and commercial space after 2010 (to which new statewide building codes established for 2011 would apply) that are not or may not be applicable in the current depressed economic environment.*

Based on the PUCT's actual established goals of 25 percent in 2011 and 30 percent for the public utility programs, these programs potentially could produce additional savings beyond those already incorporated in the ERCOT forecast of 5 percent in 2012 and 10 percent in 2013 and after. The ERCOT 2010 forecast for electricity load growth and this increment would yield a maximum of about 650 MW savings by 2015 and about 1050 MW savings per year by 2020. However, based on discussions with ERCOT and examination of the PUCT order, there are a number of considerations to keep in mind that may significantly reduce the impact on actual electricity consumption. 1) The PUCT program goals are based on "deemed" or assumed savings for specific funded activities, and do not represent measured savings. They do not, for example, count the take-back effects on electricity consumption when more efficient equipment is used more as a result of lowered operating costs. 2) The utilities are encouraged and compensated through customer rates for funding activities deemed to save energy, but are not penalized if they fall short. 3) Because the programs are operating costs of the utilities that are ultimately funded by customer utility bills, PUCT imposed cost caps on the programs to keep cost recovery from having too large an impact on customer rates. This constraint may limit the size of the program, if the cost of deemed savings escalates as the easiest savings are

achieved and more costly savings are addressed. PUCT strongly constrained the program for this reason. For all of these reasons the review team does not believe that 3300 MW will actually be achieved by the PUCT program and that a far lower estimate is appropriate. See Chapter 8 for details.

The ERCOT 2010 forecast includes all permitted conventional thermal power plants and wind and non-wind renewable portfolio standard (RPS) resources that meet the requirements for inclusion as resources in the ERCOT market area, so these are not missing from the forecast. The review team has updated the need for power analysis in Chapter 8 to include the 2010 ERCOT forecast and has conducted sensitivity tests of that forecast to include factors such as significant increases in energy efficiency and greatly expanded penetration of RPS resources.

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 1) The much lower cost of energy efficiency.

As an example, recent reports by Nexant in a study of the San Antonio demand side management program show that their energy efficiency program has significant energy savings at very low cost. They stated in their report to San Antonio, "As programs expand, CPS Energy should continue planning for the resources necessary to support large-scale deployment of DSM program portfolio and to achieve both short-term and long-term goals." The overall cost of the program as defined for the energy efficiency programs only is: "Cost of Saved Energy = $0.032/kWh." This does not take into account the additional reduction in peak costs that their load management programs achieved. The combined programs were determined to have achieved a reduction of 44.7 MW of peak energy with an expected energy savings of 86,712,978 KWh.

The Texas Public Utility Commission has been considering modifying the state's energy efficiency incentive program and has released a Strawman rule that will change the goal of the program. The proposed rule will increase the annual reduction from the current standard of 20% of new growth in demand to 50% of new growth in demand or 1% of peak demand, whichever is greater. Using the published ERCOT consumption data this would reduce energy consumption in the regulated areas of the state by 635 MW annually using the published 2009 actual value and 705 Mw annually using the 2015 ERCOT estimated peak demand forecast, this would reduce the need for additional generation by at least 3200 MW by 2020 and if the ERCOT forecast is accurate, would be over 3500MW.

ERCOT does not currently use energy efficiency other than those based on Texas HB3693 in its projections and is currently shown to be calculated at only 242 MW annually.
(**0015-17** [Johnson, Matthew])

Response: *Because the San Antonio savings discussed in the first paragraph of the comment are historical savings, the 44.7 MW already is included in the ERCOT forecast. ERCOT describes the 242 MW estimate as only efficiency gains not otherwise accounted for by its more general econometric analysis of load growth. In other words, the existing level of demand and econometric forecast plus the 242 additional MW already accounts for 20 percent savings from the PUCT program. The PUCT amended rule as adopted in late 2010 increased the percentage savings goal for 2012 to 25 percent and to 30 percent for 2013 and all later years (not 50 percent as assumed in the strawman rule). That change increases the 2012 goal by 5 percentage points and the 2013 goal by 10 percentage points. In the review team's test of the ERCOT assumptions in Chapter 8, these amounts have been multiplied by all increases in power demand in the ERCOT region (not just PUCT-regulated utilities) and subtracted from the 2010 ERCOT forecast. Applying the new percentages to all of ERCOT allows for savings that would be achieved by non-regulated utilities within ERCOT.*

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 2) ERCOT/PUC energy forecast (DEIS page 8-20, Need for Power):

ERCOT recently revised their load forecast, as released in their May 2010 load forecast and reserve margin update prepared for the ERCOT board of directors, dated May 18, 2010. According to this report ERCOT has reduced its estimate of forecasted demand from 72,172 MW to 70,517 MW for a reduction of 1655 MW or a 2.2% peak reduction in 2015. ERCOT has also increased their estimate of wind carrying capacity reported in their March 2010 report from 708 MW to 793 MW or a 12% increase in just 2 months and an additional increase of 115 MW by 2015. This does not take into account any increases in effective load carrying capacity (ELCC) factor that coastal or off shore wind developments might add or the addition of large scale storage in the market to time shift the energy provided by wind or solar generation assets. New additional generation of 2,073 MW in the ERCOT generation portfolio was also reported. Additionally 26,182 MW of planned units in the Full Interconnection Study Phase are also reported, providing an ERCOT total estimate of 31,757 MW of additional generation available in 2015. By ERCOT's estimates the reserve capacity will exceed 51% under these conditions. (**0015-18** [Johnson, Matthew])

Comment: The DEIS analysis of the need for power is flawed and incomplete.

E. The DEIS does not account for 31,757 MW of additional capacity through interconnections in the ERCOT region by 2015. The addition of this capacity will create a reserve capacity of 51% in the ERCOT region. The failure of the DEIS to account for this increase has the effect of understating the total capacity available in the ERCOT region without the addition of STP Units 3 & 4. (**0015-33** [Johnson, Matthew])

Response: *The need for power estimate in Chapter 8 has been revised to incorporate the 2010 ERCOT forecast. ERCOT does not include planned units in the process of full interconnection studies because these plants are still considered not to be available to produce power for transmission during the time period under consideration, and may in fact be cancelled before they have an interconnection agreement. After due consideration of the most recent Loss of Load Expectation study, ERCOT's Board of Directors adopted a 13.75 percent target reserve margin, but has elected to maintain the ELCC at 8.7 percent of nameplate capacity. These values are taken into account in the review team's analysis and sensitivity test of the 2010 ERCOT forecast in Chapter 8 of the EIS. Chapter 8 already had taken into account over 18,500 MW of installed wind energy (with an ELCC of 1060 MW) by 2020.*

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 3) Texas Non-wind RPS -

The PUC is considering adding an additional renewable energy mandate to the state's existing Renewable Portfolio Standard. This has been assigned a project #35792 and a strawman has been issued. This would provide an additional 500 MW of generating capacity in the ERCOT market. (**0015-19** [Johnson, Matthew])

Comment: 500 MW Rule – During the 2009 Legislative Session, there were several attempts to create a non-wind Renewable Portfolio Standard, with proposals ranging from 1,000 to 4,000 MWs of solar, geothermal and biomass requirements by 2020. While none of these legislative attempts were ultimately successful and it would be very difficult to predict what will happen in the 2011 Legislative Session, the PUC has now published a "strawman" which would implement a provision of existing law which says the state should set a target of at least 500 MWs of non-wind renewables by 2015. More recently, the PUC Commissioners discussed the potential to hold an open meeting on the non-wind renewable proposed rule this summer, with an aim of publishing a final rule for comment in early Fall and implementing the rule by the end of the year. In practice, such a rule would require Retail Electric Providers within ERCOT to either contract with non-wind renewables, purchase RECs from other entities or pay a fine. Thus, we would assume this would increase renewable energy sources within ERCOT in the competitive market, again offering a direct competition for power compared to the proposed nuclear plant. The impact of this proposed rule is not covered in the DEIS. (**0017-9** [Reed, Cyrus])

Comment: The DEIS analysis of the need for power is flawed and incomplete.

F. The DEIS does not account for a non-wind renewable capacity mandate under consideration by the Texas PUC. Adoption of this renewable portfolio standard would add 500 MW of capacity in the ERCOT region. The failure of the DEIS to account for this increase has the effect of understating the total capacity available in the ERCOT region. (**0015-34** [Johnson, Matthew])

Response: *The PUCT was directed by the Texas legislature to establish a target of having at least 500 MW of capacity from a renewable energy technology other than a source using wind energy, and this goal is already reflected in an existing regulation, 16 Texas Admin. Code 25.173(a). The PUCT has issued a strawman rule for non-wind RPS that would amend section 25.173(a), but it is not a final rule and as of late 2010 both the final text of the rule and any result are still in PUCT staff draft and are speculative. In addition, it is not clear how much net generation capacity would actually be provided to the ERCOT market as a result of this rule even if it is adopted in its current form. The strawman rule does not increase the overall goal for renewable energy installed capacity beyond 5880 MW in 2015 and 10,000 MW in 2025, both of which have been exceeded thanks to the substantial increase of wind energy in Texas. Also, the overall 500 MW capacity target for non-wind renewable is the same in the existing regulation and the strawman rule. To the extent that the strawman rule would have an effect, it may simply trade non-wind renewables for wind. Nor is it clear to what extent non-wind RPS generation could function as baseload capacity. Solar, for example, could not do so without significant investment in storage. Finally, the December 2010 update to the 2010 ERCOT forecast shows 4800 MW of newly planned non-wind generating capacity by 2015 that will meet its standards as a generating resource, of which 145 MW is biomass and most of the rest is natural gas. This forecast already is included in the need for power analysis in Chapter 8 of the EIS. No changes were made to the forecasts in the EIS as a result of these comments*

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 6) Additional Federal Incentives.

In addition to the $218 million in funding from the American Recovery and Reinvestment Act, additional Federal incentives for energy efficiency programs recently passed in the House of Representatives in HB5019 and would provide over $6 billion in energy efficiency retrofit incentives further reducing the need for new generation. (**0015-22** [Johnson, Matthew])

Comment: The DEIS analysis of the need for power is flawed and incomplete.

A. The DEIS analysis of the need for power is incomplete because it accounts only for decline in demand attributable to demand side management from the requirements of Texas House Bill 3693. The DEIS does not account for reduced demand caused by funds for energy efficiency programs under the American Recovery and Reinvestment Act nor additional funds for the same purpose as proposed in the recently passed U.S House of Representatives HB 5019. Additionally, the DEIS does not address the recent energy efficiency experiences of the San Antonio municipal utility that yielded a peak reduction of 44.7 MW and anticipated energy savings of 86,712,978 KWh at a cost of $0.032/KWh. The DEIS's attenuated consideration of the effects of energy efficiency/demand side management programs has the effect of overstating the Applicant's need for power. (**0015-31** [Johnson, Matthew])

Response: *The energy efficiency programs funded under the American Recovery and Reinvestment Act (ARRA) are included implicitly in the 2010 ERCOT forecast because the 2010*

electricity demand is affected by the recent history of electricity demand savings. This recent history implicitly includes the past impact of ARRA as well as other recent subsidies for energy efficiency and past successes in San Antonio and Austin. The past rate of success is carried forward in the econometric forecast. Similarly, recent history of energy savings for all utilities is reflected in the historical data for 2009 used to estimate future demand relationships. Based on discussions with ERCOT, the review team has learned that documentation of the actual energy savings of these activities is difficult to obtain, but so far has not shown any significant impact on the forecast, partly for reasons outlined in the answer to comment 0017-8, shown below. No changes were made to the forecasts in Chapter 8 as a result of this comment.

HB 5019 only passed the U.S. House of Representatives and is not law. It is not appropriate to base a need for power forecast on speculation that a proposed bill might become law; therefore, no changes were made the EIS as a result of these comments.

Comment: The DEIS analysis of the need for power is flawed and incomplete.

B. The DEIS analysis of the need for power is flawed because it does not consider the most recent energy forecast from ERCOT. The DEIS assumes that peak demand in 2015 will be 72,172 MW. However, the most recent ERCOT forecast actually projects peak demand in 2015 at 70,517 MW or a 1655 MW/ 2.2% reduction in peak demand. The failure to consider this more recent energy forecast has the effect of overstating the Applicant's need for power. (**0015-32** [Johnson, Matthew])

Response: *Chapter 8 of the EIS has been revised to take the 2010 ERCOT forecast into account.*

Comment: The DEIS analysis of the need for power is flawed and incomplete.

C. The DEIS analysis does not account for increases in wind carrying capacity. The most recent ERCOT analysis indicates that wind carrying capacity has increased has increased from 708 MW to 793 MW so far this year and is expected to increase another 115 MW by 2015. The failure of the DEIS to account for this increase has the effect of understating the total generation capacity available in the ERCOT region.

D. The DEIS fails to account for the addition of 2,073 MW of non-nuclear capacity to the ERCOT generation portfolio. This additional capacity was not accounted for in the need for power discussion in the DEIS. The failure of the DEIS to account for this increase has the effect of understating the total generation capacity available in the ERCOT region. (**0015-2** [Johnson, Matthew])

Response: *This comment appears to refer to values contained in the 2010 ERCOT forecast. That forecast has been included in the revised need for power analysis in Chapter 8.*

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 4) New Building codes.

The State Energy Conservation Office (SECO) has announced that the state will be adopting the IECC 2009 building code. The International Energy Conservation Code (IECC) is a national, consensus-based, model code. The 2009 IECC is expected to result in significant energy savings and related emissions reductions, estimated at 12 to 15% annual improvement for average homes. In a report examining the potential for energy efficiency in Texas, the American Council for an Energy Efficient Economy estimates that with this new code, Texas could save 10,533 kilowatt hours of electricity annually and 2,362 megawatts annually of peak summer demand by 2023. These new standards have significant increases in the requirements for energy savings that are required for all new construction. According to the Building Code's Assistance Project (BCAP) if Texas began implementing the 2009 IECC and Standard 90.1-2007 statewide in 2011, businesses and homeowners would save an estimated $785 million annually by 2020 and $1,605 million annually by 2030 in energy costs (assuming 2006 prices). Additionally, implementing the latest model codes would help avoid about 213.9 trillion Btu of primary annual energy use by 2030 and annual emissions of more than 15.6 million metric tons of CO2 by 2030. (**0015-20** [Johnson, Matthew])

Comment: The DEIS analysis of the need for power is flawed and incomplete.

G. The DEIS does not account for reduced demand caused by the adoption of the International Energy Conservation Code. The IECC building code has the potential to reduce peak demand by 2,362 MW annually by 2023 in the ERCOT region. The failure of the DEIS to account for this reduction in peak demand has the effect of understating the total capacity available in the ERCOT region. (**0015-35** [Johnson, Matthew])

Comment: Building Codes – On June, 2010, the State Energy Conservation Office approved rules that will require all areas of Texas to meet or adopt new energy codes for new construction. Thus, all commercial, industrial and multi-family homes must meet IECC 2009 Energy Codes by April 1, 2011, while single-family homes must meet 2009 IRC energy codes (Chapter 11) by January 1, 2012. What this means is that new commercial and residential homes will use less energy - about 15 percent less according to the Energy Systems Laboratory. In fact, several major metropolitan areas have already acted before SECO even passed the new rules. Thus, the City of Austin adopted 2009 IECC codes for all new construction in April of 2010 with local amendments meaning buildings in Austin will be even more energy efficient. San Antonio adopted the 2009 IECC codes on May 1, 2009, while the City of Waco did in early 2010. Thus within the next few years, all new construction in Texas will help reduce the growth in energy demand. This is not reflected in the DEIS discussion of energy demand and alternatives. We believe this could reduce baseload and peak energy demand in Texas by hundreds and perhaps thousands of megawatts over the next five years. (**0017-6** [Reed, Cyrus])

Response: *Although not directly cited in this comment, many if not all of the figures cited in the first comment appeared to come from a 2007 report of the American Council for an Energy-Efficient Economy (ACEEE) by R. Neal Elliott et al. "Potential for Energy Efficiency, Demand Response, and Onsite Renewable Energy to Meet Texas's Growing Electricity Needs (ACEE, Report No. E073). In the report being relied upon in the first comment, the reduction in peak electricity demand in the state would be 1054 MW in 2015 and 1754 MW in 2020. The 2007 report does not refer to the 2009 IRC energy or IECC energy codes but does contemplate increasing the stringency of energy codes in Texas to save 15 percent relative to the then-current code beginning in 2009 and by 30 percent in 2020. The review team notes that if sensitivity testing were performed on the 2010 ERCOT forecast in Chapter 8 to account for the new building codes, adjustments would have to be made to account for the facts that ERCOT serves only about 85 percent of the Texas electricity market, and that both later program implementation than assumed by ACEEE and lower projected building construction than was assumed by ACEEE would reduce the impact of new building codes.*

Over the very long term (20 to 30 years), a new building code could be effective in reducing electricity consumption due to heating, cooling, and to some extent, lighting. Some of the potential savings would be in end uses such as lighting that are also being targeted by utility programs and municipal programs, so it is important not to double count. There are additional reasons to consider ACEEE projection speculative. The first is that in Texas, code adoption and enforcement occurs at a local level, and as noted by the commenter, many jurisdictions do so before the state updates its statewide standard. Many of the large metropolitan code-enforcing jurisdictions in Texas already had adopted the 2003, 2004, 2006, or 2009 model standards even though the statewide standard was the 2000 version (Energy Systems Laboratory 2010). Thus, the trend in energy savings from early adoption would have been embodied in the historical energy consumption data used to produce the ERCOT forecasts. The impact of imposing the 2009 standards would be significantly less than might otherwise be supposed, based on an engineering comparison of buildings with the new codes with the old codes. Second, because the codes would apply only to new structures, its effect depends on how many new structures are built under the new codes. Third, new codes would not address additional growth and electrification of household services (e.g., additional plug loads) in either new or existing homes. Finally, the codes must be enforced as well as adopted. Not all jurisdictions do this equally well, although the major metropolitan areas in Texas reportedly do a good job. In addition, the 15 percent savings figure discussed in the second comment must hold up in the field (there would have to be no take-back or rebound effects on energy use from lowered cost of household services due to the more efficient buildings). ERCOT did not publish the underlying economic data for their 2010 forecast and the review team was not able to locate either good estimates of future construction in Texas or estimates of building-code-sensitive electricity use in new buildings so it was not possible to perform a quantitative estimate of the near-term impact of the new building code It is likely that many of the contemplated savings would be covered in the

lower demand growth in the 2010 ERCOT forecast and in the sensitivity tests the review team conducted on the ERCOT forecast in Chapter 8.

Texas A&M University Energy Systems Laboratory (Energy Systems Laboratory). 2010. 2010 Texas Jurisdiction Energy Code Adoption Survey. ESL-TR-10-06-01. Accessed on February 4, 2011 at http://www-esl.tamu.edu/terp/reports/2010.

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 5) In the new study on Energy Efficiency in the South they found that fewer new power plants would be needed with a commitment to energy efficiency.

Our analysis of nine illustrative policies shows the ability to retire almost 25 GW of older power plants - approximately 10 GW more than in the reference case. The nine policies would also avoid over the next twenty years the need to construct 49 GW of new plants to meet a growing electricity demand from the RCI sectors. Further, the industry sector offers the greatest energy efficiency potential in Texas. In 2020, savings from all three sectors is about 10% (1,180 TBtu) of the total energy consumed by the State in 2007. Electricity savings constitute 668 TBtu of this amount. With these policies, the generation of electricity from the equivalent of 17 power plants of 500-MW each could be avoided in the year 2020. (**0015-21** [Johnson, Matthew])

Response: *This comment suggests the need for power analysis in the EIS is deficient because it does not incorporate a series of policies that could potentially reduce the need for new power plants, such as energy saving building code changes. Not all of those programs have been implemented. For those programs that have been implemented, the reduction in energy demand they will produce is uncertain, and either was contained in the ERCOT forecast or to the extent that it was not, was addressed in the analysis in Chapter 8 and are likely to have a small impact. As for the policies not implemented yet, they are too speculative to be included in the analyses. Finally, the review team relied upon the analyses, assumptions, and methodologies employed by ERCOT in their assessment of the need for power. This comment did not result in a change to the EIS.*

Comment: The NRC Staff's DEIS is flawed because it failed to do a thorough analysis of the need for power. NRC Staff failed to adequately consider: 7) Compressed Air Energy Storage -

Significant advances in energy storage technologies are being made. This will provide additional firming or increase in the capacity factor of wind generation. New projects have been announced similar to one by ConocoPhillips with General Compression announced on April 14, 2010. General Compression, Inc. (GC), a Massachusetts company developing an innovative compressed air energy storage system, today announced it has signed an agreement with ConocoPhillips (NYSE: COP) of Houston, Texas, to develop compressed air energy storage projects, beginning with a pilot project in Texas, using General Compression's Advanced

Energy Storage ("GCAES") technology. GC and ConocoPhillips are evaluating a multiple-phase pilot project in Texas that would incorporate GCAES technology with wind energy, underground air storage and power sales. GC's near-isothermal compressor/expander module is used to create 2 MW to 1,000 MW, 8 to 300 hour discharge, compressed air energy storage (CAES) projects. According to the engineering designs, "The projects shape power from the wind farm so that it arrives to the customer 5 days a week for 8 hours (Peaking), 5-7 days a week for 16 hours (Intermediate) or 7 days a week for 24 hours (Baseload), or any other demand curve that a customer provides. Projects are designed to bid into firm power contracts, and to have enough storage duration, from 20-300 hours, to meet contracted delivery commitments." In addition "Shell and Luminant will also explore the use of compressed air storage, in which excess power could be used to pump air underground for later use in generating electricity. This technology will further improve reliability and grid usage and becomes more economical with large-scale projects, such as proposed for Briscoe County." As discussed in the "Comments Regarding Luminant's Revision to the Comanche Peak Nuclear Power Plant" by Raymond H. Dean, Ph.D, there has been considerable additional information on the conclusions of combining new generation power sources with storage that would also apply in this instance. Natural gas, wind, solar; and energy storage either individually or in combination, are viable alternatives that could both produce baseload power and be environmentally preferable to nuclear generation. What really matters is whether grid managers understand, know how to deal with, and have experience dealing with them in the dynamic electrical-grid environment. For example, there are several decades of experience using CAES to absorb power from the grid when customer demand is weak and supply power to the grid when customer demand is strong. This is not significantly different from using CAES to absorb power from the grid when wind power is strong and supply power to the grid when wind power is weak.
(**0015-23** [Johnson, Matthew])

Comment: The DEIS analysis of the need for power is flawed and incomplete.

H. The DEIS does not account for a compressed air energy storage (CAES) project planned for Texas by ConocoPhillips/General Compression that will be available for baseload capacity. This recently announced project is proof that the combination of wind capacity and CAES is a viable means of generating baseload power. The failure of the DEIS to account for this source of baseload capacity has the effect of understating the future total generating capacity in the ERCOT region. (**0015-36** [Johnson, Matthew])

Response: *These comments suggest that technology is commercially available that will in effect turn intermittent wind power into reliable baseload power. The projects discussed are still in the pilot stage and are subject to evaluation before full commercial deployment. Among the considerations would be technical performance, scalability, and cost. The comment provides no estimate of the effect on the overall demand for baseload power. The review team regards the comments as speculative and therefore no changes were made to Chapter 8 as a result of these comments.*

Comment: When considering all reductions in demand, due to efficiencies and DSM programs that are implemented by municipally owned utilities, the forecast reflects a likely decrease in the total need for energy of 35,877 MW by 2020. This reduction in demand, combined with the anticipated additional non-nuclear generation, including increased capacity for wind, solar, geothermal and other renewables, makes the addition of STP Units 3&4 unnecessary to meet baseload needs. Then, if the industrial customers follow the recommended guidelines, an additional 8,500 MW of reduction could be achieved for a total of 44,377 MW. Any need for additional generation to serve the market at this time would have to be in doubt. The following chart summarizes the combination of increased efficiencies and generation capacity. (**0015-24** [Johnson, Matthew])

Response: *This comment is based on the adding together of several potential sources of increased energy efficiency, some of which are accounted for in the 2010 ERCOT forecast, some of which were added to the 2010 ERCOT forecast based on events that have occurred since the forecast was published, and some of which are still speculative. The review team believes the reliable potential savings are significantly smaller than indicated in the comment and has based its assessment on the 2010 ERCOT forecast, plus the impacts of several actions taken by ERCOT and PUCT since the forecast that would modify that forecast. With respect to industrial energy, the Texas industrial sector has been active historically in saving energy and adopting combined heat and power where economically attractive. This trend is included implicitly in the ERCOT forecasts. The 2010 ERCOT forecast and review team sensitivity test of the forecast continue to show a need for baseload power in the 2015-2020 period. The modified forecast can be found in Chapter 8.*

Comment: More Wind - CREZ goes forward - While we believe the DEIS does address the likely impact of some 18,000 MWs of total wind coming into ERCOT, an update on the successful resolution of several major CREZ lines would make the DEIS more complete. A review of recent hearings before the PUC Commissioners show that three major lines by ONCOR and LCRA have been approved, while one major LCRA line was rejected, but will be resubmitted in the coming months. In addition, there is insufficient discussion of the potential for onshore and offshore wind in East Texas to provide power to Texans during the day. In fact, in addition to two existing wind projects in Kenedy County, several developers are looking all along the Texas coast for additional opportunities to provide power. We believe that this wind - more prevalent during the times when power is needed most - is likely to increase in coming years and is not analyzed in the DEIS. (**0017-12** [Reed, Cyrus])

Response: *The comment acknowledges that the draft EIS included a substantial amount of installed wind generation (18,456 MW) of which approximately 9500 MW was already installed in late 2010. Only part of the remainder was included in the ERCOT forecast because ERCOT counts only those planned units with a signed interconnection agreement, The review team included all of 18,456 MW in its sensitivity test of the ERCOT forecast in the DEIS. The 18,456*

MW was a middle planning figure used for the Competitive Renewable Energy Zones (CREZ) program. The 18,456 MW estimate assumed a successful completion of the CREZ transmission projects. The comment notes that successful resolution of the several major CREZ lines is underway.

The review team believes that the emphasis on serving peak power needs in this comment is misplaced, since the STP Unit 3 and 4 plants are intended to address baseload power needs. The CREZ lines and coastal power are discussed briefly in the Chapter 8 need for power assessment.

Comment: Energy Efficiency Portfolio Standard – First of all, the demand forecast and review fail to take into account new programs within ERCOT designed to reduce both peak demand and overall energy use. Thus, the Texas Legislature passed HB 3693 in 2007, which mandated that the major investor-owned utilities both in ERCOT, and outside of ERCOT reduce their peak demand by 20 percent of load growth in 2010, while: achieving an energy savings target of percent capacity of that peak demand reduction. While a relatively small amount on a yearly basis, reduction of approximately 20 MW of baseload power per year would lower the need for additional baseload resources. In addition, this year, in 2010, the Public Utility Council has published a draft rule that would require the nine investor-owned utilities to meet much higher goals. Just this week, the PUC has released the latest version of the rule, and an open meeting to consider it is expected later this summer. Thus, under the latest version of the proposed rule, investor-owned utilities would need to meet 50 percent of load growth while also meeting a capacity factor of 25 percent for energy savings by 2014. Thus, these goals would triple the amount of energy efficiency that investor-owned utilities are required to meet, reducing both peak and baseload demand. While the DEIS makes the case in its Alternative Section that demand reduction and conservation is already incorporated in ERCOT forecasts, the Sierra Club believes that in fact it is not and in particular the impacts of this proposed rule likely to be adopted soon are definitely not. But it will be adopted by August or September of this year. Thus, there has been no attempt to show how the new PUC requirements published as a draft rule would impact the projections of future demand. We estimate that the new requirements would reduce peak demand by 560 MWs in 2014, and baseload demand by some 150 MWs by 2014. Cumulatively, the impact would be much greater. (**0017-2** [Reed, Cyrus])

Response: *The final version of the rule discussed in this comment, as adopted, took effect December 1, 2010 and requires significantly less energy savings than contemplated by the comment. The rule's goals are 25 percent savings in 2012 and 30 percent in the year 2013 and after, which adds 5 percentage points and 10 percentage points to the previous savings goals. However, these goals may be strongly constrained by cost caps that limit the impacts on customer bills to 0.12 cents per kWh for residential customers and 0.75 cents per kWh for commercial customers. The review team's estimates of the effects of the rule are discussed in Chapter 8.*

Comment: San Antonio Plan – In addition, while the alternative section discusses CPS Energy laudatory plan to reduce peak demand by 771 MWs by 2020, there is no attempt to assess how this would impact overall demand or the need for baseload power in the state as a whole. Thus, CPS Energy itself recently discovered that the combination of reduced demand, energy efficiency goals and increasing investments in renewable energy had made its initial plan to buy 1,200 MWs of power, from nuclear plants unnecessary. Indeed, in the space of two years, CPS Energy found that there "need" for power was reduced from 1,200 MWs to 600 MWs to some 200 MWs simply by emphasizing other alternatives like efficiency, conservation and renewables. (**0017-3** [Reed, Cyrus])

Comment: Austin Energy Clean Energy Plan– Similarly, the DEIS fails to consider the impacts of the Austin Energy 2020 Plan, recently approved on April 22, 2010 by the Austin City Council. Under the plan, Austin Energy will attempt to reduce energy demand by at least 800 MWs by 2020, while purchasing close to 1,000 MWs of additional resources, including solar (200 MWs), wind (700 MWs) and natural gas (200 MWs). Thus, the DEIS fails to examine how these new resources - which will help the growing City of Austin meet its power needs - will impact the need for STP. It should be noted that when the City of Austin and Austin Energy examined the option to contract for additional power from a proposed expansion of STP they specifically declined to do so, refusing to enter into contract with NRG and the other promoters of the project. Instead, they will reduce energy demand and look to natural gas and renewables to fill their energy needs. (**0017-4** [Reed, Cyrus])

Comment: Other Utilities – Several electric cooperatives - who in theory might be interested in contracting for power from a new nuclear plant - have also adopted long-term goals to reduce energy demand. These include the State's largest electric cooperatives, such as Bluebonnet and Pedernales. Again, the DEIS makes no attempt to incorporate these additional demand savings which would reduce the need for the proposed power plants. (**0017-5** [Reed, Cyrus])

Response: *Program-based energy savings in municipal utilities and coops are accounted for in two ways in the forecasts. First, the 2010 ERCOT forecast shows low growth in electricity demand based in part on the recent reduction in the historical trend of electricity demand per capita measured econometrically. This accounts both for success in past energy efficiency programs and the ongoing success of such programs in reducing the future trend in consumption. Second, in the review team's sensitivity tests of the ERCOT forecasts, municipal utilities are assumed to save additional energy through new programs at the same rate as the investor-owned utilities regulated by PUCT under their new rule. There appears to be little or no quantitative information available on the plans of the electric cooperatives. In the sensitivity test of the 2010 ERCOT forecast in Chapter 8, they also were assumed to be as successful at cutting energy consumption as the public utilities regulated by the PUCT. The effects of the PUCT rule and energy efficiency programs are discussed in Chapter 8. The review team considers that the Austin plan's emphasis on purchase of alternative renewable resources is*

included in the overall projection of RPS resources available for power generation in the ERCOT region, so it is not addressed separately in Chapter 8.

Comment: HB 1937 – During the 2009 Legislative Session, the Legislature passed and the Governor signed legislation that allows municipalities to begin loan programs for retrofits of existing buildings to make them more energy efficient and add onsite renewable energy devices to save and produce electricity. While no city has yet adopted a program under the terms of HB 1937, several major cities - including El Paso, Austin and San Antonio - are seeking or have obtained funding to begin pilot programs aimed at reducing energy use. We expect that in 2011 there will be an attempt to clarify some of the issues surrounding HB 1937 and that by 2012 Texas will have a robust "Property Assessed Clean Energy" Financing Districts loaning out money to individual homeowners and businesses. This new program is not reflected in the DEIS, even though both Austin and San Antonio have received some $10 million apiece in ARRA funds to implement pilot programs. (**0017-7** [Reed, Cyrus])

Response: *Based on this comment, Property-Assessed Clean Energy (PACE) programs in Texas appear to be not yet settled in structure and are being implemented only at the pilot stage. Also, they address many of the end uses also addressed by building codes, ARRA, block grants and PUCT utility programs. Their potential effect on load growth is therefore highly speculative; therefore no changes were made to the EIS as a result of this comment.*

Comment: ARRA monies – There appears to be no attempt to consider the impact of the spending of some $1 billion on energy efficiency and solar programs in Texas as a result of ARRA monies. The majority of these monies will be implemented within the ERCOT market where South Texas is planning to sell its power. Thus, the $326 million being spent on low-income weatherization - some 40,000 to 50,000 homes - is not considered, nor is the expansion of SECO's LoneSTAR program for municipal buildings by some $150 million. Large cities in Texas also received hundreds of millions of dollars in direct and competitive Energy Efficiency and Conservation Block Grants. We would suggest that the DEIS obtain information from the State Energy Conservation Office, Texas Department of Housing and Community Affairs and the individual cities that obtained monies from the federal stimulus about how this will impact local demand. (**0017-8** [Reed, Cyrus])

Response: *Along with other recent programs, at least a portion of the energy efficiency programs funded under the ARRA is included implicitly in the 2010 ERCOT forecast because the 2009-2010 electricity demand is affected by the recent history of electricity demand savings. This recent history implicitly includes the past impact of ARRA as well as other recent subsidies for energy efficiency and successes in San Antonio and Austin are carried forward in the forecast. Similarly, the recent history of energy savings for all utilities is reflected in the historical data for 2009 used to estimate future demand relationships. Historically, ERCOT forecasts have shown rates of growth in peak demand of over 2 percent per year; the most recent forecast shows an average rate of closer to 1.5 percent for the period 2009-2020 before*

special adjustments ERCOT made for program-related energy efficiency not otherwise accounted for. These adjustments further reduce the growth rate to about 1.4 percent.

Based on discussions with ERCOT, the review team has learned that information documenting the actual energy savings of ARRA activities is difficult to obtain, but that ARRA and the other new programs so far have not shown any significant impact on the forecast. In the case of weatherization programs, some 40,000 to 50,000 units were weatherized, but this did not always result in overall electricity savings. In some cases, new equipment (e.g. air conditioning equipment) replaced equipment that was not operational, or was too expensive to operate. After replacement, the household benefitted from cooler indoor temperatures, but used more electricity because the customer actually ran the air conditioner. In other cases, it was necessary to repair the house in order to carry out the weatherization retrofit. For example, for increased insulation to be effective, in some cases it was necessary to fix or replace a leaking roof, greatly increasing the cost of the retrofit and improving the lives of the residents, but not saving much electricity.

Regarding SECO's LoanStar Program, the amount of funding is known, but no estimates of impact appear to be available. Regarding Energy Efficiency Block Grants, the amount of funding is known, but no estimates of impact appear to be available.

No changes were made to the forecasts in Chapter 8 as a result of this comment.

Comment: [W]e are deregulated market. We're a merchant power producer. Our owners are a merchant power producer. If this plant is going to be built, it's got to satisfy their economic model to show that it will make money. It's got to satisfy their economic model, such that they can satisfy their investors. So, basically, it won't start construction unless it passes that hurdle first, because they won't finance it. (**0004-2-37** [McBurnett, Mark])

Response: *This general comment is about the requirement that the owners of a merchant nuclear plant have a business model that will allow it to be financed in the marketplace. If the marketplace participants do not have the assurance that the owners can sell the power at a profit, they will not finance the plant. The EIS makes the same point in Section 8.4; therefore no changes were made to the EIS as a result of this comment.*

E.2.23 Comments Concerning Alternatives – No-Action

Comment: DEIS Section 09.01. No-Action Alternative. Page 9-2, Lines 17-18: The DEIS states that if the NRC denies the COL, the predicted environmental impacts would not occur. However, not all impacts from the construction and operation of STP 3 & 4 are negative and this also means that the positive impacts would not occur. Aside from the lost opportunity for additional electrical capacity, positive impacts that would be lost in the no-action alternative are not addressed in the DEIS. The Environmental Report (Rev. 3.0) describes the benefits such

as additional jobs, additional revenue injected into the regional economy, and the increased electrical capacity generated which supports national and international goals to reduce the generation of greenhouse gases as outlined in the Energy Policy Act of 2005. (**0010-2-55** [Head, Scott])

Response: *Section 9.1 of the EIS was revised in response to this comment to include a reference to the benefits of the proposed project identified in Section 10.6.1.*

Comment: DEIS Section 09.01. No-Action Alternative. Page 9-2, Line 26: The DEIS does not address that the no-action alternative would cause ERCOT to be unable to maintain the minimum 12.5% target level of reserve margin necessary to mitigate uncertainties in load requirements. (**0010-2-56** [Head, Scott])

Response: *The review team believes that the first two paragraphs of Section 9.1 of the EIS adequately cover the concern expressed by the comment. No change to the EIS was made as a result of the comment.*

Comment: DEIS Section 09.01. No-Action Alternative. Page 9-2, Lines 29-35: The DEIS states that other generation sources would be pursued which would have environmental impacts as well and would meet the need for power. Although it is stated that this is discussed in later sections, this is not part of the No-Action Alternative and could be misleading. (**0010-2-57** [Head, Scott])

Response: *The review team believes that the existing text in Section 9.1 of the EIS is not misleading to the reader. No change to the EIS was made as a result of the comment.*

E.2.24 Comments Concerning Alternatives - Energy

Comment: I don't think the NRC has done an adequate job in looking at the efficiency potential, and the potential for renewables, combined heating and power, geothermal, the impact of what we call nodal transmission, or nodal dispatch, and demand side management. ... Industry studies indicate that energy efficiency, wind, coal with carbon sequestration are all lower cost than nuclear power. (**0004-1-22** [Smith, Tom])

Response: *The review team's evaluation of alternative energy sources, including renewable sources, is in Section 9.2 of the EIS. The staff concluded in Section 9.2.3 of the EIS that energy alternatives other than coal and natural gas would not be reasonable alternatives to two new nuclear units that would provide baseload power. The review team concluded in Section 9.2.1 of the EIS that demand-side management would not be a reasonable alternative to providing new baseload power generating capacity. The review team did not include an evaluation of coal with carbon sequestration because the technology is not yet mature enough to allow for anything other than a purely speculative evaluation. The staff concluded in Sections 9.2.5 and*

10.5 of the EIS that none of the alternative energy options were both (1) consistent with STPNOC's objective of building baseload generation units to meet the need for 2700 MW(e) of baseload power and (2) environmentally preferable to the proposed action. The cost of energy alternatives was not considered in the EIS because the two preceding conditions were not met. No change was made to the EIS as a result of this comment.

Comment: You all know about cogen. There's about another 15,000 megawatts of cogen out there that have never been plugged in that could be utilized. And there's a great untapped resource called geothermal energy that's underground. And anybody who has ever drilled for oil and gas knows one of your problems is you've got to deal with the hot stuff, the hot water, the hot brines that come out from underground. That can be turned into electricity and sold to the grid. ... Energy storage is right on the horizon. And we know how to do it, we've been doing it for over 50 years with compressed natural gas. We can do it with wind, and other kinds of renewable energies. ... we believe that the NRC needs to go back and take a good hard look at the basis of the assessment for ... alternatives. (**0004-1-27** [Smith, Tom])

Response: *The review team's evaluation of alternative energy sources, including renewable sources, is in Section 9.2 of the EIS. The commenter mentioned cogeneration as an option that needed to be considered. (Cogeneration refers to the production of electricity and useful thermal energy simultaneously from a common fuel source.) Because the purpose and need for this proposed action is the generation of baseload electricity and cogeneration is for other purposes, it was not considered by the review team in the EIS. The review team concluded in Section 9.2.3 of the EIS that energy alternatives other than coal and natural gas would not be reasonable alternatives to two new nuclear units that would provide baseload power. The feasibility of energy storage is discussed in Section 9.2.3.2, and geothermal energy is discussed in Section 9.2.3.5. The review team concluded in Section 10.5 of the EIS that none of the alternative energy options were both (1) consistent with STPNOC's objective of building baseload generation units and (2) environmentally preferable to the proposed action. No change to the EIS was made as a result of this comment.*

Comment: There is also a need for decentralized power generation as shown by the many alternatives available commercially for power generation, including solar cells, generators, windmills, and other so-called alternative energy sources. It is an object of the present invention to provide such an alternative electrical power source. (**0007-7** [Fuson, David])

Comment: The DEIS describes STP 3 & 4 cumulative impacts on surface water and groundwater quality but fails to compare cumulative impacts to surface water quality from alternatives such as wind and solar. The failure to compare water quality impacts from alternatives including wind, solar, geothermal, etc. has the effect of distorting the relative advantages of nuclear power. (**0015-5** [Johnson, Matthew])

Comment: Solar announcements - Much is made in the discussion of alternatives about the high cost, large land needs and water needs of utility-scale solar plants. The DEIS seems to suggest it is just not reasonable to talk about solar replacing the need for a nuclear plant. In fact, the main point seems to be that while Matagorda County is a great place to build an additional nuclear plant it would not be a good place to build a utility-scale solar plant. And we agree. But there is no reason that NRG could not build a solar plant somewhere else. Indeed, NRG has been looking at building solar plants, such as the 10 MW project for the City of Houston. While that agreement appears to have broken down, the fact remains that NRG does have the desire and capability to explore meeting Texas's energy needs with utility scale solar power. Indeed, we now have three announced utility-scale solar plants announced in Texas, including Tesara in Presidio County, and the Austin Energy Webberville project. While these projects are relatively small - 30 or 14 MWs as opposed to 2,740 MWs - they point to the potential to replace a large project with several smaller-scale flexible projects throughout Texas. As mentioned, both Austin Energy and CPS Energy have made long term commitments to obtain hundreds of Megawatts of electricity from solar over the next 10 years. In addition to the utility-scale announcements, Texas; has begun to install onsite photovoltaic solar production. Thus, while still a tiny part of the market -perhaps 5 to 10 MWs currently - a series of announcements in San Antonio, Austin and especially the Oncor Service territory suggest that onsite solar will lead to further reduction in demand for power from the proposed plant. Thus, earlier this year, SolarCity, a California company, announced a partnership in the Oncor Service Territory. Under this partnership, SolarCity will build solar installations on homes in return for the ONCOR solar rebate and then charge homes only $35 per month. SolarCity is considering expanding their operations to other parts of the state, contingent upon the existence of solar rebates. AEP has begun a small solar rebate program as well. In the meantime, CPS Energy has announced a new feed-in tariff for larger commercial systems, while Austin Energy is currently reviewing its solar rebate and incentive program. The Sierra Club believes that while small in the short-term, these and similar programs could lead to large-scale deployment of solar PV in Texas, particularly if the Legislature takes action to get rid of some barriers. (**0017-11** [Reed, Cyrus])

Comment: DEIS undercounts alternatives to nuclear plant ... _ In fact, the Lone Star Chapter believes given its high cost, inflexibility and lengthy implementation schedule, Texas would be better served by developing smaller, more flexible, cheaper alternatives like on and off-site solar, additional natural gas plants, energy efficiency, coastal wind, energy storage and geothermal resources. (**0017-14** [Reed, Cyrus])

Response: *The review team's evaluation of alternative energy sources, including renewable sources such as solar and wind, is in Section 9.2 of the EIS. The review team concluded in Section 9.2.3 of the EIS that energy alternatives other than coal and natural gas would not be reasonable alternatives to two new nuclear units that would provide baseload power, and these comments do not provide information that would change these conclusions. There is no need to compare the environmental impacts of the proposed action with alternatives that do not meet*

the purpose and need of the action. The review team concluded in Sections 9.2.5 and 10.5 of the EIS that none of the alternative energy options were both (1) consistent with STPNOC's objective of building baseload generation units to meet the need for 2700 MW(e) of baseload power and (2) environmentally preferable to the proposed action. No changes were made to the EIS as a result of these comments.

Comment: DEIS Section 09.02. Energy Alternatives. Page 9-3, Lines 30-33: Consistent with the ER, NRC identified the Region of Interest (ROI) for the alternatives analysis as the ERCOT region (See page 9-3, lines 11-12), which represents about 85 percent of the electric load and 75 percent of the land area in Texas. However, this paragraph implicitly considers the entire State of Texas as the ROI. The discussion in the ER is limited to the ERCOT region. Other locations that may need additional clarity on the Texas/ERCOT distinction are Page 9-6, Lines 19-24, Page 9-20, Lines 32-34, Page 9-22, Lines 18-20, Page 9-23, Lines 12-14, Page 9-24, Lines 6-11. (**0010-2-58** [Head, Scott])

Response: *Section 9.2.2 of the EIS was changed to reflect the energy mix within ERCOT. No other changes to the EIS were made as a result of this comment.*

Comment: DEIS Section 09.02. Energy Alternatives. Page 9-6, Lines 15-18: The DEIS states "Consistent with NRC's evaluation of alternatives to operating license renewal for nuclear power plants, a reasonable set of energy alternatives ... should be limited to analysis of discrete power generation sources, a combination of sources, and those power generation technologies that are technically reasonable and commercially viable (NRC 1996)." This statement is incorrect. Combinations of power generation technologies were specifically excluded from NRC's evaluation of alternatives to operating license renewal for nuclear power plants (NRC 1996). Section 8.1 of NRC 1996 states "While many methods are available for generating electricity, and a huge number of combinations or mixes can be assimilated to meet a defined generating requirement, such expansive consideration would be too unwieldy to perform given the purposes of this analysis. Therefore, NRC has determined that a reasonable set of alternatives should be limited to analysis of single, discrete electric generation sources and only electric generation sources that are technically feasible and commercially viable."
(**0010-2-59** [Head, Scott])

Response: *NRC's supplemental EISs for license renewal do include an analysis of a combination of energy alternatives. In response to this comment, the citation to "NRC 1996" was removed from the first paragraph of Section 9.2.2 of the EIS.*

Comment: DEIS Section 09.02. Energy Alternatives. Page 9-12, Lines 4-8: The DEIS states "STPNOC would pay significant property taxes for the plant to Matagorda County, the Matagorda County Hospital District, Navigation District #1, Drainage District #3, the Palacios Seawall District, and the Palacios Independent School District (STPNOC 2009a). The review team estimates that the taxes would have a LARGE beneficial impact to the tax recipients." The

reference to the ER is incorrect. While the beneficial impacts from taxes on STP Units 3 & 4 are addressed in the ER, the ER does not address the potential impacts from taxes for the coal-fired alternative. Also, STPNOC is the operator of the nuclear facilities at the STP site and would not own any plant that is constructed at the site. The owners of the coal-fired plant would pay the property taxes. (**0010-2-60** [Head, Scott])

Response: *Based on this comment, the reference to the ER in Section 9.2.2.1 of the EIS was deleted. In addition, the EIS was changed to indicate that the owners would pay the property tax.*

Comment: DEIS Section 09.02. Energy Alternatives. Page 9-17, Lines 28-38 and Page 9-18, Lines 1-4: The DEIS states "The plant owner would pay significant property taxes for the plant to Matagorda County, the Matagorda County Hospital District, Navigation District #1, Drainage District #3, the Palacios Seawall District, and the Palacios Independent School District (STPNOC 2009a) and would employ a noticeable but not significant number of workers, especially during the building period. Based on the expected valuation of a natural gas plant, which would be significantly less than for nuclear or coal, the property taxes would be lower for the natural gas option. Considering the population and economic condition of the County, the review team concludes that the taxes and employment would have a MODERATE beneficial impact on the County." The reference to the ER is incorrect. While the beneficial impacts from taxes on STP Units 3 & 4 are addressed in the ER, the ER does not provide an assessment of the potential impacts from taxes for the gas-fired alternative. Also, the ER (Section 9.2.3.2.3) concluded that impacts from employment would be SMALL due to the influence of the nearby metropolitan area. (**0010-2-61** [Head, Scott])

Response: *Based on this comment, the reference to the ER in Section 9.2.2.2 of the EIS was deleted. The MODERATE beneficial socioeconomic impact characterization in the EIS is based on the tax and employment impact of a hypothetical alternative natural gas-fired plant.*

Comment: DEIS Section 09.02. Energy Alternatives. Page 9-24, Lines 15-16: The DEIS states "Geothermal systems have a relatively small footprint." The ER (Section 9.2.2.3.4) indicates that a geothermal power plant requires between 1 and 8 acres per MWe, and estimates that a 2700 MWe geothermal plant with a 93% capacity factor would require between 2900 acres and 23,200 acres. (**0010-2-62** [Head, Scott])

Response: *Section 1.8 of the report published by the Massachusetts Institute of Technology (MIT 2006) cited in the EIS states that "… a geothermal energy source is contained underground, and the surface energy conversion equipment is relatively compact, making the overall footprint of the entire system small." No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 09.02. Energy Alternatives. Page 9-27, Lines 27-28: The DEIS states "The demand-side management programs would be implemented by CPS Energy and/or Reliant Energy, a subsidiary of NRG Energy." This statement contradicts the information provided on DEIS page 9-5, lines 9-12 which states "NRG Energy ... is a wholesale power generation company ... it does not directly offer demand-side management or conservation programs." (**0010-2-63** [Head, Scott])

Response: *The review team considers the text as written in Section 9.2.4 to be accurate. NRG Energy doesn't directly offer demand side management programs, as stated in the EIS. However, the review team assumes that Reliant Energy, a subsidiary of NRG Energy, will continue to offer demand side management programs.*

Comment: Energy Storage announcements _ In the last several years, several large companies - such as Luminant, Shell and Chevron have announced plans to invest in large-scale energy storage technology in Texas. Those announcements are not incorporated or analyzed in the DEIS. (**0017-10** [Reed, Cyrus])

Response: *The feasibility of energy storage is discussed in Section 9.2.3.2 of the EIS. The review team's evaluation is based on current experience with energy storage and not on the speculation of possible future projects that might or might not come to fruition. This comment provides no new specific information that would merit a change to Section 9.2.3.2; therefore, no change was made to the EIS.*

Comment: This DEIS conclusion mistakenly assumes that alternatives such as wind, solar and geothermal (or combinations thereof) are not viable baseload alternatives. This conclusion is contradicted by, *inter alia*, the recent announcement of ConocoPhillips and General Compression of a CAES facility planned for Texas that would be suitable for baseload generation. The announcement of this project coupled with the National Renewable Energy Laboratory's conclusion that wind generation combined with CAES is a viable baseload source makes exclusion of this alternative in the DEIS unreasonable. Additionally, the DEIS omits any discussion of combinations of wind and solar power to provide baseload generation. (**0015-7** [Johnson, Matthew])

Response: *The feasibility of energy storage is discussed in Section 9.2.3.2 of the EIS. Section 9.2.3.2 points out that only two CAES plants are currently in operation and that nothing approaching the scale of a 2700 MW(e) facility has been proposed. Whether a plant this size could be constructed and operated in the ERCOT region is speculative. Wind and solar power would both require energy storage to serve as a baseload power source as discussed in Sections 9.2.3.2 and 9.2.3.3. No changes were made to the EIS as a result of this comment.*

E.2.25 Comments Concerning Benefit-Cost Balance

Comment: [This] may end being an economic albatross, both through having to pay out on the loan guarantees, but with you having a plant that's never completed (**0004-1-21** [Smith, Tom])

Comment: I'm also concerned about ... financial burden of nuclear energy, generally speaking, on the tax payer as far as loan guarantees. (**0004-2-11** [Dancer, Susan])

Response: *These comments express a concern that Units 3 and 4 will not be completed once begun, leaving the U.S. taxpayer with an obligation to pay for the plants' Federal loan guarantees, without a corresponding benefit of electricity generated. The cost of the loan guarantees only would be borne if the owners default on the loans that they take out to build the plant. From a national benefit-cost perspective, the cost of Units 3 and 4 would be roughly the same whether the taxpayers or ratepayers provide the financing; the difference would be that power generation benefits would not occur if Units 3 and 4 were not finished. The NRC is not involved in establishing national energy policy, and issues related to the guaranteeing of loans to nuclear power are outside the scope of the NRC's mission and authority. No changes were made to the EIS as a result of these comments.*

Comment: [A] study we had a consultant do last April by a former expert for the Office of Public Utility Council in Texas, came to the same conclusion. But what he showed in his study, which I think is important, is that it's 20 years before this plant starts to make a profit. And, at some point, the investor community is going to get wise to this, and say why would we invest in a plant like this, if there are a bunch of cheaper ways to end up making money, and to generating electricity? ... If load guarantees are granted, if this plant is started, somewhere along the line the market is going to do what markets do, and say this power is too expensive to use, and this plant will never be completed. (**0004-1-24** [Smith, Tom])

Response: *Whether STP Units 3 and 4 make a profit for their owners is outside the scope of authority and responsibility of either NRC or the Corps . No changes were made to the EIS as a result of this comment.*

Comment: The STP proposed reactors are incredibly expensive. They could be as much as $22 billion, according to one study. Federal loan guarantees, if granted, and if there were to be a default, would cost billions of dollars, and all U.S. tax payers would be left with that bill. (**0004-1-36** [Hadden, Karen])

Response: *There are a number of studies estimating the cost of new nuclear plants including STP Units 3 and 4. The study cited by the commenter includes projected escalation of costs and includes financing costs. The capital costs reported in Chapter 10 are overnight or cash-equivalent costs of building the plant, based on publicly available studies. They are the true national resource costs of building Units 3 and 4 and ignore the economic transfers associated*

with financing the facilities. There is as yet no publicly-available specific cost estimate for STP Units 3 and 4. No changes were made to the EIS as a result of this comment.

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-21, Table 10-4: The DEIS states that 300 acres will be occupied on a long term basis for the 2 new reactors and associated infrastructure (which is the acreage for the existing STP Units 1 & 2). The Environmental Report (Rev. 3.0) states that 90 acres will be occupied on long term basis for the 2 new reactors and infrastructure (Sections 4.3, 5.10, and 10.1). (**0010-2-79** [Head, Scott])

Response: *Table 10-4 of the EIS was corrected to show that 90 ac will be occupied on a long-term basis rather than 300 ac.*

Comment: One last item I'd like to talk about is cost. Nuclear power plants are very large capital investments, no denying that. They're also long-term investments. This plant will run for upwards of 60 plus years generating reliable power. It's a long-term investment. ... It's true the new units are going to be expensive. (**0004-2-3** [McBurnett, Mark])

Response: *The comment qualitatively addresses the cost of nuclear power plants, but does not provide any specific information about cost. The license period for a combined license is 40 years. A licensee can request renewal for an additional 20 years. The cost-benefit analysis is done for the license period of 40 years. It would not be appropriate to assume additional cost or benefit for an additional 20 years of operation under a renewed license when that action has not been requested or approved. No changes were made to the EIS as a result of this comment.*

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-27, Lines 5-6: The DEIS states that "Table 10-3 includes a summary of both internal and external costs of the proposed activities at the STP site for Units 3 and 4, as well as the identified benefits". This sentence is incorrect. Table 10-3 only includes a summary of the benefits of the project. Table 10-4 includes a summary of the costs. (**0010-2-84** [Head, Scott])

Response: *The EIS has been corrected to state that Table 10-3 summarizes benefits while Table 10-4 summarizes costs.*

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-21, Table 10-4: The DEIS states in the table under "Land Use" that the already utilized plant site is approximately 12,200 acres. The Environmental Report (Rev. 3.0), as does other sections of the DEIS, states that the STP site is approximately 12,220 acres. Additionally, the wording "already utilized plant site" could be misleading that all 12,220 acres is being used for plant operations. Section 2.2.1.1 of the ER states that "The 12,220-acre STP site includes land developed for industrial use, farmland, and undeveloped natural and man-made wetlands. The existing plant and plant facilities, including the NTF, operations area, support facilities, and transmission right-of-ways

occupy approximately 65 acres, while the MCR makes up an additional 7000 acres. Another approximate 1700 acres remain as natural lowland habitat. The remaining portion of the STP site is undeveloped land, some of which, located to the east of the MCR, is leased for cattle grazing". (**0010-2-82** [Head, Scott])

Response: *The reference to "already-utilized" land was removed from Table 10-4 of the EIS.*

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-21, Table 10-4: The DEIS does not list land use for fuel cycle support. The Environmental Report (Rev. 3.0) states that the total annual land requirements for fuel cycle support committed would be 21 permanently committed acres and 160 temporarily committed acres per unit (Table 10.4-2). (**0010-2-80** [Head, Scott])

Response: *Table 10-4 of the EIS has been updated to include land committed to fuel cycle support.*

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-19, Line 19-31: The DEIS gives an estimated ERCOT fuel mix from a 2008 source. The citation is incorrect for this information. The call-out is dated 2006, the document is dated 2008, and the ADAMS accession number is for a 2007 document. Additionally, this does not agree with Chapter 9 of the DEIS, which addresses the fuel mix for the entire State of Texas instead of the ERCOT region of interest. The Environmental Report (Rev. 3.0) cites a fuel mix from actual ERCOT energy production values from June 2005 to May 2006 (Section 10.4.1.2).
(**0010-2-77** [Head, Scott])

Response: *The value for ERCOT's 2007 energy mix is a figure on page 20 of the cited reference (ERCOT 2008). The summer capacity fuel mix is the 2009 estimated available summer capacity from page 13 of the May 2009 cited report (ERCOT 2009). The 2006 callout is for the national mix, not ERCOT. ERCOT data should not necessarily be the same as that for Texas. However, Sections 9.2.2 and 10.6.1 of the EIS were revised to use 2008 annual energy production data.*

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-21, Table 10-4: The DEIS does not list hydrology as a cost category. The Environmental Report (Rev. 3.0) includes both groundwater and surface water in the benefit-cost summary table (Table 10.4-2). (**0010-2-81** [Head, Scott])

Response: *Table 10-4 of the EIS was revised to include information about groundwater and surface water use.*

Comment: DEIS Section 10.06. Benefit-Cost Balance. Page 10-20, Lines 23-26: The DEIS states that operations would yield 656 additional operations workforce and 964 additional

indirect jobs within 50-mile radius. The Environmental Report (Rev. 3.0) states that operations would yield 444 additional operations workforce and 653 additional indirect jobs within 50 mile radius (Section 5.8.2.1 and 10.4.1.7). (**0010-2-78** [Head, Scott])

Response: *The 444 workers cited in the comment are STPNOC's number of new workers who would move to the 50-mi region, not the number of operations jobs at Units 3 and 4 (estimated by STPNOC as 888 jobs in Section 5.8.2.1 of the ER, but as 959 jobs in Table 3.10.S-3, which was the figure the review team used). The review team also accounted for a net decrease in employment at the existing STP Units 1 and 2, yielding a net increase of operations jobs at the STP site of 656 jobs. The 964 additional indirect jobs came from applying the same operations job multiplier of 1.47 as used in the ER to the 656 net jobs increase. No changes were made to the EIS as a result of this comment.*

E.2.26 General Comments in Support of the Licensing Action

Comment: I want to thank you all again for giving me the opportunity to speak tonight in support, you know, of Units 3 and 4 at STP. ... And we look forward to you being back soon to continue this expansion. (**0003-12** [Humphries, Jim])

Comment: Titan Hotels Group and Hampton Inn and Suites have chosen to put their roots down in Bay City, and, therefore, we are here to support STP and we ask that you do the same. (**0003-13** [Roberts, Kaley])

Comment: I am excited to speak here today in support of the expansion of Units 3 and 4. (**0003-14** [Yeamans, Joe])

Comment: [I] hope for that expansion at STP, so I can continue to offer services there. (**0003-17** [Green, Julie])

Comment: So as both a union member and a union officer, I would just like to express my support for this expansion project. (**0003-19** [Griffin, Mark])

Comment: I challenge anyone to find anything environmentally sensitive about what we are doing here. This is truly a wonderful outfit to do business with. Coupling it with NRC's expertise and guiding hand, this truly is something that we can move America and Texas forward with, and certainly Matagorda County, if and when this new Units 3 and 4 build occurs. (**0003-2** [McDonald, Nate])

Comment: I would like to tell the NRC that we love our power plant. ... and we want Units 3 and 4. (**0003-21** [Head, Bobby])

Comment: I am excited that we are going to build Units 3 and 4. I think it is a great thing. ... So my only comment to the NRC would be, hey, hurry up and approve this thing, and let's get this thing built. (**0003-22** [Grebe, Lynn])

Comment: I am speaking today in support of the expansion of STP to include two new units, Reactors Number 3 and 4. (**0003-24** [Hutto, Veronica])

Comment: I am very excited about STP's expansion with Units 3 and 4, and I am highly confident that the new advanced boiling water reactors will be a huge success, complementing Units 1 and 2 well into the future. (**0003-26** [Chavez, Chance])

Comment: I strongly support STP's request to get their operating licenses, and I would recommend that NRC should help them with it. (**0003-32** [Kumar, Vatsu])

Comment: So I don't know why it took so long for the good news to get out about Units 1 and 2, so that we are finally building 3 and 4. It's going to happen, you know that. ... and I'll just be glad when it's up and running. (**0003-36** [Mann, Billy])

Comment: Two years ago I stood at this podium and I said, PIMBY -- for those of you who have forgotten what PIMBY is, let me remind you. It is Please In My Backyard. (**0003-4** [Knapik, Richard])

Comment: We are hopefully on the crux of greatness here in many aspects -- one, becoming a mini power-generating mecca of South Texas, doing it in a relationship with STP. (**0003-6** [Marceaux, Brent])

Comment: [T]he reason we can fill this room up tonight at 7:00 with hardworking people with families to look after, when we can fill this room up this afternoon, is because we as a community know what [Units] 3 and 4 means. (**0003-9** [Thames, Mitch])

Comment: I am writing in support of the South Texas Project Units 3 and 4 Combined License application. This project will provide much needed energy, generation capacity in the area, and will have a significant positive impact for economic development in Matagorda County (**0004-1-1** [Paul, Ron])

Comment: I strongly urge the NRC to grant the license. (**0004-1-11** [Knapik, Richard])

Comment: This project, 3 and 4, will not only help the State of Texas with power needs, it'll help this community, as well. (**0004-1-14** [Thames, Mitch])

Comment: The Matagorda County Economic Development Corporation submits this letter in support of the findings of the Draft Environmental Impact Statement, that there are no significant environmental reasons for denying the construction, and operating license for Units 3 and 4.

...on behalf of the Matagorda County Economic Development Corporation, and the City of Palacios Economic Development Corporation, we urge approval of the Draft EIS into a Final EIS, and quickly proceed to issue the operating license in early 2012 with the construction of Units 3 and 4. (**0004-1-19** [Bludau, Owen])

Comment: [A]s the Texas State Senator whose district includes Matagorda County, and the South Texas Project, I am pleased to endorse the proposed expansion of the facility. (**0004-1-2** [Hegar, Glenn])

Comment: We're the local sponsor for the federal project, which is Colorado River Navigation Channel. We've been affiliated with the nuclear plant in some of their activities, and they've been a great partner. And the Port fully supports the expansion of Units 3 and 4. (**0004-1-29** [Griffith, Mike])

Comment: Matagorda Regional Medical Center Board of Managers supports the expansion of South Texas Project's proposed Units 3 and 4. ... The Matagorda Regional Medical Center Board of Managers supports STP's expansion. The new units will benefit not only our local communities, but our entire state for decades to come. (**0004-1-43** [Smith, Steve])

Comment: Titan Hotels Group and Hampton Inn & Suites have chosen to put roots down in Bay City, and, therefore, we're here to show our support for STP, and we ask that you do the same. (**0004-1-47** [Roberts, Kaley])

Comment: As both a union member, and a union officer, I would just like to express my support for this expansion project. (**0004-1-48** [Griffin, Mark])

Comment: I want to go on record as being in support of this project, and to reiterate that Matagorda County has a quality of life that's more than a slogan, it's an experience worth living. (**0004-1-8** [Weber, Randy])

Comment: [P]lease accept this as my endorsement of Units 3 and 4, and my endorsement of the Draft Environmental Impact Statement that we're hearing today. (**0004-1-9** [McDonald, Nate])

Comment: [W]e urge for the certificate to be granted. (**0004-2-14** [Holt, Ben])

Comment: I do want to support the implementation of the [STP] expansion. (**0004-2-15** [Croft, Roy])

Comment: I am very excited about STP's expansion of 3 and 4, and I am highly confident that the new advanced boiling water reactors will be a huge success, complementing Units 1 and 2 well into the future. (**0004-2-22** [Chavez, Chance])

Comment: I am speaking today in support of the expansion of STP to include two new reactors, Units 3 and 4. (**0004-2-27** [Hutto, Veronica])

Comment: I am excited to speak here today in support of expansion of Units 3 and 4. (**0004-2-30** [Yeamans, Joe])

Comment: I want to support -- please, hurry this up, and let's get some people working. (**0004-2-33** [Lucero, Greg])

Comment: I fully support the expansion of the project. (**0004-2-35** [Arnold, James])

Comment: I think it [building of STP 3 and 4] is a great thing for Matagorda, and I look forward to you all getting started. (**0004-2-36** [Bradish, Michael])

Comment: I very strongly recommend to NRC that they should have no hesitation to approve and issue a license, operating license to STP, and STP will do a fine job. (**0004-2-6** [Kumar, Vatsu])

Comment: I am proud that STP, located in Matagorda County, will be providing a greater amount of electric energy needed to support the needs of families and businesses throughout our great State of Texas! (**0005-4** [Purvis, Gail])

Comment: I am writing in support of the South Texas Project Units 3 and 4 Combined License Application. This project will provide much needed energy generation capacity in the area and will have a significant positive impact for economic development in Matagorda County. (**0007-1** [Paul, Ron])

Comment: I strongly urge NRC to issue the Construction and Operating Licenses to STP. (**0007-4** [Kumar, Vatsu])

Comment: The Matagorda County Economic Development Corporation (MCEDC) fully supports the granting of a Combined Operating License for STP Units 3 and 4. ...The Matagorda County Economic Development Corporation submits this letter in support of the findings of the STP Draft Environmental Impact Statement that there are no significant environmental reasons for denying a Construction and Operating License for STP Units 3 and 4. ... The Matagorda County Economic Development Corporation urges the NRC to approve the Draft EIS and to proceed with the remainder of the review process in order to issue the Construction and Operating License in early 2012 for Units 3 and 4 to begin construction. (**0007-5** [McDonald, Nate])

Comment: The City of Palacios Economic Development Corporation wishes to go on record as supporting the findings of the STP Draft Environmental Impact Statement that there will be no

significant environmental reasons for denying a construction and operations permit for STP Units 3 and 4. ... The City of Palacios Economic Development Corporation urges the NRC to approve the Draft EIS and to proceed with the remainder of the review process in order to issue the construction and operating license in early 2012 for Units 3 and 4 to begin construction. (**0007-6** [Johnson, Ken])

Comment: The Matagorda Regional Medical Center Board of Managers supports the expansion of the South Texas Project's proposed Units 3 & 4. ... The Matagorda Regional Medical Center Board of Managers supports STP's expansion. The new units will benefit not only our local communities but our entire state for decades to come. (**0012-1** [Scurlock, Betty])

Response: *These comments provide general support of STPNOC's application for COLs. The comments do not provide any new information that would require changes to the EIS.*

E.2.27 General Comments in Support of the Licensing Process

Comment: I also appreciate that the NRC here tonight has two sessions, one for those that are not able to be here earlier today. (**0003-23** [Corder, John])

Comment: [W]e have the freedom of speech, and I am exercising that tonight, and I appreciate it. (**0004-2-13** [Corder, John])

Response: *These comments express general support for the NRC COL process. No changes were made to the EIS as a result of these comments.*

E.2.28 General Comments in Support of Nuclear Power

Comment: You have experienced nuclear power for the last 30 years. Let that experience speak for itself. (**0003-10** [Halpin, Ed])

Comment: [W]e are able to produce electricity without polluting the air and producing greenhouse gases, which would damage the atmosphere and cause harm to plants and animals. We are an ecofriendly plant and offset the equivalent of 35 million barrels or oil and nine million tons of coal each and every year. (**0003-27** [Chavez, Chance])

Comment: With nuclear power on the rise, the NRC overseeing reactor safety, and with nuclear plants producing energy without pollution, it is apparent that nuclear power is a clear-cut choice in producing electricity. (**0003-29** [Chavez, Chance])

Comment: Why nuclear energy, when people are looking at coal, natural gas, geothermal, wind, so many things? Because there is a wonderful technology available for plant design, the most recent and the most advanced plant design in this industry. Large amount of power that can be produced economically and reliably from one location -- at one location. It is a clean

environment. There is no fly ash, no sulphur dioxide emission, no sludge to be removed, and no need to store an enormous quantity of raw materials and fuels. No raw materials -- know that raw materials also need to be handled in or outside of the facilities.
(**0003-30** [Kumar, Vatsu])

Comment: [W]e think nuclear is very good for all of us, for the environment, avoiding across the United States some 700 tons per year of carbon dioxide going into the environment (**0004-1-16** [Halpin, Ed])

Comment: We need the energy to happen. It should happen through nuclear. Nuclear is safe and clean. (**0004-1-18** [Halpin, Ed])

Comment: [N]uclear energy must play a larger role in our state's energy future. Nuclear energy has the lowest fuel and production costs of all major power sources together, averaging less than 2 cents per kilowatt hour. It also is the most reliable source, because nuclear power plants operate around the clock, and throughout the year. Nuclear energy is also carbon-free, and produces no greenhouse gases. Increased nuclear generation will help secure our state's energy future. It will also stabilize our energy costs, produce a cleaner environment, and reduce our dependence on fossil fuels. (**0004-1-4** [Hegar, Glenn])

Comment: We believe nuclear energy must play a larger role in our state's long-term energy future. There is a growing recognition of nuclear energy's environmental benefits, and its role in providing much needed generating capacity in Texas for the decades ahead.
(**0004-1-46** [Smith, Steve])

Comment: With STP being a nuclear power plant, we are able to produce electricity without polluting the air or producing greenhouse gases, which damage the atmosphere and cause harm to plants and animals. We are an ecofriendly plant and offset the equivalent of 35 million barrels of oil or nine million tons of coal each and every year. (**0004-2-23** [Chavez, Chance])

Comment: With nuclear power on the rise, the NRC overseeing nuclear reactor safety, and with nuclear plants producing energy without air pollution, it is apparent that nuclear power is a clear-cut choice in producing electricity. (**0004-2-26** [Chavez, Chance])

Comment: [W]hy nuclear energy? ... The answer to this question, first of all, nuclear energy, availability of advanced technology in the area of plant design that's provided by nuclear energy industry. Large amount of power that is reliable, economical, that will be available for a long period of time, like 60 years or longer with the same facility. Clean environment, not fly ash, no sulfur dioxide emission, no sludge removal, no need to store enormous quantities of raw fuel, either carting them in, or carting them out, no raw materials, no unnecessary raw materials needed on the site. The nuclear industry has continuously done engineering, monitors the plant

performances, looks for ways and means of continuously improving the plant efficiency. (**0004-2-4** [Kumar, Vatsu])

Comment: As the Director of The Trull Foundation, I am a member of the Texas Environmental Grantmakers Group. I have learned to appreciate the clean, energy producing aspects of nuclear power. Again, I am proud that Matagorda County has STP as a neighbor, producing clean energy. Energy produced in a way that is not a threat to the County's precious assets of water, air, bay critters, birds in flight and citizens of our County. (**0005-3** [Purvis, Gail])

Comment: 1. Availability of advanced technology in the areas of plant design. 2. Large amount of power that is reliable and economical. 3. Clean environment, no fly ash, no sulphur dioxide emission, no sludge removal, no need to store enormous quantities of fuel. 4. No raw materials to be handled to or from the site in large volumes. (**0007-3** [Kumar, Vatsu])

Comment: We believe nuclear energy must play a larger role in our state's long-term energy future. There is a growing recognition of nuclear energy's environmental benefits and its role in providing much needed generating capacity in Texas for the decades ahead. (**0012-4** [Scurlock, Betty])

Response: *These comments provide general support of nuclear power. No changes were made to the EIS as a result of these comments.*

E.2.29 General Comments in Support of the Existing Plant

Comment: [I]ts heartening for me, and quite gratifying, to be able to witness firsthand the commitment to the culture of excellence that has been promulgated and brought forth out at STP. It permeates everything we do at the STP here in Matagorda County. It permeates their operations, it permeates their maintenance, it permeates their emergency management, and it certainly permeates their commitment to the environment. (**0003-1** [McDonald, Nate])

Comment: [E]ven more important, is the relationship that we have with the community. It is one that has been forged over the last 30 years like a piece of steel. It is a relationship, a partnership, a friendship, and people are envious of that relationship, which is why it's great to build at STP. (**0003-11** [Halpin, Ed])

Comment: In my opinion, STP and the Center for Energy Development is the best thing that has ever happened to Matagorda County. ... in all my life I have never experienced anything that meets or exceeds the culture of STP. Their strong commitment to safety and exemplary work ethics are a model for any industry. (**0003-15** [Yeamans, Joe])

Comment: [O]n the north side of the plant, along FM-521, many years ago a lot of migrating birds would stay there for the winter. And a lot of birders in the area -- and not only our area,

but from all over, came to, you know, watch the birds. Well, this became a problem, because it was a traffic hazard. It was along FM-521, a small, narrow, two-lane road. STP, without any prodding, but because they are a great corporate citizen and are partners in our community, took it upon themselves to add a parking area and a viewing area to enable the safety of the birders, so they can watch in enjoyment all the birds that came there during the winter. I mean, if that's the kind of corporate citizens they are, I will take 800 more of them any day, any time. I mean, they are great to live with here. (**0003-3** [Knapik, Richard])

Comment: Now, specifically about STP, engineering continuously monitors the plant performance, looking for ways and means to continuously improve the plant efficiency. Cost of generation has gone down continuously for over a decade, due to improved plant performance, training of personnel, and the positive attitude that exists at STP. (**0003-31** [Kumar, Vatsu])

Comment: Would we have that hospital that we have right now without a nuclear plant? Would we have the emergency response that we have, teams? How about our high school over here? I'm proud of our new high school. Would we have that? They encourage their employees to be active in the community, and they are. They get involved in different clubs. ... But they are very supportive. They work in the community, and that's good, because that's what it's all about. (**0003-33** [Mann, Billy])

Comment: [N]o other city can be more proud of the way they [STP] operate, the way they respond to the necessities of charitable institutions, the unending door open and access to all of their staff, all of their directors. It is a rare and wonderful thing to have in our community. (**0003-7** [Marceaux, Brent])

Comment: Thanks to STP's leadership, and corporate citizenry, they built a road, and a parking lot that allowed citizens and bird watchers to pull in there and safely observe the birds during the winter months. That, to me, is corporate citizenship above and beyond the call of duty. (**0004-1-10** [Knapik, Richard])

Comment: As a City Council person, we want STP as a partner. We love STP as a partner. (**0004-1-13** [Thames, Carolyn])

Comment: For 20 years, STP's existing units have provided safe, clean, reliable energy to 2 million Texas homes. The facility is a recognized industry leader in production, reliability, and safety. Earlier this year, STP surpassed 10 million man hours, nearly three years, without a loss time or restricted duty injury. The facility is focused and committed to the safety of its employees, and the surrounding communities. (**0004-1-45** [Smith, Steve])

Comment: STP, in my opinion, epitomizes that focus, and that commitment to quality of life. STP, in my estimation, is a good corporate citizen. (**0004-1-6** [Weber, Randy])

Comment: I believe that STP has been a great steward. I've enjoyed all my relationships with them. I've been in the plant. I like the way they do their business. I think it's a very safe facility, and I'm here in support. (**0004-2-17** [O'Day, Mike])

Comment: I can just tell you as a child, and as a young adult, and as an older adult, always appreciated everything that the plant has done for the community, wonderful stewards of the community of all the events, of the environment. So, I appreciate that very much as a young person, and as an older person, but especially as a parent now. I have three children of my own, and just the support, not only in what they do for the environment, but also for the educational system, and how they support those programs. (**0004-2-18** [Segovia, Valerie])

Comment: They [STP employees] come into our schools, and they teach skills. They've got a welding program going in ACIC giving our students some much needed real job, real life skills that they will be able to get jobs with. They do a lot of environmental awareness programs in our schools. ... they are very, very generous to our school district, ... And I really appreciate that. (**0004-2-19** [Silva, Allison])

Comment: Several years ago, about 30, I was Mayor of Bay City. ... And as Mayor, I represented the City of Bay City, the City Council, and the majority of the citizens. We gave our full support to the permitting, construction, and operation at STP. And I certainly haven't changed my mind, as a citizen, for that. (**0004-2-21** [Opella, Ernest])

Comment: STP has done an excellent job of performing the tasks that they have when they moved into town. They provide a valuable product to this region of the country. They provide employment opportunities for people, and they do it in a very, very good and neighborly way. They support all county and civic organizations tenfold. They go way beyond the call of duty, and they do their business in a safety manner. And because of that, I am for them. (**0004-2-29** [Stanley, Rikki])

Comment: In my opinion, STP and the Center for Energy Development is the best thing that has ever happened to Matagorda County. ... in all my life I have never experienced anything that meets or exceeds the culture of STP. Their strong commitment to safety and exemplary work ethics are a model for any industry. (**0004-2-31** [Yeamans, Joe])

Comment: I think that STP is doing a wonderful job in the community ... They are so good in the community, with no problems, no one even knows you're here beyond the boundaries of this local area. ... I know that you are good for the community, and you are doing really well. (**0004-2-34** [Fuson, David])

Comment: Why STP? ... STP provides super, super training that I have not seen anywhere else. The emphasis on quality of work, there are multiple points of checks and balances, so there's nothing that can fall in the crack. Reviews, updates, new designs are done in a very

timely manner. Cost of generation has gone down continuously due to improvement of plant performance, training of personnel, and a very positive attitude that can be seen and experienced at the STP. (**0004-2-5** [Kumar, Vatsu])

Comment: As a resident of Palacios and Matagorda County, I am proud that STP is a good neighbor and a productive, tax paying organization. STP's safety record and emergency response methods have been a models for other nuclear power plants throughout the nation. ... As a member of the Palacios Hospital board, I appreciate STP and NINA's commitment of support for our Critical Access Hospital, a non-taxing 501c3 organization. (**0005-1** [Purvis, Gail])

Comment: Safety of plant personnel and plant equipment is number 1 priority at STP. Trained personnel perform far more better than those that are not. Emphasis on quality of work, multiple points of checks and balances at STP. Design reviews, updates and new designs in a timely manner at STP. ... Engineering continuously monitors the plant performance, looking for ways and means to continuously improve plant efficiency. Cost of generation has gone down continuously since 1996 due to improved plant performance, training of personnel and a positive attitude. (**0007-2** [Kumar, Vatsu])

Comment: For 20 years, STP's existing units have provided safe, clean, reliable energy to two million Texas homes. The facility is a recognized industry leader in production, reliability, and safety. Earlier this year, STP surpassed 10 million man-hours --nearly three years -without a lost -time or restricted duty injury. The facility is focused and committed to the safety of its employees and the surrounding communities. (**0012-3** [Scurlock, Betty])

Response: *These comments express support of the existing Units 1 and 2 at the site. No changes were made to the EIS as a result of the comments.*

E.2.30 General Comments in Opposition to Nuclear Power

Comment: There are ways to generate electricity. There are safe, affordable, less risky options to do so, and plenty of ways to have economic vitality in the community without building nuclear reactors. (**0004-1-38** [Hadden, Karen])

Response: *This comment expresses general opposition to nuclear power and does not provide any specific information relating to the environmental effects of the proposed action. No changes were made to the EIS as a result of this comment.*

E.2.31 Comments Concerning Issues Outside Scope - Safety

Comment: We have concerns with safety. (**0004-1-31** [Hadden, Karen])

Comment: The EIS is deficient because it fails to consider the combined effects of ongoing subsidence, frequent flooding due to tropical weather and rising sea levels. For both the units and the community, the cumulative effect of these could mean both would eventually be below mean sea level. (**0013-6** [Dancer, Susan])

Response: *Safety issues are outside the scope of the environmental review and were not addressed in the EIS. However, the NRC is developing a Safety Evaluation Report that analyzes all aspects of reactor and operational safety.*

E.2.32 Comments Concerning Issues Outside Scope - Security and Terrorism

Comment: We have concerns with ... security. (**0004-1-32** [Hadden, Karen])

Response: *Comments related to security and terrorism are safety issues that are not within the scope of the environmental review. The NRC is devoting substantial time and attention to terrorism-related matters, including coordination with the U.S. Department of Homeland Security. As part of its mission to protect public health and safety and the common defense and security pursuant to the Atomic Energy Act, the NRC staff is conducting vulnerability assessments for the domestic utilization of radioactive material. In the time since September 2001, the NRC has identified the need for license holders to implement compensatory measures and has issued several orders to license holders imposing enhanced security requirements. The NRC has also imposed enhanced security requirements on both license holders and applicants by rule. Finally, the NRC has taken actions to ensure that applicants and license holders maintain vigilance and a high degree of security awareness. Consequently, the NRC will continue to consider measures to prevent and mitigate the consequences of acts of terrorism in fulfilling its safety mission. Additional information about the NRC staff's actions regarding physical security since September 11, 2001, can be found on the NRC's website at* www.nrc.gov/reading-rm/doc-collections/fact-sheets/security-enhancements.html.

E.2.33 General Editorial Comments

Comment: DEIS Section 01.01. Background. Page 1-2, Line 33: The DEIS states "... two ABWR reactors each with thermal power ratings of 3853 MW(t)." The correct value for Units 3 & 4 is 3926 MW(t) (RAI Response 07.02-07). (**0010-1-1** [Head, Scott])

Comment: DEIS Section 02.03.02. Water - Water Use. Page 2-37, Line 17, Table 2-4, "Annual Permitted" line: The DEIS Table 2-4 states in the last row of the References column "CBGCD 2009". Please change "CBGCD" to "CPGCD". (**0010-1-16** [Head, Scott])

Comment: DEIS Section 02.04. Ecology. Page 2-91, Lines 4-6: The DEIS states "This species was collected in the Columbia River during the 1975-1976 nekton samples (NRC 1986), the 1983-1984 ichthyplankton samples (NRC 1986), and in the 2007-2008 bag seine and trawl

samples (ENSR 2008c)." The data refer to the Colorado River, not the Columbia River. Please note that ichthyoplankton is misspelled. (**0010-1-19** [Head, Scott])

Comment: DEIS Section 02.05. Socioeconomics. Page 2-112, Line 27: The DEIS text references Figure 2-17. Instead, it should reference Table 2-18. (**0010-1-22** [Head, Scott])

Comment: DEIS Section 02.05. Socioeconomics. Page 2-112, Line 28: The DEIS text references Figure 2-17. Instead, it should reference Table 2-18. (**0010-1-23** [Head, Scott])

Comment: DEIS Section 02.05. Socioeconomics. Page 2-118, Line 13: The DEIS states "Table 2-23 shows where the STP site's employees lived". This should be "Table 2-16 shows...." (**0010-1-25** [Head, Scott])

Comment: DEIS Section 02.05. Socioeconomics. Page 2-127, Line 6: The DEIS contains an incomplete reference to a table. The correct reference should be Table 2-28. (**0010-1-28** [Head, Scott])

Comment: DEIS Section 02.05. Socioeconomics. Page 2-131, Line 29: The DEIS contains an incomplete reference to a table. The correct reference should be Table 2-16. (**0010-1-29** [Head, Scott])

Comment: DEIS Section 02.13. References. Page 2-183, lines 26-28: The DEIS states: "South Texas Project Nuclear Operating Company (STPNOC). 2009e. Letter from Scott Head, STPNOC, to NRC, dated November 23, 2009, Response to Request for Additional Information Accession No. ML093310296." Accession No. ML093310296 is related to ER Section 5.4, instead of ER Section 2.3. The correct document for the STPNOC 2009e Reference should be another STPNOC letter to the NRC, also dated November 23, 2009 (Accession No. ML093310392), that provided COLA markups for ER Section 2.3.1. (**0010-1-34** [Head, Scott])

Comment: DEIS Section 03.03. Construction and Preconstruction Activities. Page 3-15, Line 10: The DEIS states, "The MDC from the site would be relocated via shallow excavation of the new course." The phrase "would be" in the sentence should be changed to "has been." (**0010-1-43** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-18, Lines 29-30: The DEIS states, During normal plant operation, the CWS would dissipate approximately 8.656×10^9 Btu/hr for each unit, or 1.732×10^9 Btu/hr for both units, of waste heat. The correct value is 1.732×10^{10} Btu/hr for both units consistent with DEIS Table 3-4. (**0010-1-46** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-23, Line 31: The DEIS states, "Water from the MCR may be discharged to the Colorado River subject to the limitations of the STP site's existing National Pollutant Discharge Elimination System (NPDES) permit (STPNOC

2009a)." The phrase "National Pollutant Discharge Elimination System (NPDES)" should be changed to "Texas Pollutant Discharge Elimination System (TPDES)." (**0010-1-50** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-24, Table 3-3: The DEIS states, two of the chemicals in Table 3-3, Representative Water Treatment Chemicals Used for STP Units 1 and 2, as "Sodium hyperchlorite and Sodium bisulfate." This should be corrected to read "Sodium hypochlorite and Sodium bisulfite." (**0010-1-51** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-25, Line 6: The DEIS contains an incomplete reference to a table. The correct reference should be Table 3-2. (**0010-1-54** [Head, Scott])

Comment: DEIS Section 03.04. Operational Activities. Page 3-26, Table 3-4: The DEIS cites a value of "1.732 x 1010" under both the Normal Operating Condition and Maximum Condition columns for the Meteorology/Air Quality Resource Area." The value should be corrected to show the proper exponential notation as "1.732×10^{10}." (**0010-1-57** [Head, Scott])

Comment: DEIS Section 04.10. Nonradiological Waste Impacts - Construction. Page 4-76, Line 18: The DEIS states that cumulative impacts to water are discussed in Section 7.2.2.1 and cumulative air impacts from nonradioactive emissions are discussed in Section 7.5. Cumulative water impacts are discussed in both 7.2.2.1 and 7.2.2.2 while air impacts are discussed in Section 7.6 of the DEIS. (**0010-1-80** [Head, Scott])

Comment: DEIS Section 04.10. Nonradiological Waste Impacts - Construction. Page 4-75, Lines 32-33: The DEIS states a conclusion that "no further mitigation would not be warranted." STPNOC recommends correcting this double negative statement to "further mitigation would not be warranted". (**0010-1-82** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-3, Line 32: The DEIS states that "...make-up to the Main Cooling Reactor...." Main Cooling Reactor should be changed to Main Cooling Reservoir. (**0010-2-1** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-6, Lines 8-9: The DEIS states that, "The normal and maximum conditions refer to 93 and 100 percent load factors, respectively (STPNOC 2008a)." The correct reference is STPNOC 2009a (STPNOC Letter U7-C-STP-NRC-090130, dated September 16, 2009), which includes this information in Environmental Report (Rev. 3.0), Section 3.3.1. (**0010-2-4** [Head, Scott])

Comment: DEIS Section 05.02 Water-Related Impacts - Operation. Page 5-7, Lines 27-28: The DEIS states that, "As described in Section 2.3.1.1, STPNOC currently diverts water from the Colorado River following a set of rules specified by the STPNOC-LCRA water contract (STPNOC 2009c)." This reference should be corrected to STPNOC 2009d (STPNOC Letter U7-

C-STP-NRC-090006, dated January 22, 2009) which includes RAI 02.03-06 stating these rules. (**0010-2-8** [Head, Scott])

Comment: DEIS Section 05.02. Water-Related Impacts - Operation. Page 5-7, Lines 30-31: The DEIS states that "... maintain the MCR water level at or above 25 ft above MSL." Based on Supplemental Response to RAI 02.03-06 (STPNOC 2009d Reference STPNOC Letter U7-C-STP-NRC-090006, dated January 22, 2009) and the 'Amended and Restated Contract by and between the Lower Colorado River Authority and STP Nuclear Operating Company', page 26, Note 4, effective January 1, 2006, the MCR water level is maintained at or above 27 ft MSL. The MCR water level of 27 ft MSL is correctly stated in DEIS Section 2.3.2, Page 2-34, Line 17. (**0010-2-9** [Head, Scott])

Comment: DEIS Section 05.03. Ecological Impacts - Operation. Page 5-22, Line 29: The DEIS states that the maximum drift rate reported by STPNOC is 45 gpm. However, per response to RAI 05.10-4, US Tower Drift is a maximum of 10 gpm, not 45 gpm. (**0010-2-16** [Head, Scott])

Comment: DEIS Section 05.03. Ecological Impacts - Operation. Page 5-32, Line 18-20: The DEIS states, "Water quality monitoring during the 2007-2008 aquatic ecology studies in the MCR showed that the salinity (a surrogate for dissolved solids) was on average 1.6 parts per trillion (ppt) (ENSR 2008a)." The Environmental Report (Rev. 3) defines ppt as follows: "Salinities less than 0.5 parts per thousand (ppt) are generally regarded as limnetic or "fresh," while salinities greater than 0.5 ppt are generally regarded as indicative of brackish water." (Section 2.4.2.1.2 in the ER). "Parts per trillion" should be changed to "parts per thousand". (**0010-2-17** [Head, Scott])

Comment: DEIS Section 05.04. Socioeconomic Impacts – Operation. Page 5-49, Line 23: The DEIS references Section 2.5.1. The appropriate reference should be Section 4.4.1.1. (**0010-2-20** [Head, Scott])

Comment: DEIS Section 05.10. Nonradiological Waste Impacts - Operation. Page 5-95, Line 3: The DEIS states that cumulative impacts to air from nonradioactive emissions are discussed in Section 7.5. Cumulative air impacts are discussed in Section 7.6 of the DEIS. (**0010-2-32** [Head, Scott])

Comment: DEIS Section 05.11. Environmental Impacts of Postulated Accidents, Page 5-97, Line 32-34: The DEIS states: "The doses in Table 5-16 were calculated by the NRC staff from the DBA doses in the design control document using the ratio of the staff's site-specific atmospheric dispersion factors in Table 5-16 to the atmospheric dispersion factors assumed for the design certification." The staff's site-specific atmospheric dispersion factors are provided in Table 5-15 on DEIS Page 5-98, Line 1, not Table 5-16. (**0010-2-33** [Head, Scott])

Comment: DEIS Section 05.11. Environmental Impacts of Postulated Accidents, Page 5-98, Line 2: The DEIS Table 5-16 states that the EAB thyroid dose for a Loss-of-Coolant Accident is 51 rem. This dose appears to be a typographical error with a factor of 10 too high. DEIS Section 05.11, Page 5-97, Lines 32-34 states, "The doses in Table 5-16 were calculated by the NRC staff from the DBA doses in the design control document using the ratio of the staff's site-specific atmospheric dispersion factors in Table 5-16 to the atmospheric dispersion factors assumed for the design certification." Use of this approach results in an EAB thyroid dose for the Loss-of-Coolant Accident of 5.1 rem, instead of 51 rem. (**0010-2-34** [Head, Scott])

Comment: DEIS Section 06.01. Fuel Cycle Impacts and Solid Waste Management. Page 6-2, Table 6-1: The DEIS includes format differences in Table 6-1 that make it inconsistent with Table S-3 of 10 CFR 51.51(b). Under the "Natural Resource Use" heading, "Disturbed area" should be a subcategory under "Temporarily committed" land similar to "Undisturbed area." "Natural gas" should be a subcategory under "Fossil fuel." (**0010-2-35** [Head, Scott])

Comment: DEIS Section 06.01. Fuel Cycle Impacts and Solid Waste Management. Page 6-5, Line 14: The DEIS states that UO_2 is converted to uranium hexafluoride at a conversion facility. The type of uranium oxide that is converted to uranium hexafluoride is U_3O_8, commonly known as yellowcake, not UO_2. (Reference DEIS Table 6-1). (**0010-2-36** [Head, Scott])

Comment: DEIS Section 06.02. Transportation Impacts. Page 6-23, Line 5: Text was omitted from the DEIS. The sentence should be revised to add "they" after "Air passengers are less of a concern because..." (**0010-2-39** [Head, Scott])

Comment: DEIS Section 09.03. Alternative Sites, Page 9-92, lines 5-7: The DEIS states: "Allens Creek is a greenfield site that was set aside for a nuclear power plant and cooling reservoir in the early 1970s in a proposal by the Houston Power and Lighting Company." The correct company name is "Houston Lighting & Power Company." (**0010-2-65** [Head, Scott])

Comment: EIS Section 10.06. Benefit-Cost Balance. Page 10-26, Line 16: The DEIS states that "normal operation of a nuclear power plant does not result in any emissions of criteria (e.g., oxides of nitrogen or sulfur dioxide)". The word pollutants should be added after criteria for clarification. (**0010-2-83** [Head, Scott])

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-5, Table G-1 (contd): In the Sectors column change "SSW SW" to "SSW". (**0010-2-86** [Head, Scott])

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-7, Table G-1 (contd): In the Sectors column change the first and topmost "NNW" to "NW". (**0010-2-87** [Head, Scott])

Response: *These comments are editorial in nature. The EIS was changed to reflect these comments.*

Comment: DEIS Section 04.07. Meteorological and Air-Quality Impacts. Page 4-64, Line 10: The DEIS states, "STPNOC (2009a) has stated that a construction management traffic plan would be developed before building activities begin." STPNOC suggests that the phrase "building activities" be changed to "construction activities." (**0010-1-77** [Head, Scott])

Response: *The NRC has defined "construction" according to the bounds of its regulatory authority, but many of the activities required to build a nuclear power plant do not fall within the NRC's regulatory authority. Those non-NRC authorized activities are referred to as "preconstruction" activities. The review team used the term "building activities" to capture both preconstruction and NRC-authorized construction activities, and believe the STPNOC's construction management traffic plan would cover "building activities;" therefore, no change was made to the EIS.*

Comment: DEIS Section 10.04. Irreversible and Irretrievable Commitments of Resources. Page 10-15, Line 17: The DEIS gives specific quantities of building materials required for the construction of a single reactor based on the following reference: "U.S. Department of Energy-Energy Information Administration (DOE/EIA). 2006. Energy Power Annual. Energy Information Administration, Washington, D.C. Accessed February 4, 2008 at http://www.eia.doe.gov/cneaf/electricity/epa/epa_sum.html. Accession No. ML100600709." This reference is a review of electric industry activities that occur annually and does not provide information on construction materials. Additionally, the citation is incorrect for this information. The call-out is dated 2006, the document is dated 2008, and the ADAMS accession number is for a 2007 document. (**0010-2-76** [Head, Scott])

Response: *The reference callout in Section 10.4 was revised based on this comment. This information is from the following document:*

U.S. Department of Energy. 2004. "Application of Advanced Construction Technologies to New Nuclear Power Plants." In NP2010 Improved Construction Technologies, O&M Staffing and Cost, Decommissioning Costs, and Funding Requirements Study. MPR-2610. Washington, D.C. Accession No. ML093160836.

Comment: DEIS Appendix G. Supporting Documentation for Socioeconomic and Radiological Dose Assessment. Page G-16, Line 8: The DEIS states, "The NRC staff and STPNOC calculated the dose at 2.19 mi west-southwest of the new units." Rev. 3.0 of the Environmental Report (Section 5.4, Table 5.4-4, p. 5.4-11) indicates that the distance was revised to 2.18 miles. (**0010-2-88** [Head, Scott])

Response: *Appendix G of the EIS was revised to correct the distance for the dose to the maximally exposed individual. The revision is editorial in nature and does not affect the conclusions of the EIS. The appropriate value of 2.18 mi was used in EIS Section 5.9.2.2.*

Appendix F

Key Consultation Correspondence

Appendix F

Key Consultation Correspondence

Correspondence received during the evaluation process for the combined license application for the siting of two new nuclear units, Units 3 and 4, at the South Texas Project Electric Generating Station (STP) site in Matagorda County, Texas, is identified in Table F-1. In addition, full copies of the Biological Assessment (BA), consultation correspondence with the National Marine Fisheries Service concerning the BA, and the Essential Fish Habitat Assessment are included in this appendix.

Table F-1. Key Consultation Correspondence

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (William Burton)	National Marine Fisheries Service (Mr. David Bernhart)	January 25, 2008 ML080020174
U.S. Nuclear Regulatory Commission (William Burton)	Alabama-Coushatta Tribe, Historical Preservation Department	January 25, 2008 ML080090115
U.S. Nuclear Regulatory Commission (William Burton)	Kiowa Tribe of Oklahoma (Mr. Billy Evans Horse)	January 25, 2008 ML073620378
U.S. Nuclear Regulatory Commission (William Burton)	Comanche Nation NAGPRA and Historic Preservation Program (Ms. Ruth Toahty)	January 25, 2008 ML0703620358
U.S. Nuclear Regulatory Commission (William Burton)	Tonkawa Tribe of Oklahoma (Mr. Anthony E. Street)	January 25, 2008 ML080090198
U.S. Nuclear Regulatory Commission (William Burton)	Advisory Council on Historic Preservation (Mr. Don Klima)	January 25, 2008 ML080100669
U.S. Nuclear Regulatory Commission (William Burton)	Texas State Historic Preservation Officer (Mr. Lawerence Oaks)	January 25, 2008 ML080110216
U.S. Nuclear Regulatory Commission (William Burton)	Fish and Wildlife Service (Ms. Moni Belton)	January 25, 2008 ML080090170
U.S. Nuclear Regulatory Commission (William Burton)	Texas Parks and Wildlife Department (Ms. Kathy Boydston)	April 4, 2008 ML080730469
STP Nuclear Operating Company (Mr. Gregory Gibson)	Texas General Land Office (Mr. Benjamin Rhame)	April 22, 2008 ML091760272
Texas Parks and Wildlife (Mr. Carter Smith)	U.S. Nuclear Regulatory Commission (William Burton)	May 19, 2008 ML090330752
Texas General Land Office (Mrs. Tammy Brooks)	STP Nuclear Operating Company (Mr. Gregory Gibson)	June 09, 2008 ML091590374

Table F-1. (contd)

Source	Recipient	Date of Letter
U.S. Army Corps of Engineers (Mr. Fred Anthamatten)	U.S. Nuclear Regulatory Commission (Mr. Scott Flanders)	July 7, 2008 ML082140640
U.S. Nuclear Regulatory Commission (Mr. Scott Flanders)	U.S. Army Corps of Engineers (Mr. Fred Anthamatten)	August 29, 2008 ML082310619
STP Nuclear Operating Company (Mr. Scott Head)	Texas Commission on Environmental Quality (Mr. Mark Fisher)	February 03, 2009 ML090360530
U.S. Army Corps of Engineers (Mr. Kenny Jaynes)	STP Nuclear Operating Company (Mr. Russell Kiesling)	April 07, 2009 ML091050501
U.S. Army Corps of Engineers (Mr. Kenny Jaynes)	STP Nuclear Operating Company (Mr. Russell Kiesling)	May 14, 2009 letter ML091350101 Memo ML091390111
STP Nuclear Operating Company (Mr. Scott Head)	U.S. Army Corps of Engineers (Mr. Jayson Hudson)	June 04, 2009 ML092030309
U.S. Army Corps of Engineers (Mr. Casey Cutler)	STP Nuclear Operating Company (Mr. Scott Head)	July 08, 2009 ML092030304
U.S. Army Corps of Engineers (Mr. Jayson Hudson)	U.S. Nuclear Regulatory Commission (Ms Jessie Muir)	August 10, 2009 ML092460137
U.S. Nuclear Regulatory Commission (Ms Jessie Muir)	Fish and Wildlife Service (Ms. Moni Belton)	October 15, 2009 ML092580516
U.S. Nuclear Regulatory Commission (Ms Jessie Muir)	Texas Parks and Wildlife Department (Mr. Carter Smith)	October 15, 2009 ML092580421
STP Nuclear Operating Company (Mr. Scott Head)	U.S. Army Corps of Engineers (Mr. Jayson Hudson)	October 29, 2009 ML093210232
U.S. Army Corps of Engineers (Mr. Jayson Hudson)	STP Nuclear Operating Company (Mr. Scott Head)	November 10, 2009 ML093210227
Texas Parks and Wildlife (Mr. Ross Melinchuk)	U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	November 13, 2009 ML093210221
U.S. Nuclear Regulatory Commission (Ms. Jessie Muir)	Texas Parks and Wildlife (Ms. Amy Hanna)	January 20, 2010 ML093450914
Texas Commission on Environmental Quality (Mr. Charles Maguire)	U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	February 2, 2010 ML100500926
U.S. Army Corps of Engineers (Mr. Casey Cutler)	U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	February 19, 2010 ML100660017
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	U.S. Fish and Wildlife Service (Mrs. Moni Belton)	March 19, 2010 ML100470259
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	National Marine Fisheries Service (Mr. David Bernhart)	March 19, 2010 ML100470304
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	Advisory Council on Historic Preservation (Mr. John Fowler)	March 19, 2010 ML100490064
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	Kiowa Tribe (Mr. Billy Evans Horse)	March 19, 2010 ML100490124

Table F-1. (contd)

Source	Recipient	Date of Letter
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	Tonkawa Tribe of Oklahoma (Mr. Anthony E. Street)	March 19, 2010 ML100490722
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	Alabama-Coushatta Tribe (Principal Chief Oscola Clayton Sylestine)	March 19, 2010 ML100490732
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	Comanche Nation NAGPRA and Historic Preservation Program (Ms. Ruth Toahty)	March 19, 2010 ML100490795
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	Texas Historical Commission (Mr. Mark Wolfe)	March 19, 2010 ML100490740
Texas Historical Commission (Mr. William A. Martin for Mark Wolfe)	U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	March 30, 2010 ML100990381
National Marine Fisheries Service (Mr. Rusty Swafford)	U. S. Nuclear Regulatory Commission	April 20, 2010 ML1011903791
Alabama-Coushatta Tribe (Mr. Bryant J. Celestine)	U.S. Nuclear Regulatory Commission	May 6, 2010 ML101300039
U.S. Environmental Protection Agency Region Ground Water Center (Mr. Michael Bechdol)	U.S. Nuclear Regulatory Commission (Ms. Jessie Muir)	June 2, 2010 ML101540268
U.S. Department of Interior (Mr. Stephen Spencer)	U.S. Nuclear Regulatory Commission	June 8, 2010 ML101600049
U.S. Environmental Protection Agency Region 6 (Mrs. Cathy Gilmore)	U.S. Nuclear Regulatory Commission (Ms. Jessie Muir)	June 9, 2010 ML101610346
U.S. Army Corps of Engineers (Mr. Jayson Hudson)	STP Nuclear Operating Company (Mr. Scott Head)	June 9, 2010 ML101660315
U.S. Army Corps of Engineers (Mr. Casey Cutler)	STP Nuclear Operating Company (Mr. Scott Head)	September 16, 2010 ML103020111
STP Nuclear Operating Company (Mr. Scott Head)	U.S. Army Corps of Engineers (Mr. Jayson Hudson)	October 12, 2010 ML103060028
U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	National Marine Fisheries Service (Mr. David Bernhart)	November 17, 2010 ML102880822
National Marine Fisheries Service (Mr. Roy E. Crabtree)	U.S. Nuclear Regulatory Commission (Mr. Ryan Whited)	January 18, 2011 ML110190723

Biological Assessment

National Marine Fisheries Service

South Texas Project Electric Generating Station Units 3 and 4

U.S. Nuclear Regulatory Commission Combined License Application
Docket Nos. 52-012 and 52-013

U.S. Army Corps of Engineers Permit Application

Matagorda County, Texas

March 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Galveston District

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from STP Nuclear Operating Company (STPNOC) for two combined construction permit and operating licenses (combined licenses or COLs) for two new reactors at the South Texas Project Electric Generating Station (STP) site in Matagorda County, approximately 12 mi south-southwest of Bay City, Texas (Figure 1). STPNOC submitted the COL application to the NRC on September 20, 2007. The STP site and existing facilities are owned by NRG South Texas LP (NRG), City Public Service Board of San Antonio, Texas (CPS Energy), and the City of Austin, Texas. It is planned that proposed Unit 3 would be owned by Nuclear Innovation North America (NINA) South Texas 3 LLC and CPS Energy, and proposed Unit 4 would be owned by NINA South Texas 4 LLC and CPS Energy (STPNOC 2009a). Concurrent with the NRC's review, the U.S. Army Corps of Engineers (Corps) is reviewing STPNOC's application for a Department of the Army (DA) Permit to build the proposed reactors on the STP site. The NRC and the Corps are cooperating agencies with the NRC serving as the lead agency. This biological assessment (BA) supports a joint consultation with the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) pursuant to Section 7(c) of the Endangered Species Act of 1973, as amended (ESA).

The NRC and the Corps are preparing an environmental impact statement (EIS) as part of the agencies' review of the COL and DA permit applications pursuant to the National Environmental Policy Act (NEPA). As required by Title 10 of the Code of Federal Regulations (CFR) Part 51.26, the NRC has published a Notice of Intent (72 FR 72774) in the *Federal Register* to prepare an EIS, conduct scoping, and publish a draft EIS for public comment. The final EIS would be issued after considering public comments on the draft. The impact analysis in the EIS includes an assessment of the potential environmental impacts of the construction and operation of two new nuclear power units at the STP site and along the associated transmission line corridors, including potential impacts to threatened and endangered species. If approved, the COLs and DA permit would authorize STPNOC to construct and operate the new units.

This BA examines the potential impacts on threatened or endangered species due to construction of the proposed Units 3 and 4 at the STP site. As discussed in the STP EIS, operation of the proposed two new nuclear power units at the STP site would not affect critical habitat or Federally listed species within the jurisdiction of NMFS. Therefore, this BA focuses on the species that may be affected by construction activities, specifically barging of heavy equipment and materials to the site. These species include loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricata*), and Kemp's ridley sea turtle (*Lepidochelys kempii*) (Table 1).

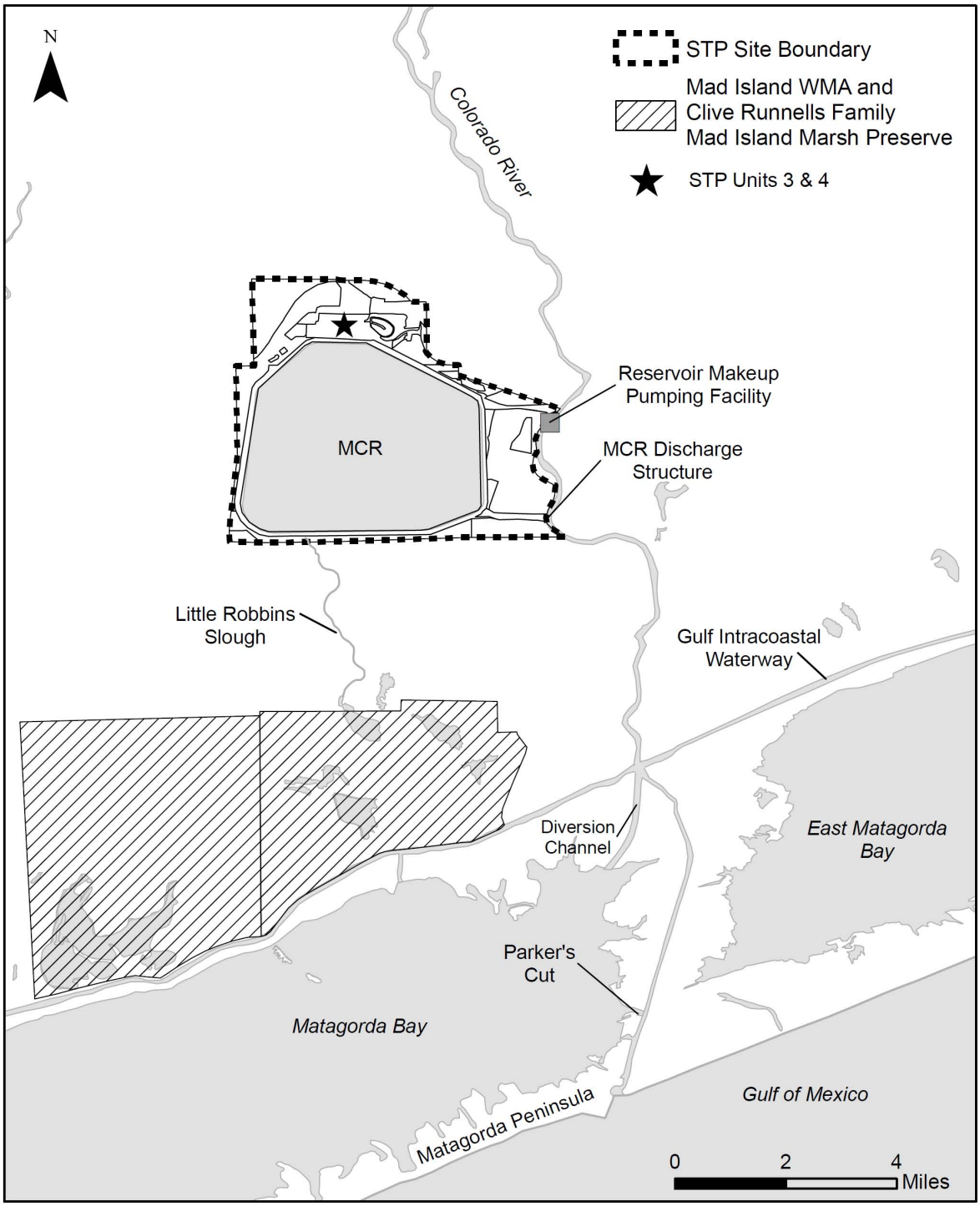

Figure 1. Location of the STP Site and Major Important Aquatic Resources

Table 1. Federally Listed Marine Species Occurring in the Vicinity of Transportation Routes to the STP Site (NMFS 2009a)

Scientific Name	Common Name	Federal Status
Caretta caretta	loggerhead sea turtle	Threatened
Chelonia mydas	green sea turtle	Threatened
Dermochelys coriacea	leatherback sea turtle	Endangered
Eretmochelys imbricata	hawksbill sea turtle	Endangered
Lepidochelys kempii	Kemp's ridley sea turtle	Endangered

2.0 South Texas Project Site Description

The STP site is located in a rural area of Matagorda County, Texas. STPNOC currently operates two nuclear generating units (existing STP Units 1 and 2) on the site. The site is located approximately 10 mi north of Matagorda Bay, 70 mi south-southwest of Houston, and 12 mi south-southwest of Bay City, Texas. The site is along the west bank of the Colorado River, approximately 6 navigable miles from the confluence with the Gulf Intracoastal Waterway (GIWW). This section provides a description of the existing and proposed facilities and the ecological resources found at the site of the proposed project and in the vicinity.

2.1 Existing and Proposed Facilities on the STP Site

The 12,220-ac STP site currently contains two pressurized water reactors and their associated facilities, which occupy approximately 300 ac. The main condenser heat sink for the existing two units is a 7000-ac reservoir called the Main Cooling Reservoir (MCR). The 7000-ac MCR is a constructed impoundment enclosed by an engineered embankment with a maximum normal operating pool of 49 ft mean sea level. The existing units also have a much smaller 46-ac Essential Cooling Pond (ECP) for their Ultimate Heat Sink (UHS). Makeup water for the MCR is withdrawn from the Colorado River at the Reservoir Makeup Pumping Facility (RMPF) to maintain the reservoir volume and control the concentration of total dissolved solids in its waters. The RMPF is located on the west bank of the river, approximately 8 navigable miles upstream of the confluence of the Colorado River and the GIWW. Near the southeast corner of the MCR is a spillway and blowdown discharge pipeline, which releases water to the Colorado River downstream from the RMPF. The spillway allows release of excess water from the MCR to the Colorado River during heavy precipitation events. The blowdown discharge pipeline allows for controlled releases of water from the MCR into the Colorado River through seven valve boxes along the river shoreline. Next to and downstream of the RMPF is a barge slip that was used for delivery of major equipment during the construction of Units 1 and 2. STPNOC's proposed location for proposed Units 3 and 4 is wholly within the STP site, approximately 1500 north and 2150 ft west of the center of the existing Units 1 and 2 containment buildings on the north side of the MCR, as shown in Figure 2 (STPNOC 2009a).

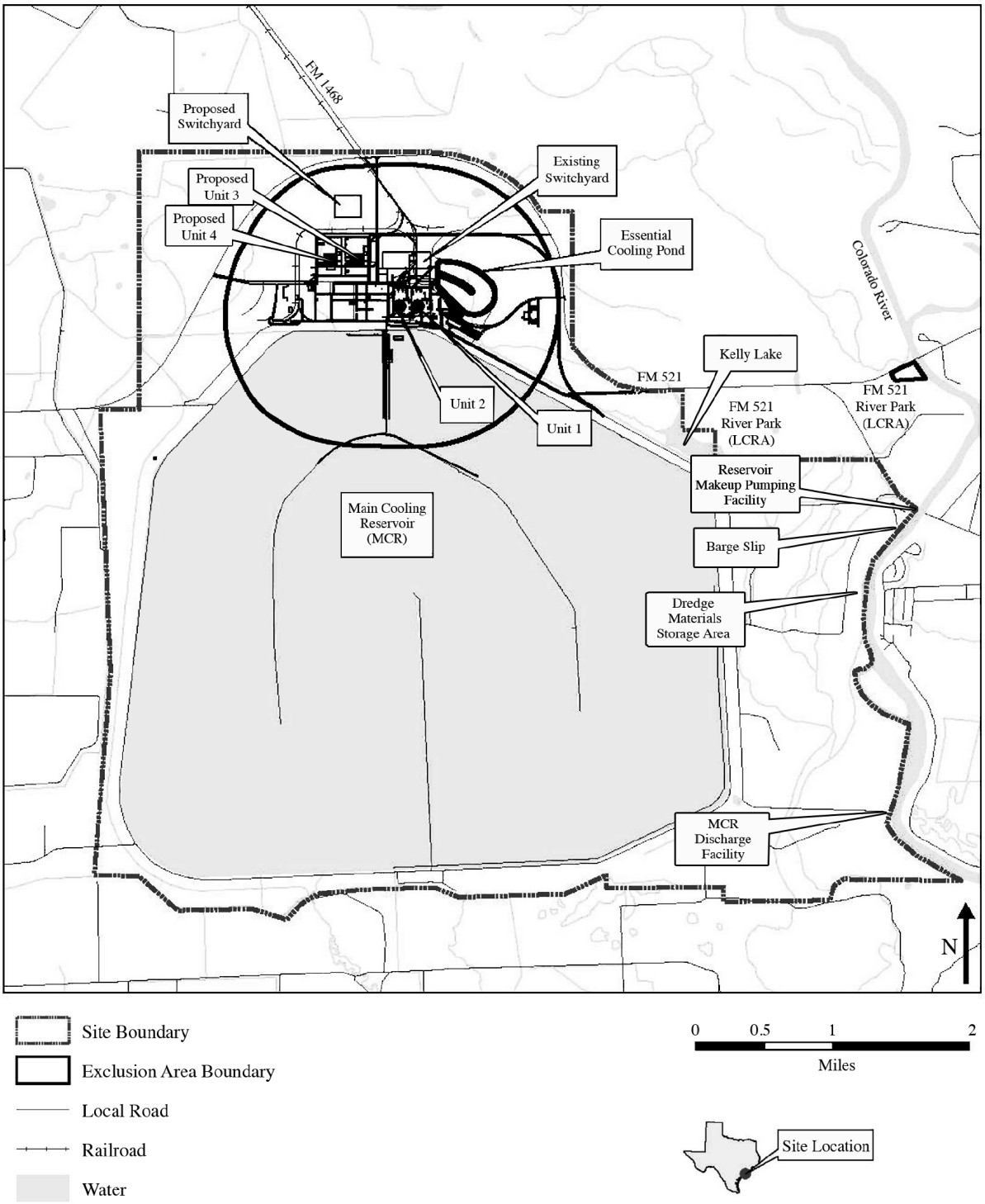

Figure 2. STP Site and Proposed Plant Footprint (STPNOC 2009a)

Many of the existing facilities already were designed to support four nuclear reactor units, and the proposed Units 3 and 4 would rely on these facilities. The main condenser heat sink for the proposed units would be the MCR. The proposed new units would not rely on the ECP as an UHS in the event of an emergency, but rather would rely on two 119-ft-tall mechanical draft cooling towers that would be located north of the MCR (STPNOC 2009a). Modifications to the RMPF associated with the two new units would be limited and include refurbishing or replacing intake screens for currently unused bays and the addition of two new pumps. Maintenance dredging in front of the intake screens and the RMPF's forebay would continue during construction and operation of the new units. No changes or upgrades are planned for the spillway and blowdown discharge pipeline from the MCR to the Colorado River to support the new units. The barge slip would be refurbished to allow delivery of material for constructing Units 3 and 4. In the event of an emergency, the proposed Units 3 and 4 would not rely on the ECP as a UHS. Instead, they will rely on two mechanical draft cooling towers as mentioned above (STPNOC 2009a). In addition, the Corps would periodically dredge the Colorado River to maintain the navigation channel from the GIWW to a point upstream of the STP site.

2.2 Aquatic Ecological Resources

The aquatic resources associated with the STP site include onsite water resources (sloughs, drainage areas, wetlands, Kelly Lake, and the MCR) and offsite water resources, particularly the Colorado River. The species of concern for this BA are associated with the offsite water resources. This section will discuss the offsite water resources likely to be affected by the barging activities for the construction and operation of the proposed STP Units 3 and 4.

The Colorado River is one of the largest river systems within the State of Texas. The river is approximately 862 mi, extending from the high plains to the coastal marshes in Matagorda County. The section of the river near the STP site, between Bay City and the GIWW, is a diverse, fluvial system that meanders through the coastal plain providing freshwater, sediments, and nutrients to Matagorda Bay (ENSR 2008a). The lower Colorado River has been studied on a limited basis with specific studies conducted in 1974, 1976, 1983, and 1984 associated with the licensing of existing STP Units 1 and 2 (NRC 1975, 1986) and in 2007-2008 associated with the licensing of the proposed STP Units 3 and 4 (ENSR 2008a).

Changes in the aquatic community in the Colorado River over time were evaluated using the results of the 1974, 1983, 1984, and 2007-2008 studies. These studies span the time of construction and operation of the existing STP Units 1 and 2, as well as the Corps' Mouth of Colorado River project that completed the diversion of the Colorado River into Matagorda Bay in July 1992. The sampling locations and gear types varied with each study, making some comparisons more difficult. Trawl samples collected from the GIWW to the STP site in 1974 showed a moderately diverse species community for the lower river based on measures for species richness, diversity, and evenness. All three measures were slightly lower than those in

similar segments of the river compared to the 2007-2008 study, suggesting that the diversity of aquatic species is greater now than in the past. Data collected during 1974 examining specific segments also indicated a diverse species community for all three segments. The 1983-1984 trawl and seine data indicated overall lower species richness, diversity, and evenness relative to the present data (ENSR 2008a). Rerouting of the lower Colorado River has likely contributed to these changes in diversity of aquatic species.

The number and assortment of organisms collected during this study indicate that this portion of the lower Colorado River supports a diverse assemblage of fauna. The regular occurrence of both freshwater and saltwater species, the range of macroinvertebrate and finfish fauna, and the sheer number of species captured among various sampling gears and river reaches provide evidence of a dynamic ecosystem. There was a low to moderate level of similarity between the current 2007-2008 faunal communities and the historic communities (1974 and 1983-84) (ENSR 2008a).

Matagorda Bay is 300 mi^2 formed by a 45-mi-long barrier island parallel to the coast and is located to the southeast of STP. The Bay is connected naturally to the waters on the site through the discharges of Little Robbins Slough into the marshes next to the GIWW, which then flow into Matagorda Bay. As mentioned, the Colorado River flows past STP, across the GIWW, and into a diversion channel, which flows into the Bay. The Bay is described as the Matagorda Bay system, and it is the third largest estuary on the Texas coast. The Bay system includes Lavaca, East Matagorda, Keller, Carancahua, and Tres Palacios Bays (Corps 2007).

The aquatic community of the Matagorda Bay system includes organisms in open water areas, as well as organisms over hard substrates (including oyster reefs and offshore sands). In the open water areas of the Bay, phytoplankton (e.g., algae) are the major primary producers providing the main food source for zooplankton (e.g., small crustaceans), fish, and benthic organisms (e.g., mollusks). A study of Lavaca Bay found that phytoplankton species composition changes based on the season, with maximum abundance occurring in the winter and minimum in the summer, and the most dominant organisms were diatoms (Corps 2007). Zooplankton composition also changed seasonally, with the greatest abundance during the spring and minimum in the fall. The same composition of phytoplankton and zooplankton are thought to be found throughout the Matagorda Bay estuary (Corps 2007).

The Matagorda Bay system supports a diverse population of aquatic organisms that are found in the open water column (nekton), including fish, shrimp, and crabs. The nekton assemblages consist mainly of secondary consumers feeding on zooplankton or juvenile and smaller organisms in the water column. Some of these species are resident species, spending their entire life in the Bay, whereas other species may spend only a portion of their life cycle in the Bay. According to a summary of studies on the nekton species in the Matagorda Bay estuary, the dominant nekton species include the bay anchovy (*Anchoa mitchilli*), Atlantic croaker (*Micropogonias undulatus*), white shrimp (*Litopenaeus setiferus*), brown shrimp

(*Farfantepenaeus aztecus*), hardhead catfish (*Ariopsis felis*), sand seatrout (*Cynoscion arenarius*), blue crab (*Callinectes sapidus*), and Gulf menhaden (*Brevoortia patronus*). All of these species are ubiquitous along the Texas coast, and they are unaffected by seasonal or other short-term changes (e.g., salinity). The abundance of these species changes with the season, with biomass and number usually being the smallest in the fall after Gulfward migrations. In the winter and early spring, newly spawned fish and shellfish begin migrating into the Bay, with the maximum biomass observed during the summer months (Corps 2007). Many of these species have been collected in the Colorado River and some in the MCR at the STP site (NRC 1975, 1986; ENSR 2008a, 2008b; STPNOC 2009a).

Areas of the Matagorda Bay estuary that are not considered open water include oyster reefs (Eastern oyster, *Crassostrea virginica*) and offshore sands. The oyster reefs of Matagorda Bay are formed in areas where the substrate is hard and the current is strong enough to provide phytoplankton and nutrients to the oysters and carry sediment away from the organisms. The reefs are subtidal or intertidal and found near passes, cuts, and along the edges of marshes. The oyster reefs provide an ecologically important function to the Bay system by supplying habitat to other benthic organisms and influencing water clarity and quality (oysters can filter water 1500 times the volume of their body per hour). While oysters can survive in salinities ranging from 5 to more than 40 ppt, they thrive within a range of 10 to 25 ppt. The current distributions of oyster reefs in Matagorda Bay are not mapped, but the prominent locations (including commercial harvests) are in the vicinity of Lavaca Bay (Corps 2007). Primary goals of the diversion of the Colorado River into the Bay are to increase mixture of freshwater in the estuary and to enhance locations of the Bay for further reef development (Wilbur and Bass 1998; Corps 2005).

The offshore sands of the Matagorda Bay system include areas of open sandy substrate, as well as regions where seagrass or attached algae grow. Much of the faunal diversity in these areas is buried in the sand, and the organisms rely on the phytoplankton for food. Sand dollars (*Mellita quinquiesperforata*) and several species of brittle stars (*Hemipholis elongata*, *Ophiolepis elegans*, and *Ophiothrix angulata*) are some of the most common species found in the shallow offshore sands. The bivalves in offshore sands include the blood ark (*Anadara ovalis*), incongruous ark (*Anadara brasiliana*), southern quahog (*Mercenaria campechiensis*), giant cockle (*Dinocardium robustum*), disk dosinia (*Dosinia discus*), pen shells (*Atrina serrata*), common egg cockle (*Laevicardium laevigatum*), crossbarred venus (*Chione cancellata*), tellins (*Tellina* spp.), and the tusk shell (*Dentalium texasianum*). The most common gastropods are moon snail (*Polinices duplicatus*), ear snail (*Sinum perspectivum*), Texas olive (*Oliva sayana*), Atlantic auger (*Terebra dislocata*), Sallé's auger (*Terebra salleana*), Scotch bonnet (*Phalium granulatum*), distorted triton (*Distorsio clathrata*), wentletraps (*Epitonium* spp.), and whelks (*Busycon* spp.). Crustaceans also inhabit the open sand areas, including white and brown shrimp, rock shrimp (*Sicyonia brevirostris*), blue crabs, mole crabs (*Albunea* spp.), speckled crab (*Arenaeus cribrarius*), box crab (*Calappa sulcata*), calico crab (*Hepatus epheliticus*), and

pea crab (*Pinnotheres maculatus*). With respect to the number of individuals found in the open sands, the most abundant infaunal organisms are the polychaetes (Capitellidae, Orbiniidae, Magelonidae, and Paraonidae) (Corps 2007).

Aquatic resources of the GIWW in the vicinity of Matagorda Bay up to Port Freeport are not well described. The aquatic ecology is thought to be similar to that found in Matagorda Bay. GIWW is used extensively for commercial traffic and recreational use. The locks in the GIWW at the confluence of the Colorado River probably disrupt some aquatic organisms from moving through the area. Maintenance dredging of the GIWW occurs at such a frequency that the typical benthic community found in Matagorda Bay does not fully recover (Corps 2007).

3.0 Proposed Federal Actions

This section provides information on the potential aquatic impacts of construction activities related to the proposed Units 3 and 4 at the STP site. The proposed Federal actions are NRC's issuance of two COLs for construction and operation of two new nuclear reactors at the STP site pursuant to 10 CFR Part 52 and the Corps' issuance of a DA permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" to activities that fall within its regulatory authority in 10 CFR 51.4. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erection of support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this BA, and they are being discussed together as construction activities for this Section 7 consultation.

This BA addresses the potential impacts posed by the construction activities that have the potential to interact with aquatic threatened and endangered species under the jurisdiction of NMFS. Primarily, these activities are associated with transport of materials and equipment using barges, which is not part of the NRC action. Operations of Units 3 and 4 would not interact with Federally listed aquatic threatened and endangered species or critical habitat.

Delivery of major equipment for proposed Units 3 and 4 would be by barging the material to the site. The cargo that would be barged to the site includes heavy equipment (prefabricated modules and large components fabricated overseas) and bulk commodities (e.g., aggregate or

structural fill materials). STPNOC has stated that no firm shipping contracts have been developed for transportation of the materials to the STP site. However, STPNOC has indicated the current plans call for the heavy equipment to be shipped to the Port of Freeport (or points north) where they would be transferred from ocean-going ships to inland barges. The inland barges would then enter the GIWW, move south to the confluence of the Colorado River, and proceed upstream to the site. Currently, the ports in Matagorda Bay to the south of the site do not have adequate facilities for the transfer of heavy cargo from ocean-going vessels to inland barges. Therefore, transport of these materials would not involve the Matagorda Shipping Channel or the diversion canal in Matagorda Bay (STPNOC 2009b).

STPNOC plans to ship bulk commodities (e.g., aggregate or structural fill materials) via inland barges. Access to the Colorado River by the barges would depend on the source of the materials and could be transported either from the north or south along the GIWW. However, no bulk commodity traffic is expected to traverse the diversion canal in Matagorda Bay or the Matagorda Shipping Channel (STPNOC 2009b).

4.0 Protected Estuarine and Marine Species Descriptions

NMFS lists 11 threatened and endangered species in Texas (Table 2). Of these species, only the sea turtles are expected to be associated with the construction of proposed STP Units 3 and 4. The other species listed by NMFS for Texas are either too far away from the site (e.g., whales) or have not been found in the vicinity of the Colorado River or Matagorda Bay for numerous years (e.g., smalltooth sawfish [*Pristis pectinata*] [TPWD 2009a]). This section describes the life history and habitat use for the Federally listed sea turtles along the routes for ocean-going ships and inland barges that would transport materials to the STP site.

There are two families and six genera of living sea turtles containing eight species (Pritchard 1996). All but one of the species are in the family Cheloniidae. The leatherback sea turtle is the only living member of the family Dermochelyidae. Five of the eight living species of sea turtles occur in the Gulf of Mexico. These species are the loggerhead sea turtle, the green sea turtle, the leatherback sea turtle, the hawksbill sea turtle, and the Kemp's ridley sea turtle. Although each of these species have nested along the Texas coast, no critical habitat has been designated in the State for any of these sea turtle species (Pritchard 1996; NMFS 2009a; NPS 2009).

Table 2. Federally Listed Estuarine and Marine Species Occurring in Texas (NMFS 2009a)

Listed Species	Scientific Name	Status	Date Listed
Fish			
smalltooth sawfish	*Pristis pectinata*	Endangered	04/01/2003
Marine Mammals			
sei whale	*Balaenoptera borealis*	Endangered	12/02/1970
blue whale	*Balaenoptera musculus*	Endangered	12/02/1970
fin whale	*Balaenoptera physalus*	Endangered	12/02/1970
humpback whale	*Megaptera novaeangliae*	Endangered	12/02/1970
sperm whale	*Physeter macrocephalus*	Endangered	12/02/1970
Turtles			
loggerhead turtle	*Caretta caretta*	Threatened	07/28/1978
green sea turtle	*Chelonia mydas*	Threatened	07/28/1978
leatherback sea turtle	*Dermochelys coriacea*	Endangered	06/02/1970
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered	06/02/1970
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered	12/02/1970

4.1 Loggerhead Turtle (*Caretta caretta*)

The loggerhead turtle was named for its relatively large head and has powerful jaws used to feed on hard-shelled prey, such as whelks and conchs. Its carapace is slightly heart-shaped and reddish-brown, while the plastron is generally a pale yellowish color. Adult turtles weigh 170 to 400 lb and have a carapace up to 41 in. long. Females nest on beaches in subtropical and temperate areas and may nest several times during a breeding season (April to September), laying as many as 110 eggs per clutch. The hatchings vary in color from light to dark brown to dark gray, and they lack the reddish-brown coloration of the adults and juveniles. When loggerheads hatch, they are about 1.7 in. long and weigh approximately 0.04 lb (Prichard and Mortimer 1999; NMFS 2009b; TPWD 2009b).

4.1.1 Reasons for Status

The loggerhead turtle was listed as a threatened species throughout its range on July 28, 1978 (43 FR 32808). Until the 1970s, these turtles were commonly harvested commercially for their meat, eggs, leather, and fat. While the loggerhead is the most common and abundant turtle on the inshore coastal waters of the Gulf of Mexico, its population has been declining as a result of overexploitation by man, fishing and trawling activities inadvertently killing individuals, and natural predation. The most significant threats to the loggerhead are development, commercial fisheries, and pollution (NMFS 2009b; Corps 2007; TPWD 2009b).

4.1.2 Habitat and Life History

Loggerhead turtles are mainly found over the continental shelf and in bays, estuaries, lagoons, creeks, and mouths of rivers, but they can also occur in the open seas as far as 500 mi from shore. Loggerheads prefer warm temperate and subtropical regions not far from shorelines. Adult loggerheads occupy various habitats, from turbid bays to clear waters of reefs, while subadults occur mainly in nearshore and estuarine waters. Hatchlings move directly from their nest into the sea, and then often float in masses of sargassum (*Sargassum* sp.). Juvenile loggerheads may remain associated with sargassum for perhaps three to five years (NMFS and FWS 2008; Corps 2007).

Loggerheads consume a wide variety of both benthic and pelagic food items. Their prey has been found to include conches, shellfish, horseshoe crabs, prawns, other crustacea, squid, sponges, jellyfish, basket starts, fish (carrion or slow-moving species), and even hatchling loggerhead turtles (Corps 2007). Adults forage primarily on the bottom but will also take jellyfish from the surface. The young feed primarily on the surface, grazing on gastropods and fragments of crustaceans as well as sargassum.

Nesting usually occurs on open sandy beaches above the high-tide mark and seaward of well-developed dunes. Loggerheads prefer steeply sloped beaches with gradually sloped offshore approaches on high-energy beaches on barrier islands adjacent to continental land masses (Corps 2007).

4.1.3 Range

The loggerhead is widely distributed in tropical and subtropical seas, being found in the Atlantic Ocean from Nova Scotia to Argentina; the Gulf, Indian, and Pacific Oceans (although it is rare in the eastern and central Pacific); and the Mediterranean Sea. In the continental U.S., loggerheads nest along the Atlantic coast from Florida to as far north as New Jersey and sporadically along the Gulf Coast. In recent years, a few have nested on barrier islands along the Texas coast (Corps 2007). The loggerhead is the most abundant sea turtle species in U.S. coastal waters (NMFS and FWS 2007a).

4.1.4 Distribution in Texas and Presence in the Study Area

The most abundant sea turtle in the Texas coastal region is the loggerhead. The species prefers the shallow inner continental shelf waters and only infrequently does it move into the bays. The turtles are often found near offshore oil rig platforms, reefs, and jetties. They are likely present off the coast year-round. However, they are most often observed in the spring when their favorite food, the Portuguese man-of-war (*Physalia physalis*), is abundant. The loggerhead turtles are the most common species of sea turtles found washed ashore, either

dead or moribund (stranded), on the Texas coast each year (Sea Turtle Stranding and Salvage Network [STSSN] 2009). The greatest proportion of these deaths appears to be the result of accidental capture by shrimp trawlers, when caught turtles drown. There was no positive documentation of loggerheads nesting along the Texas shoreline before 1977 (Hildebrand 1982). Nesting sites in Texas have been confirmed since 1999 when two loggerhead nests were verified and again in 2000 when five loggerhead nests were confirmed. Between 2001 and 2005, up to five loggerhead nests per year have been recorded on the Texas coast (Corps 2007). In 2006, one nest each was observed on Padre Island National Seashore and on South Padre Island (NPS 2009). Loggerhead populations have declined in Texas as they have worldwide. In the early 1900s, the species was taken in Texas for local consumption, and a few were marketed (Hildebrand 1982; Corps 2007).

The loggerhead turtle has been found in the vicinity of Matagorda Bay. Within the study area, a loggerhead was killed in 1996 during dredging operations in the entrance channel of the Matagorda Shipping Channel. In 2006, two loggerheads were taken at the entrance channel of the shipping channel during dredging operations (Corps 2007).

4.2 Green Turtle (*Chelonia mydas*)

The green turtle has a smooth shell and is the largest of the hard-shelled sea turtles. Adult turtles can grow to be more than 3 ft long and can weigh 300 to 350 lb. They have a smooth carapace that can be shades of black, gray, green, and brown in starburst or irregular patterns. The adults are unique in that they are herbivorous, feeding on primarily seagrasses and algae. The nesting season for green turtles varies based on location, but, typically, nesting occurs from June through September. The females choose a variety of locations for nesting, from large open beaches to small cove beaches, and can lay from 110 to 130 eggs per clutch (NMFS and FWS 1991; Prichard and Mortimer 1999; Corps 2007; NMFS 2009c; TPWD 2009b).

4.2.1 Reasons for Status

On July 28, 1978, the green turtle was listed throughout its range as a threatened species except for Florida and the Pacific Coast of Mexico where it was listed as endangered (43 FR 32808). Green turtles have declined primarily due to their commercial harvest, where the eggs and adults are used for food and other body parts for leather and jewelry. The recovery of the species has been hindered by mortality of juveniles and adults caught incidentally by commercial shrimp trawling. Various other fishing operations have also affected recovery of the species (NMFS 2009c). Another threat to the survival of the species is epidemic outbreaks of fibropapillomatosis, or “tumor” infections, in green turtle populations, especially in Hawaii and Florida. The cause of these outbreaks is largely unknown, but the disease is thought to be caused by a viral infection (Barrett 1996; Corps 2007).

4.2.2 Habitat and Life History

Adult green turtles are found primarily in shallow habitats such as lagoons, bays, inlets, shoals, estuaries, and other areas where they can find an abundance of marine algae and seagrasses. They often use coral reefs and rocky outcrops near where they feed as resting areas. Individual adults passing through open ocean are thought to be migrating to feeding grounds or nesting beaches (Meylan 1982). Hatchlings often can be found floating in rafts of sargassum (sea plants) in convergence zones. The adults are primarily herbivorous, while the juveniles consume more invertebrates. Green turtles consume primarily seagrasses, macroalgae, and other marine plants. Juveniles, and sometimes adults, also feed on mollusks, sponges, crustaceans, and jellyfish (Mortimer 1982; Corps 2007).

Green turtles typically come to shore only for nesting activities. However, they sometimes can be seen basking on beaches in areas such as Hawaii and the Galápagos Islands. They prefer to enter high-energy beaches with an open offshore approach and deep sand, which may be coarse to fine with little organic content. Generally, green turtles nest at the same beach each year, which is apparently their natal beach (Balazs 1980; Prichard and Mortimer 1999; Corps 2007; NMFS and FWS 2007b).

4.2.3 Range

The green turtle is a circumglobal species in tropical and subtropical waters. They are found in U.S. Atlantic waters around the U.S. Virgin Islands and Puerto Rico and the continental U.S. from Massachusetts to Texas. Major nesting activity occurs on Ascension Island, Aves Island (Venezuela), Costa Rica, and in Surinam. Relatively small numbers nest in Florida, with even smaller numbers in Georgia, North Carolina, and Texas (NMFS and FWS 1991; Hirth 1997; Corps 2007).

4.2.4 Distribution in Texas and Presence in the Study Area

The green turtle in Texas generally inhabit shallow bays and estuaries around seagrass beds. Small juvenile turtles have been observed in bays that are devoid of seagrasses and are thought to be feeding on benthic invertebrates and jellyfish. The worldwide decline in green turtles has also been seen in the population off of the Texas coast. During the mid- to late-19th century, there was a green turtle fishery in Matagorda Bay, Aransas Bay, and the lower Laguna Madre, although a few also came from Galveston Bay. By 1900, however, the fishery had collapsed. Still, some turtles continued to be collected commercially until 1935 (Hildebrand 1982; Corps 2007).

Green turtle nests are rare in Texas. Padre Island National Seashore has recorded from one to five nests per year since 1987, except in 1999 when no nests were found (NPS 2009). Florida

and Mexico are more common areas for green turtle nests. Adult green turtles found in Texas waters are thought to be in transit to distant feeding grounds or nesting beaches. Juvenile turtles found in Texas bays are thought to be using those waters as they move to other feeding grounds (Corps 2007).

A study by Williams and Renaud (1998) in 1996-1997 found that four of the green turtles fitted with radio transmitters spent time in Lavaca Bay, western Matagorda Bay, and Powderhorn Bayou. A green turtle was recorded swimming in the Matagorda Ship Channel, and one was taken during dredging operations at the same location in 2004 (Corps 2007). In 2006, two green turtles were killed during maintenance dredging of the entrance and jetty channels of the Freeport Harbor Project. No green turtle nests have been recorded in the vicinity of the STP site (Corps 2007, 2008; NPS 2009).

4.3 Leatherback Turtle (*Dermochelys coriacea*)

Leatherback turtles are the largest and most distinctive of the living sea turtles. They reach a length of 78 in. and weigh more than 2000 lbs. Large, outstretched front flippers of the adult turtles may span 106 in. Lacking a keratinized shell, they are covered instead with a tough hide. Because they have physiological adaptations for heat conservation, leatherback turtles are more widely distributed as adults than other sea turtles in temperate and boreal waters throughout the world. However, all leatherbacks return to subtropical and tropical shores to nest (NMFS 2009d).

4.3.1 Reasons for Status

On June 2, 1970, the leatherback sea turtle was listed as endangered throughout its range (35 FR 8495). Critical habitat was designated for leatherbacks in the U.S. Virgin Islands (43 FR 43688 and 44 FR 17710). Estimating the world population of leatherbacks is based on nesting populations. Spotila et al. (1996) estimated the 1995 worldwide population of nesting female leatherbacks at 26,000 to 42,000. The decline of leatherbacks is attributable to overexploitation of the turtles for various uses, as well as incidental mortality from commercial shrimping and fishing activities. Leatherbacks have been known to be killed from complications after consuming litter, particularly plastics that are thought to be mistaken for jellyfish by the turtles. Other reasons for the decline of the turtles include collection of eggs for food and destruction or degradation of nesting habitat. Leatherbacks are probably more susceptible than other turtles to drowning in shrimp trawlers equipped with turtle excluder devices (TEDs) because the adults are too large to pass through the TED exit opening. To address this, NMFS established a leatherback conservation zone extending from Cape Canaveral to the Virginia-North Carolina border, and commercial shrimping activities can be closed when there is an abundance of leatherbacks in those vicinities (NMFS and FWS 1992a; Corps 2007).

4.3.2 Habitat and Life History

The leatherback sea turtle is mainly pelagic, found in the open ocean, and seldom approaches land except for nesting. Leatherbacks are most often found in coastal waters only when nesting or when following populations of jellyfish. The turtles dive almost continuously, often to great depths. Their diet consists largely of jellyfish and sea squirts, but they are also known to consume sea urchins, squid, crustaceans, fish, blue-green algae, and floating seaweed (FWS 1980). Leatherback turtles typically nest on wide, long beaches with steep slope, deep, rock-free sand and an unobstructed deep water or mud-bottom approach (Prichard and Mortimer 1999; Corps 2007; TPWD 2009b).

4.3.3 Range

Leatherback turtles probably have the greatest range of all the sea turtle species. They are found in the Atlantic, Pacific and Indian Oceans; as far north as British Columbia, Newfoundland, Great Britain, and Norway; as far south as Australia, the Cape of Good Hope, and Argentina; and in other water bodies such as the Mediterranean Sea. Leatherbacks are known to migrate further and venture into colder water than any other marine reptile. Adult turtles appear to engage in routine migrations between boreal, temperate, and tropical waters, presumably to optimize both foraging and nesting opportunities. During the summer, leatherbacks tend to occur off the coast of the Atlantic states, from the Gulf of Maine south to the middle of Florida (Corps 2007; NMFS and FWS 2007c).

Nesting areas are primarily in the tropical regions, including Malaysia, Mexico, French Guiana, Surinam, Costa Rica, and Trinidad. The turtles nest infrequently on the Atlantic and Gulf of Mexico coasts. The largest nesting assemblages occur in the U.S. Virgin Islands, Puerto Rico, and Florida (Corps 2007; NMFS and FWS 2007c).

4.3.4 Distribution in Texas and Presence in the Study Area

There have been no recorded leatherback nests in Texas since the 1930s when one was found on Padre Island. There have been occasional reports of leatherbacks feeding on jellyfish off Port Aransas and in the Brownsville area. No leatherback turtles have been taken by dredging activities in Texas. One leatherback was caught in 2003 by a relocation trawler in a shipping channel approximately 1.5 mi north of Aransas Pass (NMFS and FWS 1992a, 2007c; TPWD 2007; Corps 2007, 2008). This species is unlikely to occur in the vicinity of the STP site.

4.4 Hawksbill Turtle (*Eretmochelys imbricata*)

The hawksbill turtle is a medium-sized tropical and subtropical species that inhabits the warm waters of the Atlantic, Pacific, and Indian Oceans (NMFS and FWS 1993). It is the most tropical

of the sea turtles and is restricted primarily to warmer waters more than the other four sea turtles found in the Gulf of Mexico. In U.S. territorial waters, hawksbills occur along the U.S. coast of south Texas and along the Gulf and Atlantic coasts of Florida. Adult nesting females have a carapace length of about 34 in. and weigh about 176 lbs. The largest hawksbill on record weighed 276 lbs. Hatchlings are about 1.7 in. long and weigh 0.5 to 0.7 oz (NMFS and FWS 1993). In the U.S. Caribbean and Florida Keys, overexploitation severely depleted hawksbills during the 20th century. Since banning sales of turtle shell products, hawksbills may no longer be in decline at present. However, data are not available to indicate that numbers are increasing (NMFS and FWS 1993, 2007d; NMFS 2009e).

4.4.1 Reasons for Status

On June 2, 1970, the hawksbill turtle was Federally listed as endangered throughout its range (35 FR 8495). Critical habitat for the species was designated in Puerto Rico (43 FR 22224 and 63 FR 46693). The greatest threat to this species is commercial harvest of the turtle for its highly valued shell and as stuffed turtle curios. The hawksbill is also used in the manufacture of leather, oil, perfume, and cosmetics. Other threats to hawksbill turtles include destruction of breeding locations by beach development, incidental take in lobster and Caribbean reef fish fisheries, pollution by petroleum products (especially oil tanker discharges), entanglement in persistent marine debris, and predation on eggs and hatchlings (Corps 2007; NMFS 2009e).

4.4.2 Habitat and Life History

Hawksbills generally are found in coastal waters less than 70 ft deep, including coastal reefs, bays, rocky areas, passes, estuaries, and lagoons. Like loggerhead and green turtles, hatchlings are often found around sargassum rafts in the open ocean. Hawksbills reenter coastal waters as juveniles. Coral reefs are widely used for foraging on sponges by juveniles, subadults, and adults. In Texas, juvenile hawksbills are associated with stone jetties (FWS 1980; Corps 2007; NMFS 2009e).

Hawksbills are considered omnivorous, but they prefer invertebrates, especially encrusting organisms such as sponges, tunicates, bryozoans, mollusks, corals, barnacles, and sea urchins. Along the coast, they also consume algae, sea grasses, and mangroves. In open waters, the turtles consume jellyfish and fish. The young turtles appear to be more herbivorous than adults (Corps 2007; NMFS 2009e).

Nesting typically is the only time hawksbills are found on shore. Hawksbills almost exclusively nest in the tropics on islands or the mainland. They are typically solitary nesters and prefer nesting on narrow beaches with reefs obstructing offshore approach (Prichard and Mortimer 1999; Corps 2007).

4.4.3 Range

Although it does occur in many temperate regions, the hawksbill turtle is probably the most tropical of all the marine turtles. Its range is circumtropical, occurring in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The hawksbill turtle is widely distributed in the Caribbean Sea and western Atlantic Ocean, with representatives of at least some life history stages regularly occurring in southern Florida and the northern Gulf (especially Texas) and south to Brazil. In the continental U.S., the hawksbill sporadically nests in Florida. However, a major nesting beach exists on Mona Island, Puerto Rico. Small numbers of nests have been observed elsewhere in the western Atlantic, along the Gulf Coast of Mexico, the West Indies, and along the Caribbean coasts of Central and South America (NFMS and FWS 1993; Corps 2007).

4.4.4 Distribution in Texas and Presence in the Study Area

Outside of Florida, Texas is the only state where hawksbills are encountered with any regularity. Most of these sightings are of post-hatchling and juvenile turtles around stone jetties. These small turtles probably traveled north from nesting beaches in Mexico. The first and only hawksbill nest recorded in Texas was in 1998 at Padre Island National Seashore (NMFS and FWS 1993, 2007d; Corps 2007, 2008; TPWD 2009b). This species may potentially occur in the vicinity of the STP site.

4.5 Kemp's Ridley Turtle (*Lepidochelys kempii*)

The Kemp's ridley turtle is one of the smallest living sea turtles. Adult females have shell lengths of 24 to 28 in., and they weigh 77 to 99 lb (NMFS and FWS 1992b). Pelagic-phase juvenile Kemp's ridleys range in size from 2 to 8 in. in carapace length. Subadults are 8 to 24 in. long, and mature adults generally are longer than 24 in. in carapace length (Marquez 1994). Kemp's ridley turtles are distributed throughout the Gulf of Mexico and into the Atlantic Ocean. The center of their distribution is in the Gulf of Mexico. The Kemp's ridley turtle is the most endangered sea turtle in the world (NMFS and FWS 1992b) and is listed as endangered throughout its range. From 1947 to 1985, the number of females nesting at the only significant Kemp's ridley nesting beach dropped from more than 40,000 to as low as 702 (NMFS and FWS 2007e). This is the most severe population decline documented for any species of sea turtles. Since the mid 1980s, there has been a noticeable increase in the number of nests. In 2003, an estimated 3,600 turtles produced over 8,000 nests (NMFS 2009f). While this trend is positive, the criteria for downlisting the status for Kemp's ridley sea turtles under the ESA put forth in the recovery plan have not yet been met (NMFS and FWS 2007e).

4.5.1 Reasons for Status

On December 2, 1970, the Kemp's ridley turtle was listed as endangered throughout its range (35 FR 18320). Primarily, the decline of this species has been the result of human activities, including collection of eggs, fishing for juveniles and adults, killing adults for meat and other products, and direct take for indigenous use. Another major factor in the loss of the species is the high level of incidental takes by shrimp trawlers (NMFS and FWS 1992b; NMFS 2009f; Corps 2007).

Campbell (1995) documented the loss of Kemp's ridley turtles due to the consumption of debris on the Texas coast. Postmortem examinations of Kemp's ridleys found stranded from 1986 through 1988 revealed 54 percent (60 of the 111 turtles examined) had eaten some type of marine debris. The most commonly ingested debris included pieces of plastic bags, Styrofoam, plastic pellets, balloons, rope, and fishing line. Other debris was also found, such as glass, tar, and aluminum foil. Campbell speculated that the source of the debris was from offshore oil rigs, cargo ships, commercial and recreational fishing boats, research vessels, naval ships, and other vessels operating in the Gulf.

Further threats to this species include collisions with boats, explosives used to remove oil rigs, and entrapment in coastal power plant intake pipes (Campbell 1995). Incidental takes of Kemp's ridley turtles have happened in association with dredging operations, particularly with hopper dredges. Placement of dredged materials, degraded water quality/clarity, and altered current flow associated with dredging activities can also affect turtles through channelization of the inshore and nearshore areas degrading foraging and migratory zones (NMFS and FWS 1992b).

4.5.2 Habitat and Life History

Kemp's ridleys inhabit shallow coastal and estuarine waters, usually over sand or mud bottoms. Adult turtles are primarily shallow-water benthic feeders, where they forage on crabs, while juveniles feed on sargassum and other organisms found in the mass of plants (NMFS and FWS 1992b). In some regions, juvenile and adult Kemp's ridleys almost exclusively eat blue crabs. Other food items in the Kemp's ridleys diet include shrimp, snails, bivalves, sea urchins, jellyfish, sea stars, fish, and occasional marine plants (Campbell 1995; Corps 2007).

Nesting occurs in a highly synchronized manner with large numbers of females (called an "arribada") coming ashore within a period of a few hours during daylight (Marquez 1994). Hatchlings migrate rapidly down the beach and out to sea, where they spend a period of perhaps two years in the pelagic zone. They are about 8 in. long at the end of the pelagic period. Little is known about the feeding behavior and food preferences of hatchling Kemp's ridley turtles during their pelagic stage. During this period, they presumably feed on

zooplankton and floating matter, including sargassum weed and the associated biotic community. Following a pelagic feeding stage shortly after hatching and lasting for several months, the juvenile Kemp's ridleys move into shallow coastal waters to feed and grow. The young subadults often forage in water less than 3 ft deep, but they tend to move into deeper water as they grow. Because of their preference for crabs and other primarily shallow-water demersal prey, juvenile and adult Kemp's ridley turtles concentrate in coastal waters less than 30 ft deep throughout their range. They make long dives to the bottom and may feed on the bottom for an hour or more at a time (Turtle Expert Working Group 1998).

4.5.3 Range

Nearly all reproduction of Kemp's ridleys takes place along a single 9.3-mi stretch of beach near Rancho Nuevo, Tamaulipas, Mexico, about 200 mi south of Brownsville, Texas (Marquez 1994). A small number of nests have been found in Texas and along the Mexican coast of the Gulf of Mexico between Playa Lauro Villar, Tamaulipas, Mexico and Isla Aguada, Campeche, Mexico, but nothing that reaches the level of nests at Rancho Nuevo.

4.5.4 Distribution in Texas and Presence in the Study Area

Kemp's ridley turtles occur in Texas in small numbers and, when observed, are probably in transit between crustacean-rich feeding areas in the northern Gulf and breeding grounds in Mexico. As mentioned earlier, the number of nesting Kemp's ridley turtles has been increasing, which may be a sign of the earliest stages of recovery for the species. The species has nested sporadically in Texas in the last 50 years with reports increasing over the last 12 years from four nests in 1995 to 102 nests in 2006 (a majority of the nests are located at Padre Island National Seashore). There was one nest recorded on Matagorda Peninsula in 2002 and four on Matagorda Island in 2004. The increase in nests is related to the success of breeding programs in Texas. A study by Williams and Renaud (1998) in 1996 found that seven of the Kemp's ridley turtles fitted with radio transmitters spent most of their time within 4 mi of the western shoreline of Matagorda Bay, but they also swam to Lavaca Bay, Carancahua Bay, Tres Palacios Bay, and Powderhorn Bayou. Two Kemp's ridleys were taken at the entrance of the Matagorda Ship Channel in 2006 during dredging operations (NMFS and FWS 1992b, 2007e; Corps 2007, 2008; TPWD 2009b). Of all the turtles, Kemp's ridleys are likely to be the most common in the vicinity of the STP site.

5.0 Potential Environmental Effects of the Proposed Actions

This section describes potential impacts from construction of the proposed Units 3 and 4 at the STP site to the sea turtle species found in the Gulf of Mexico and on the coast of Texas. As

stated above, impacts from operation of the proposed new units are highly unlikely to affect sea turtles as they do not swim upstream in the Colorado River to STP site.

The potential impacts to Federally threatened and endangered sea turtle species resulting from the barging of heavy equipment and bulk commodities to the STP site are associated with collisions between the vessels and the turtles, capture in the turbine washes of the vessels, and potential disorientation from lights on the vessels. Sea turtles may be present at certain times of the year when barging traffic is moving through the Port of Freeport, Matagorda Ship Channel, and the GIWW. The five species of sea turtles discussed above would all be exposed to these potential impacts to degrees relative to their occurrence in Texas waters. There are no areas designated as critical habitat near the STP site (Corps 2007, 2008; NMFS and FWS 2007a, b, c, d, e; NMFS 2009a).

Loggerhead, green and Kemp's ridley turtles have all been recorded in the area where barging traffic for STP equipment and material would be expected to travel. Kemp's ridley turtles have nested in the vicinity, and all the other sea turtle species are known to have nested to the south of the study area. An estimate of the species of sea turtles in the study area can be obtained from the STSSN, which tracks, collects, and documents standing of marine turtles in the Gulf of Mexico. STSSN divides the Gulf into zones, and the study area is included in zone 19, which extends from Freeport to Port Aransas, Texas. From 1986 through 2007, STSSN reported a total of 1051 strandings in zone 19: 523 loggerhead, 285 Kemp's ridley, 105 green, 29 leatherback, 15 hawksbill, and 94 unknown species (STSSN 2009).

Increased vessel activity could affect sea turtles in the area. The most common effect from vessel activity on sea turtles is from propeller and boat strikes on the turtles. Direct strikes on the turtles can kill or maim the animals. The wash from the propellers of the barges is also known to entrain turtles and either temporarily disorient the organisms or potentially drown them. Lights from the vessels are thought to disorient turtles, particularly hatchlings. However, barging traffic to STP is not likely to happen in the dark (Corps 2007, 2008; STPNOC 2009b). The wash from moving barges could create flows that would disrupt food sources for the sea turtles. Organisms in the open water would be disrupted as the barge moved through the area, but the effects would be temporary. Increased vessel movements in narrow channels could erode shorelines and increase turbidity that could settle on benthic organisms, which could result in diminished food supply for the turtles. Barge traffic would be restricted to channels where traffic is common, and these areas are limited in comparison to the overall area of the bays and waterways where turtles can forage. While turtles can forage elsewhere, sea turtles that are swimming in vessel channels would be adversely affected if they interact with barges transporting materials and equipment to the STP site.

6.0 Cumulative Impacts to Federally Protected Species

Barging of heavy equipment and bulk commodities would add to the vessel traffic through the Port of Freeport, Matagorda Ship Channel, and the GIWW in the study area. STPNOC has not finalized the plans for shipping equipment and material to the STP site. While traffic in these navigation areas would increase during the building of proposed Units 3 and 4, the number of trips for the barges carrying both heavy equipment and construction materials would not add significantly to the existing traffic in the area (STPNOC 2009b).

Barging traffic may add cumulatively to the impacts on sea turtles from other activities within the study area. Sea turtles are affected by numerous activities that are common in the study area, including dredging, commercial fishing, vessel traffic, development along nesting beaches, pollution, and poaching. The Corps is responsible for maintaining over 12,000 mi of waterways throughout the United States for commercial and recreational vessel traffic, water supply, regional development, and national security. The three primary types of dredges used for maintaining navigational waters are cutterhead pipeline, mechanical, and hopper dredges. Sea turtles are most likely to be harmed or killed by hopper dredges. Based on the Corps' Sea Turtle Data Warehouse, there have been 85 incidental takes of sea turtles since 1995 within the Galveston District from dredging activities, primarily loggerhead, green and Kemp's ridley sea turtles. The Corps and the dredging industry continue to work on protocols, operational methods, and modifying dredging equipment to reduce impacts to sea turtles (Corps 2010). Some of these improvements include a plow-like deflector designed to move the turtles away from the suction of the draghead (NMFS and FWS 2007e).

Along the proposed barging routes for transporting heavy equipment and bulk commodities for the construction of proposed Units 3 and 4, there are plans for dredging and changing the shipping channels at the Port of Freeport and Matagorda Bay. The Corps has prepared BAs for both of these activities and evaluated the effects on sea turtles from the use of pipeline and hopper dredges, sedimentation, loss of benthic habitat, and disorientation from lights on vessels. The Corps concluded these activities may affect the species, and hopper dredging would adversely affect the sea turtles. The Corps and NMFS have identified "reasonable and prudent measures" to reduce the potential for affecting sea turtles from the proposed activities at the Port of Freeport (Corps 2008) and will likely agree to similar measures for the Matagorda Ship Channel (Corps 2007). These measures include the implementation of a sea turtle avoidance plan. For more than a decade, these measures have been incorporated in the Corps' regulatory and civil works projects throughout the Gulf of Mexico. Barging traffic to STP during the dredging activities planned by the Corps may create more distractions for the sea turtles in the area.

Commercial fishermen in the bay systems of Texas must use approved TEDs to minimize collection of turtles in their trawl equipment (TPWD 2009c). Kemp's ridley sea turtles are

particularly susceptible to being caught in trawl nets because they inhabit shallow waters. In the past, shrimp trawls were known to kill thousands of Kemp's ridley sea turtles each year before the implementation of TEDs, which occurred in 1990 for the Texas commercial fishing industry (TPWD 2009d). In addition, in 2000 Texas Parks and Wildlife Commission established seasonal closure for shrimping from the beach out to five nautical mi from December 1 through July 15, which is the season when adult Kemp ridleys use those waters for mating, nesting, foraging and migrating (NMFS and FWS 2007e). Other sea turtle species also benefit from the implementation of TEDs and seasonal closure of the fishing industry when they are prevalent.

Vessel traffic in the area includes commercial and recreational vessels. NMFS has identified that these activities have an adverse impact on sea turtles from propeller and boat strike damage (Singel et al. 2003; NMFS and FWS 2007e). However, the magnitude of these events in the study area is not known (Corps 2008).

Development in the study area can lead to loss of nesting habitat, increased pollution, increased recreational activities, etc. As mentioned above, there have been few sea turtles nesting in the Matagorda Bay area. Increased development of Matagorda Peninsula could remove appropriate habitat for future nesting activity. Lighting of homes and on roadways can disorient adult females as well as hatchlings and diminish the success of future nesting opportunities. Turtles can be harmed through ingestion and entanglement with debris washed into waters from developed areas or dropped overboard. Coastal runoff can contribute to poor water quality that affects the food for turtles as well as potentially harming them. Organochlorine compounds, heavy metals, and petroleum products are all known to be detrimental to turtles either directly or indirectly through bioaccumulation of the toxins in the food web (NMFS and FWS 2007e).

Power plants and other large industrial systems in coastal waters also have the potential to affect sea turtles. The intake systems for cooling water at power plants have attracted and impinged turtles. Most of these power plants are located along the coastal area where turtles are foraging and nesting. It is unlikely that the operation of the nuclear units at the STP site would harm sea turtles because the intake system is located upstream in the Colorado River and turtles have not been reported in that area. Other industrial ports can attract turtles and they can be harmed by vessels approaching the port.

7.0 Conclusions

The potential impacts of barging heavy equipment and material for proposed Units 3 and 4 to the STP site on Federally protected sea turtle species in the vicinity of the site have been evaluated. The known distributions and records of those species and the potential ecological impacts of barging to the species, their habitats, and their prey have been considered in this BA.

Based on this review, the NRC and the Corps conclude that the overall effects of barging heavy equipment and material to the STP site for construction of the proposed Units 3 and 4, may affect but would not be likely to adversely affect or jeopardize the continued existence of the loggerhead sea turtle, green sea turtle, leatherback sea turtle, hawksbill sea turtle, and Kemp's ridley sea turtle in the Gulf of Mexico and on the coast of Texas.

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November 17, 2010

Mr. David Bernhart
Assistant Regional Administrator
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SUBJECT: SECTION 7 CONSULTATION RELATED TO THE REVIEW OF THE COMBINED LICENSES APPLICATION FOR THE SOUTH TEXAS PROJECT, UNITS 3 AND 4

Dear Mr. Bernhart:

On March 19, 2010 the U. S. Nuclear Regulatory Commission (NRC) along with the U.S. Army Corps of Engineers (Corps) transmitted a biological assessment (BA) as an appendix in the environmental impact statement (EIS) pertaining to the construction and operation of two additional closed-cycle nuclear power reactors at the South Texas Project Electric Generating Station (STP) located near Bay City, Texas. The BA addressed the potential for impact to five species of Federally protected sea turtles under the jurisdiction of the National Marine Fisheries Service (NMFS), resulting from interactions with planned barge traffic related to construction of the two new reactors at the STP site. As stated in the BA, a barge unloading facility is about 8 miles upstream of the confluence of the Colorado River and the Gulf Intracoastal Waterway. Much of the bulk material as well as a number of large components would be delivered to the site by barge.

During the course of our consultation with NMFS we have had several discussions with your staff, notably Mr. Noah Silverman and Mr. Bob Hoffman. We discussed the potential for adverse impacts to protected sea turtles from barge traffic on the Colorado River. Based on these discussions and upon further review of additional information, the NRC staff believes we mischaracterized and overstated in Section 5 of our March 2010 BA, the potential impact to sea turtles from barge traffic related to the construction and operation of the proposed Units 3 and 4. We now believe that although adverse interactions between protected sea turtle species and barge traffic on the river is theoretically possible, the likelihood of any interactions with a healthy sea turtle is discountable. The slow speeds at which the barges would be traveling and the use of a displacement hull as opposed to a planing hull significantly reduce or eliminate the likelihood of any adverse interactions with sea turtles[1].

Therefore, the NRC and Corps staffs conclude that barging large reactor components and material to the STP site for construction of proposed Units 3 and 4 may affect, but is not likely to adversely affect, sea turtles as any interactions between sea turtles and barge traffic would be discountable.

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1 Barnette, M. NMFS Memorandum dated January 12, 2009: Threats and Effects Analysis for Protected Resources on Vessel Traffic Associated with Dock and Marina Construction. NMFS Southeast Regional Office, Protected Resources Division.

D. Bernhart - 2 -

If you have any questions regarding the BA, please contact Ms. Jessie Muir, Environmental Project Manager, by phone at 301-415-0491 or via email at Jessie.Muir@nrc.gov, or Dr. Michael Masnik, Senior Aquatic Ecologist, at 301-415-1191 or via email at Michael.Masnik@nrc.gov.

Sincerely,

/RA/

Ryan Whited, Branch Chief
Environmental Projects Branch 2
Division of Site and Environmental Reviews
Office of New Reactors

Docket Nos.: 52-012 and 52-013

Enclosures:
As stated

cc w/enclosures:
See next page

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
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JAN 18 2011 F/SER31:AB

Ryan Whited, Chief
Environmental Projects Branch 2
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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Galveston District Corps of Engineers
Department of the Army
P.O. Box 1229
Galveston, TX 77553-1229

Re: Draft Environmental Impact Statement, Essential Fish Habitat Assessment and Biological Assessment Related to the Review of the Combined License Application for the South Texas Project, Units 3 and 4

Dear Mr. Whited:

This responds to your March 19, 2010, letter requesting National Marine Fisheries Service (NMFS) concurrence with your determinations pursuant to section 7 of the Endangered Species Act (ESA), for the subject application to the U.S. Nuclear Regulatory Commission (NRC). The application is for the combined construction permit and operating license for the South Texas Project Nuclear Operating Company (STPNOC). The U.S. Army Corps of Engineers, Galveston District, is a joint consulting agency for the project. Additional information was requested on April 19, 2010, and received on November 23, 2010. You determined the action may affect, but is not likely to adversely affect sea turtles. NMFS' determination regarding the effects of the proposed action is based on the description of the action in this informal consultation. You are reminded that any changes to the proposed action may negate the findings of the present consultation and may require reinitiation of consultation with NMFS.

The project is located at approximately 28.7972°N, 96.0589°W (North American Datum 1983), 10 miles north of Matagorda Bay along the west bank of the Colorado River in Matagorda County, Texas. The applicant proposes to construct two additional nuclear generating units beside the two existing units on the 12,220-acre South Texas Project property. The new reactors would operate in a manner similar to units 1 and 2. This project would require the use of inland barges to shuttle heavy construction supplies and equipment from the Port of Freeport, Texas to the STP site. The applicant anticipates the project will take approximately 5 years to complete.

Five species of sea turtles (loggerhead, green, hawksbill, Kemp's ridley, and leatherback), protected by the ESA, can be found in or near the action area and may be affected by the project. There is no designated critical habitat in or near the project area. NMFS believes that the proposed action may affect but is not likely to adversely affect these species and will have no effects on other listed species.

Although the actual construction and operation of the proposed nuclear generating units would have no effect on protected species under the purview of NMFS, there is a risk of injury to sea turtles from interactions with vessels during the barging of equipment and materials to the STP site. Inland barges will transport construction equipment and supplies from the Port of Freeport, Texas, through the Intracoastal Waterway and up the Colorado River. Vessel traffic, particularly high-speed boats, can strike sea turtles, leading to injury or death. However inland transportation barges such as the ones proposed for this project have a shallow draft, semi-displacement hull (i.e., non-planing), and typically travel at very slow speeds, therefore, interactions (i.e., collisions) with sea turtles are unlikely. Additionally, these barges will be operating in a marked navigational channel (Intracoastal Waterway), where sea turtles are not likely to be foraging or resting due to the large volume of vessel traffic. Given the mobility of sea turtles and the slow speeds at which barges will be operating, the risks of vessel strike impacts to listed species resulting from this project are discountable.

This concludes your consultation responsibilities under the ESA for species under NMFS' purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action.

We have enclosed additional information on other statutory requirements that may apply to this action, and on NMFS' Public Consultation Tracking System to allow you to track the status of ESA consultations. If you have any questions, please contact Adam Brame by e-mail at Adam.Brame@noaa.gov. Thank you for your continued cooperation in the conservation of listed species.

Sincerely,

Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

File: 1514-22.M
Ref: I/SER/2010/01063

PCTS Access and Additional Considerations for ESA Section 7 Consultations
(Revised 7-15-2009)

Public Consultation Tracking System (PCTS) Guidance: PCTS is an online query system at **https://pcts.nmfs.noaa.gov/** that allows federal agencies and U.S. Army Corps of Engineers' (COE) permit applicants and their consultants to ascertain the status of NMFS' Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations, conducted pursuant to ESA section 7, and Magnuson-Stevens Fishery Conservation and Management Act's (MSA) sections 305(b)2 and 305(b)(4), respectively. Federal agencies are required to enter an agency-specific username and password to query the Federal Agency Site. The COE "Permit Site" (no password needed) allows COE permit applicants and consultants to check on the current status of Clean Water Act section 404 permit actions for which NMFS has conducted, or is in the process of conducting, an ESA or EFH consultation with the COE.

For COE-permitted projects, click on "Enter Corps Permit Site." From the "Choose Agency Subdivision (Required)" list, pick the appropriate COE district. At "Enter Agency Permit Number" type in the COE district identifier, hyphen, year, hyphen, number. The COE is in the processing of converting its permit application database to PCTS-compatible "ORM." An example permit number is: SAJ-2005-000001234-IPS-1. For the Jacksonville District, which has already converted to ORM, permit application numbers should be entered as SAJ (hyphen), followed by 4-digit year (hyphen), followed by permit application numeric identifier with no preceding zeros. For example: SAJ-2005-123; SAJ-2005-1234; SAJ-2005-12345.

For inquiries regarding applications processed by COE districts that have not yet made the conversion to ORM (e.g., Mobile District), enter the 9-digit numeric identifier, or convert the existing COE-assigned application number to 9 numeric digits by deleting all letters, hyphens, and commas; converting the year to 4-digit format (e.g., -04 to 2004); and adding additional zeros in front of the numeric identifier to make a total of 9 numeric digits. For example: AL05-982-F converts to 200500982; MS05-04401-A converts to 200504401. PCTS questions should be directed to Eric Hawk at Eric.Hawk@noaa.gov. Requests for username and password should be directed to PCTS.Usersupport@noaa.gov.

EFH Recommendations: In addition to its protected species/critical habitat consultation requirements with NMFS' Protected Resources Division pursuant to section 7 of the ESA, prior to proceeding with the proposed action the action agency must also consult with NMFS' Habitat Conservation Division (HCD) pursuant to the MSA requirements for EFH consultation (16 U.S.C. 1855 (b)(2) and 50 CFR 600.905-.930, subpart K). The action agency should also ensure that the applicant understands the ESA and EFH processes; that ESA and EFH consultations are separate, distinct, and guided by different statutes, goals, and time lines for responding to the action agency; and that the action agency will (and the applicant may) receive separate consultation correspondence on NMFS letterhead from HCD regarding their concerns and/or finalizing EFH consultation.

Marine Mammal Protection Act (MMPA) Recommendations: The ESA section 7 process does not authorize incidental takes of listed or non-listed marine mammals. If such takes may occur an incidental take authorization under MMPA section 101 (a)(5) is necessary. Please contact NMFS' Permits, Conservation, and Education Division at (301) 713-2322 for more information regarding MMPA permitting procedures.

Essential Fish Habitat Assessment

National Marine Fisheries Service

South Texas Project Electric Generating Station Units 3 and 4

U.S. Nuclear Regulatory Commission Combined License Application
Docket Nos. 52-012 and 52-013

U.S. Army Corps of Engineers Permit Application

Matagorda County, Texas

March 2010

U.S. Nuclear Regulatory Commission
Rockville, Maryland

U.S. Army Corps of Engineers
Galveston District

1.0 Introduction

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801 et seq.) and amendments by the Sustainable Fisheries Act of 1996 (Public Law 104-297) recognized that habitat is important for the protection of healthy fisheries and established procedures to identify, conserve, and enhance essential fish habitat (EFH) for Federally managed fish and shellfish species (GMFMC 2004). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC 1801 et seq.; NMFS 2004). Federal agencies must consult with the Secretary of Commerce on all actions or proposed actions that are authorized, funded, or undertaken by the agency that may adversely affect EFH (NMFS 2004). Identifying EFH is an essential component in the development of fishery management plans (FMPs) to evaluate the effects of habitat loss or degradation on fishery stocks and to take actions to mitigate such damage. This responsibility was expanded by the National Marine Fisheries Service (NMFS) to ensure additional habitat protection (NMFS 1999). The consultation requirements of Section 305(b) of the MSA provide that Federal agencies consult with the Secretary of Commerce on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from STP Nuclear Operating Company (STPNOC) for two combined construction permits and operating licenses (combined licenses or COLs) to construct and operate two new nuclear reactors at the South Texas Project Electric Generating Station (STP) site in Matagorda County, Texas, approximately 12 mi south-southwest of Bay City, Texas (Figure 1). The STP site is located adjacent to the Colorado River, upstream of its confluence with the Gulf Intracoastal Waterway (GIWW). STPNOC submitted the COL application to the NRC on September 20, 2007. The STP site and existing facilities (Units 1 and 2) are owned by NRG South Texas LP (NRG), City Public Service Board of San Antonio, Texas (CPS Energy), and the City of Austin, Texas. STPNOC plans for the proposed STP Unit 3 to be owned by Nuclear Innovation North America (NINA) South Texas 3 LLC and CPS Energy, and the proposed STP Unit 4 to be owned by NINA South Texas 4 LLC and CPS Energy (STPNOC 2009a). Concurrent with the NRC's review, the U.S. Army Corps of Engineers (Corps) is reviewing STPNOC's application for a Department of the Army (DA) Permit pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC Sec. 403) and Section 404 of the Clean Water Act (CWA) (33 USC 1344) to perform site preparation activities and construct supporting facilities for two proposed new nuclear reactors at the STP site (Units 3 and 4). The Corps is a cooperating agency with the NRC to ensure that the information presented in the environmental impact statement (EIS) is adequate to fulfill the requirements of Corps regulations; the CWA Section 404(b)(1) Guidelines, which contain the substantive environmental criteria used by the Corps in evaluating discharges of dredged or fill material into waters of the United States; and the Corps public interest review process. The NRC and the Corps have formed a combined review team

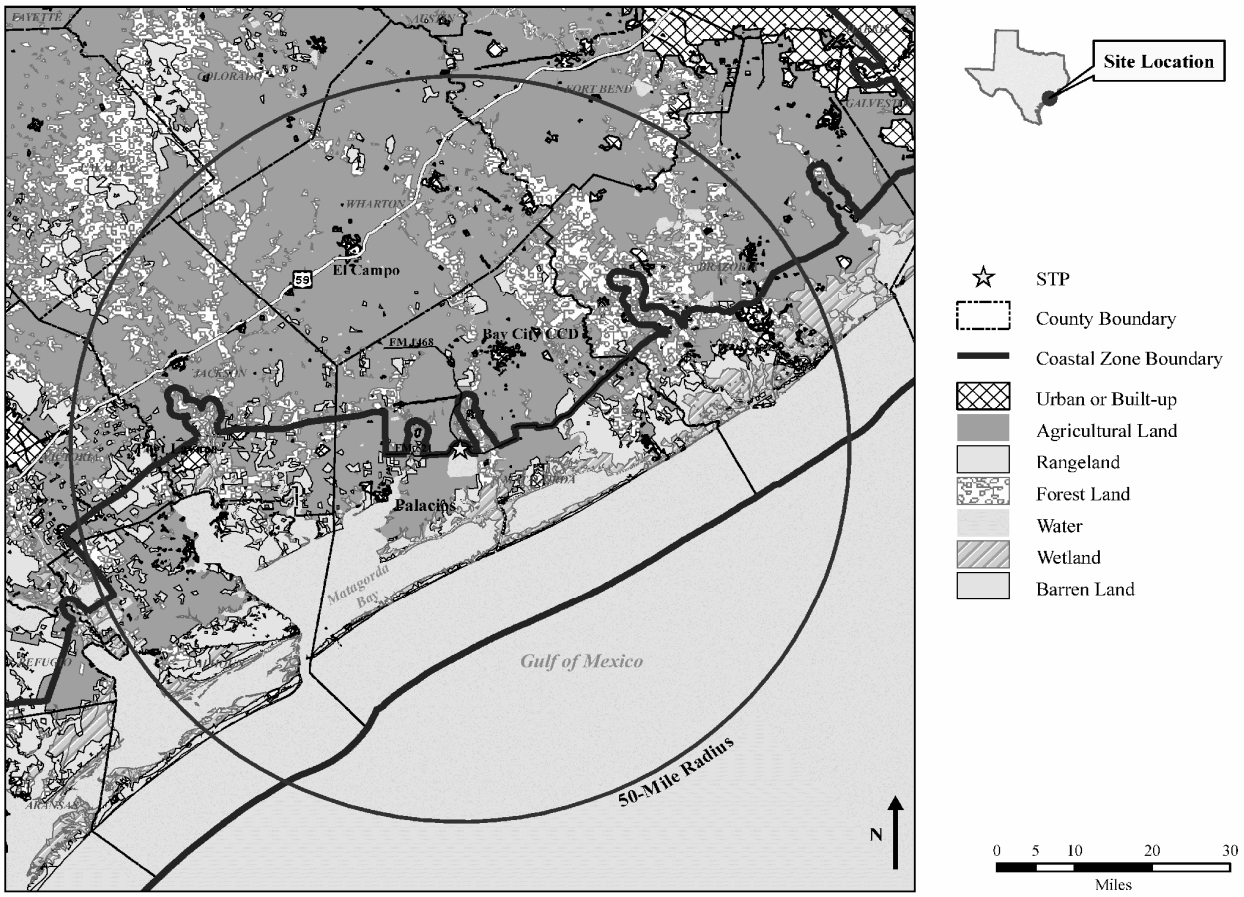

Figure 1. Location of the STP Site and General Land Use Classification for the Region

and prepared this EFH assessment to support their joint consultation with the NMFS in accordance with the MSA. The Corps permit decision will be made following issuance of the final EIS for building the two new reactors at the STP site.

The proposed project has the potential to cause temporary and permanent adverse impacts to spawning, nursery, forage, and shelter activities and habitats. The review team has evaluated potential impacts on the designated EFH and Federally-managed fish and shellfish species in the vicinity of STP based on information from communications with the NMFS (Southeast Regional Office, Habitat Conservation Division, Gulf Branch) and review of information on the Gulf of Mexico Fishery Management Council's final EIS on the generic EFH amendments (GMFMC 2004). In addition, the EFH mapper tool was used to visualize the extent of potential designated EFH in the vicinity of the STP site, with an understanding that the area may be within known areas of spatial data quality issues (NMFS 2009). Matagorda Bay, the GIWW, and the Colorado River extending up to the bridge at FM 521 (at approximately navigable mile marker [NMM] 10, upstream of the confluence of the Colorado River and the GIWW) are within

Ecoregion 5 of the designated EFH by the Gulf of Mexico Fishery Management Council's FMP (GMFMC 2004; NMFS 2009). Ecoregion 5 extends from Freeport, Texas to the Mexico border. FMPs for coastal migratory pelagics, reef fish, red drum, shrimp, and stone crab fisheries include the Colorado River, the GIWW and Matagorda Bay within the vicinity of STP include coastal migratory pelagic, reef fish, red drum, shrimp, and stone crab (GMFMC 2004). This EFH assessment examines the potential impacts of the proposed actions on eight species: king mackerel (*Scomberomorus cavalla*), Spanish mackerel *(S. maculates*), gray snapper (*Lutjanus griseus*), red drum (*Sciaenops ocellatus*), brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*F. duorarum*), white shrimp (*Litopenaeus setiferus*), and Gulf stone crab (*Menippe adina*). These species are described in Section 4.0, and the impacts to them and their EFH, including their prey, are discussed in Section 5.0.

2.0 STP Site Description

The 12,220-ac STP site currently contains two pressurized water reactors (Units 1 and 2) and their associated facilities, which occupy approximately 300 ac (Figure 2). Existing Units 1 and 2 share a 7000-ac Main Cooling Reservoir (MCR). Approximately 58 percent of the 12,220-ac STP site is covered in water (STPNOC 2009a). The MCR is an engineered cooling reservoir originally sized for four nuclear units and currently dissipates heat as part of a closed-cycled cooling system for the existing Units 1 and 2. Water loss from the MCR through evaporation, seepage, and discharge is made up from the Colorado River. Colorado River water is pumped from the Reservoir Makeup Pumping Facility (RMPF) into the MCR. Operation of the RMPF requires periodic maintenance dredging of the river in the immediate vicinity. When the total dissolved solids concentration in the MCR exceeds operating criteria, water is released through a discharge structure on the Colorado River downstream from the RMPF. However, STPNOC has only discharged water from the MCR into the Colorado River once during operation of Units 1 and 2 (STPNOC 2009a). There is a barge slip near the downstream shoreline of the RMPF that was used for the construction of Units 1 and 2 and could be required in the future for continued operation of Units 1 and 2. Both existing units would continue to operate during the site preparation activities, construction, and operation of the proposed Units 3 and 4, and the proposed two new units would share many of the same systems for cooling, including the use of the existing RMPF, MCR, and discharge structure, and transmission of power.

A diverse aquatic community has developed over time since the construction of the MCR. The organisms are likely survivors of entrainment at the RMPF from the Colorado River, but it is unclear if these organisms are reproducing in the MCR. The organisms are not available for harvest as there is no public access to the MCR and STPNOC has only evaluated the aquatic community in the MCR twice (during an employee fishing tournament in 1994 and during an aquatic community survey during 2007-2008) (ENSR 2008a; STPNOC 2009a). For the purpose of this assessment and consultation, the entrained aquatic community will be considered lost to the environment and, therefore not evaluated further. Within the vicinity of the STP site, the major aquatic communities occur in the Colorado River, Matagorda Bay and the associated GIWW (Figure 3). The segment of the Colorado River adjacent to the STP site is used for recreational boating and fishing, as well as shipping to upstream ports. Matagorda Bay is used for commercial fishing and shipping as well as for recreational activities. The GIWW is used for shipping as well as for some recreational activities. Designated EFH occurs in the lower Colorado River, Matagorda Bay, and the GIWW, but there are no habitat areas of particular concern in any of those water bodies (GMFMC 2004).

2.1 Colorado River

The Colorado River is one of the largest river systems in Texas. The river is approximately 862 mi long, extending from the high plains to the coastal marshes in Matagorda County. The segment of the river near the STP site, between Bay City and the GIWW, is a diverse, tidal, fluvial system that meanders through the coastal plain providing freshwater, sediments, and nutrients to Matagorda Bay (ENSR 2008a). The substrate and bathymetry of the Colorado River from the RMPF to the confluence with the GIWW is not well characterized. The Corps' Galveston District reported in December 2009 that the Colorado River Channel from navigable mile 0 (GIWW) to the turning Basin near Bay City had a minimum width of 100 ft, minimum depth of 9 ft. In the vicinity of the STP site, the left quarter, middle half and right quarter channel had average depths of 2.1 ft, 3.8 ft, and 4.5 ft, respectively (all measurements were provided at the mean low tide datum) (Corps 2009a). The width of the river near the RMPF is approximately 900 ft. The west bank of the river channel drops off quickly to a shelf that extends approximately 400 ft, then drops again to the thalweg (lowest point in the river channel) approximately 600 ft from the west bank. The east bank of the river channel drops to the thalweg within 300 ft from the east bank. The bathymetry of the river at the discharge structure is not known, but the width is approximately 300 ft (STPNOC 2009a). The river's bottom habitat in the vicinity of the STP site is described as un-vegetated, estuarine benthic habitats with mud and sand substrate (STPNOC 2009a).

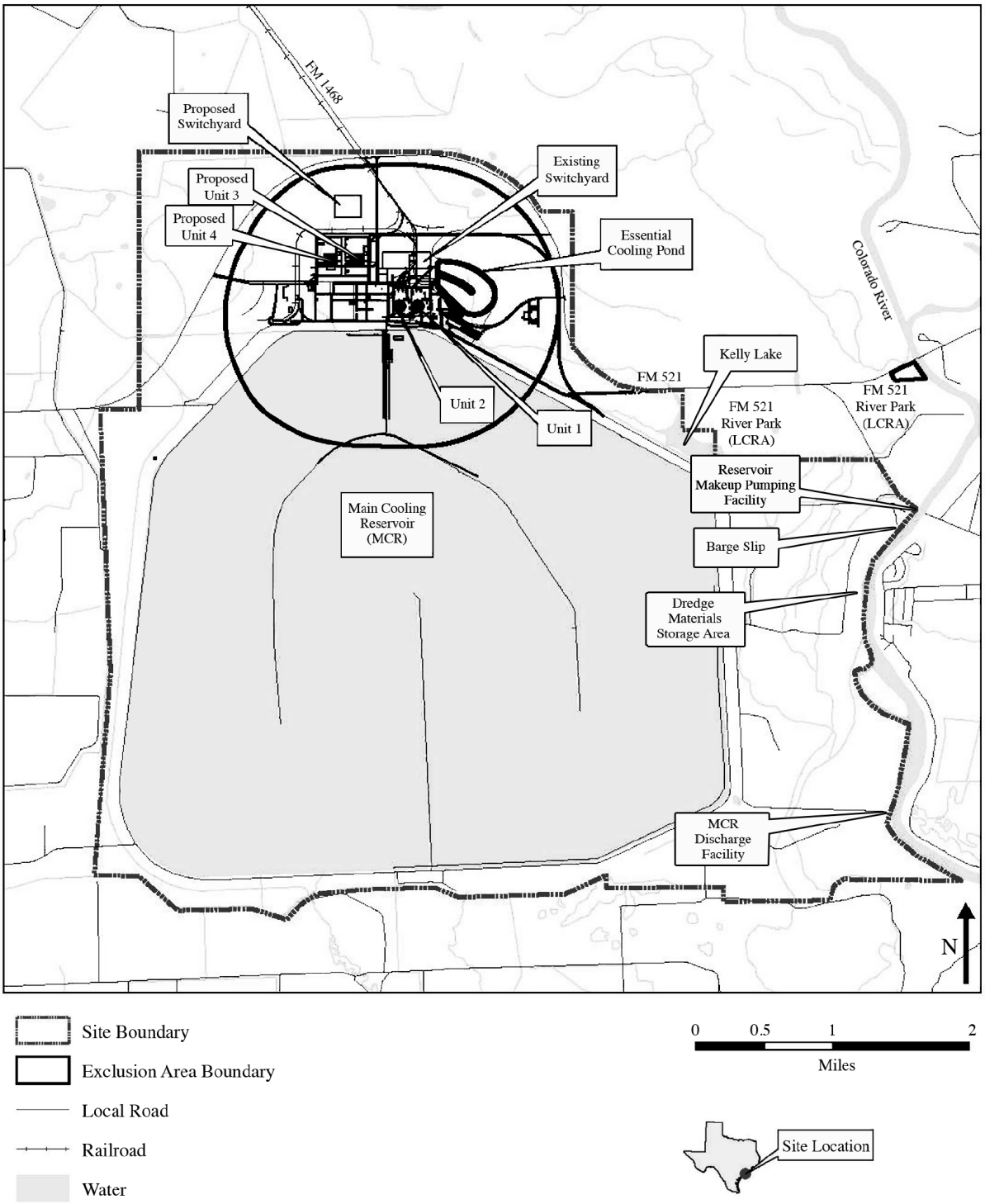

Figure 2. STP Site and Proposed Plant Footprint (STPNOC 2009a)

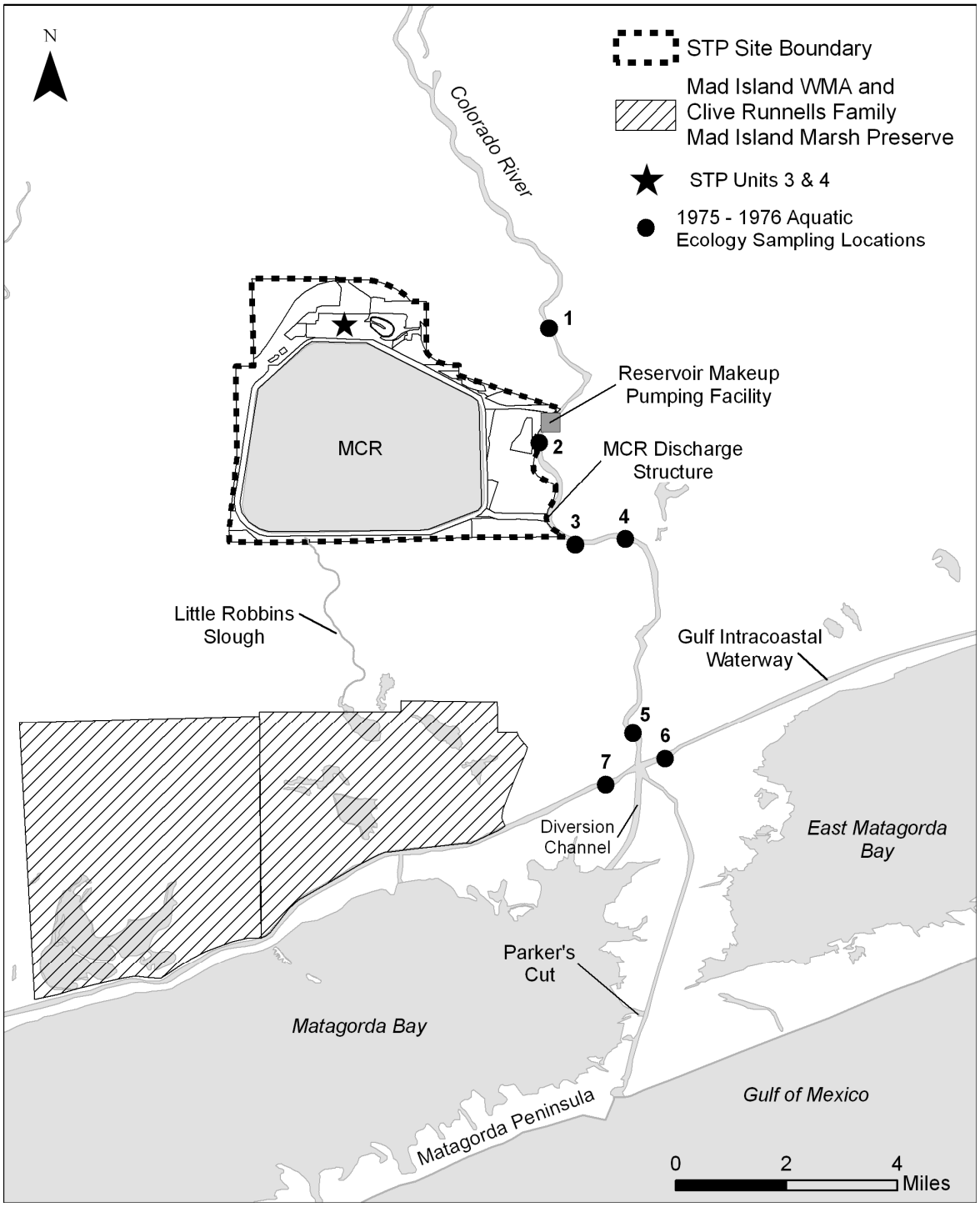

Figure 3. Location of the STP Site and Major Important Aquatic Resources

Today, there is no natural direct connection between the Gulf of Mexico and the Colorado River. Aquatic resources associated with the Gulf of Mexico can move into and out of the Colorado River through the navigation channel (that connects the Gulf to the GIWW), and through the GIWW or a diversion channel into Matagorda Bay. The major shipping channels connect to the GIWW in the northeast through the Freeport Harbor Channel (Corps 2008) and in the southwest through the Matagorda Ship Channel (Corps 2007).

The lower Colorado River has been studied on a very limited basis with specific studies conducted in 1974, 1976, 1983, and 1984 associated with the licensing of existing STP Units 1 and 2 (NRC 1975, 1986) and in 2007-2008 associated with the licensing of the proposed Units 3 and 4 (ENSR 2008a). The flow of the Colorado River and the Gulf of Mexico has changed with development of the area since the 1920s. The course of the river prior to the 1920s flowed directly into Matagorda Bay. In the 1930s, a delta began to form in the mouth of the river, and a channel was constructed through the Matagorda Peninsula, shunting the river flows away from the bay directly into the Gulf of Mexico. Then, in the 1950s, the Tiger Island Channel was constructed through the west side of the delta, re-establishing flow between the river and the bay. The Corps constructed a deeper river diversion channel northwest of the Tiger Island Channel in 1990. In 1991, two dams were constructed to divert the river flow, including one across the Tiger Island Channel (called the Tiger Island Cut dam) and a diversion dam across the river channel on Matagorda Peninsula. By July 1992, all of the Colorado River flow was diverted into Matagorda Bay through the GIWW and the newly constructed diversion channel. The changes in freshwater inflow to Matagorda Bay over time, and the changes to flow from the Gulf of Mexico into the Colorado River have likely influenced the aquatic communities historically in the river and bay (Wilber and Bass 1998).

Changes in the aquatic community over time in the Colorado River were evaluated using the results of the 1974, 1983, 1984, and 2007-2008 studies (NRC 1975, 1986; ENSR 2008a). The sampling locations and gear types varied with each study, making some comparisons more difficult. Trawl samples collected from the GIWW to the STP site in 1974 showed a moderately diverse species community for the lower river based on measures for species richness, diversity, and evenness. All three measures were slightly lower than those in similar segments of the river compared to the 2007-2008 study, suggesting that the diversity of aquatic species is greater now than in the past. Data collected during 1974 examining specific segments also indicated a diverse species community for all three segments. The 1983-1984 trawl and seine data indicated overall lower species richness, diversity, and evenness relative to the present data (ENSR 2008a). Rerouting of the lower Colorado River has likely contributed to these changes in diversity of aquatic species.

The number and assortment of organisms collected during the 2007-2008 study indicate that this portion of the lower Colorado River supports a diverse assemblage of fauna, many of which would be prey for species with designated EFH in the area (Table 1 on the following page). The

regular occurrence of both freshwater and saltwater species, the range of macroinvertebrate and finfish fauna, and the sheer number of species captured among various sampling gears and river reaches provide evidence of a dynamic ecosystem. There was a low to moderate level of similarity between the current 2007-2008 faunal communities and the historic communities (1974 and 1983-1984) (ENSR 2008a).

The 2007-2008 survey of the Colorado River did not include sampling for younger life stages (e.g., ichthyoplankton). In addition, there were no reports during the 1974, 1983, 1984, and 2007-2008 studies of any submerged aquatic vegetation (SAV) in the Colorado River from the GIWW to the bridge with FM 521 (NRC 1975, 1986; ENSR 2008a).

Table 1. Fish and Shellfish Collected in the Colorado River by Gear Type, 2007-2008 (ENSR 2008b)

Common Name	Scientific Name	Bag Seine	Gill Net	Hoop Net	Trawl	Total
alligator gar	*Atractosteus spatula*	2	2	13		17
Atlantic brief squid	*Lolliguncula brevis*	1			30	31
Atlantic croaker	*Micropogonias undulatus*	562	1		482	1045
Atlantic cutlassfish	*Trichiurus lepturus*				6	6
Atlantic seabob	*Xiphopenaeus kroyeri*				127	127
Atlantic spadefish	*Chaetodipterus faber*			3		3
Atlantic threadfin	*Polydactylus octonemus*				6	6
bay anchovy	*Anchoa mitchilli*	24			264	288
bay whiff	*Citharichthys spilopterus*	15			2	17
bayou killifish	*Fundulus pulvereus*	3				3
black drum	*Pogonias cromis*	1	1	1	1360	1363
blackcheek tonguefish	*Symphurus plagiusa*				3	3
blue catfish	*Ictalurus furcatus*	51	22	3	677	753
blue crab	*Callinectes sapidus*	190	2	3	77	272
bluegill	*Lepomis macrochirus*	3				3
brown shrimp	*Farfantepenaeus aztecus*	264			192	456
bull shark	*Carcharhinus leucas*		6			6
channel catfish	*Ictalurus punctatus*	22		2	6	30
cichlid	*Cichlasoma* spp.				16	16
crayfish	*Procambarus* sp.				1	1
crevalle jack	*Caranx hippos*	2				2
cyprinid sp.	Cyprinidae	1				1

Table 1. (contd)

Common Name	Scientific Name	Bag Seine	Gill Net	Hoop Net	Trawl	Total
diamond killifish	*Adinia xenica*	11				11
flathead catfish	*Pylodictis olivaris*			2		2
freshwater goby	*Ctenogobius shufeldti*	9				9
gafftopsail catfish	*Bagre marinus*		9		183	192
gizzard shad	*Dorosoma cepedianum*	8		2	52	62
grass carp	*Ctenopharyngodon idella*		2	1		3
grass shrimp	*Palaemonetes pugio*	1762				1762
gray (mangrove) snapper	*Lutjanus griseus*				1	1
Gulf killifish	*Fundulus grandis*	15				15
Gulf menhaden	*Brevoortia patronus*	2960	5	2	1076	4043
hardhead catfish	*Ariopsis felis*		1	1	252	254
Harris mud crab	*Rhithropanopeus harrisii*				1	1
inland silverside	*Menidia beryllina*	6				6
killifish sp.	*Fundulus* sp.	5				5
ladyfish	*Elops saurus*		2		1	3
lesser blue crab	*Callinectes similis*	1			5	6
lined sole	*Achirus lineatus*				3	3
longnose gar	*Lepisosteus osseus*			1		1
mosquitofish	*Gambusia affinis*	1				1
naked goby	*Gobiosoma bosc*	3				3
pigfish	*Orthopristis chrysoptera*				1	1
pinfish	*Lagodon rhomboides*				11	11
rainwater killifish	*Lucania parva*	2				2
red drum	*Sciaenops ocellatus*	8	8	38	25	79
red eared slider	*Trachemys scripta elegans*			1		1
river shrimp	*Macrobrachium ohione*	10			5	15
rough silverside	*Membras martinica*	17				17
sailfin molly	*Poecilia latipinna*	150				150
sand seatrout	*Cynoscion arenarius*	22	5		294	321
sharptail goby	*Oligolepis acutipennis*	39				39
sheepshead	*Archosargus probatocephalus*	14	1	6	48	69
sheepshead minnow	*Cyprinodon variegatus*	79			7	86
shiner	*Notropsis* spp.	2				2

Table 1. (contd)

Common Name	Scientific Name	Bag Seine	Gill Net	Hoop Net	Trawl	Total
silver jenny	*Eucinostomus gula*				2	2
silver perch	*Bairdiella chrysoura*				350	350
smallmouth buffalo	*Ictiobus bubalus*		32	5		37
Southern flounder	*Paralichthys lethostigma*	2	2	3	12	19
southern stingray	*Dasyatis americana*				1	1
spot croaker	*Leiostomus xanthurus*	88		1	156	245
spotfin mojarra	*Eucinostomus argenteus*	3			5	8
spotted gar	*Lepisosteus oculatus*	1	1	10	1	13
spotted seatrout	*Cynoscion nebulosus*		4		53	57
star drum	*Stellifer lanceolatus*				86	86
striped mullet	*Mugil cephalus*	1676		1	1	1678
threadfin shad	*Dorosoma petenense*	4			7	11
violet goby	*Gobioides broussonnetii*	2				2
white mullet	*Mugil curema*	181			2	183
white shrimp	*Litopenaeus setiferus*	584			2870	3454
	Total	**8806**	**106**	**99**	**8760**	**17771**

2.2 Matagorda Bay

Matagorda Bay is 300 mi^2 formed by a 45-mi-long barrier island-peninsula complex that is parallel to the Gulf of Mexico and is located to the southeast of the STP site (STPNOC 2009a). The Matagorda Bay system is considered the second largest of the seven major bay systems in Texas (LCRA 2006). The bay is connected to the waters on the site as it receives water discharged from the site through drainage ditches and channels into Little Robbins Slough and downstream marshes and also through the discharge facility into the Colorado River; water in the slough, marshes, and river flows into the bay. As mentioned above, the Colorado River flows by STP then across the GIWW into a diversion channel into the bay. The bay is described as the Matagorda Bay system, and it is the third largest estuary on the Texas coast. The bay system includes Lavaca, East Matagorda, Keller, Carancahua, and Tres Palacios bays (Corps 2007).

The Colorado River and associated discharge basin is a major contributor of freshwater to Matagorda Bay (LCRA 2006). Salinity in the bay system depends on the tidal exchange and freshwater inflow. There is little vertical stratification since the bay is relatively shallow and mixing occurs from consistent winds (LCRA 2006). Salinity at the Matagorda Ship Channel is

higher than in the northeastern end of the bay, closest to the diversion channel with the Colorado River, decreasing from 27 to 18 parts per trillion (ppt) (Kim and Montagna 2009).

The aquatic community of Matagorda Bay system includes organisms in the open water areas as well as organisms over hard substrates (including oyster reefs and offshore sands). In the open water areas of the bay, phytoplankton (e.g., algae) are the major primary producers that are the main food source for zooplankton (e.g., small crustaceans), fish and benthic organisms (e.g., mollusks).

3.0 Proposed Federal Actions

The proposed Federal actions are (1) NRC's issuance of two COLs for the construction and operation of two new nuclear reactors at the proposed STP site pursuant to Title 10 of the Code of Federal Regulations (CFR) 52.97, and (2) the Corps' issuance of a DA permit pursuant to Section 404 of the CWA and Section 10 of the Rivers and Harbors Act of 1899.

The NRC, in a final rule dated October 9, 2007 (72 FR 57416), limited the definition of "construction" in 10 CFR 50.10 and 51.4 to activities that fall within its regulatory authority. Many of the activities required to build a nuclear power plant are not part of the NRC action to license the plant. Activities associated with building the plant that are not within the purview of the NRC action are grouped under the term "preconstruction." Preconstruction activities include clearing and grading, excavating, erecting of support buildings and transmission lines, and other associated activities. These preconstruction activities may take place before the application for a COL is submitted, during the staff's review of a COL application, or after a COL is granted. Although preconstruction activities are outside the NRC's regulatory authority, many of them are within the regulatory authority of local, State, or other Federal agencies. The distinction between construction and preconstruction is not carried forward in this EFH assessment, and both are being discussed together as construction for the purposes of the NRC/Corps joint EFH consultation.

The Corps action is the decision whether to issue a permit pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Appropriation Act of 1899 for proposed structures in and under navigable waters and the discharge of dredged, excavated, and/or fill material into waters of the United States, including jurisdictional wetlands.

Prerequisites to certain construction activities include, but are not limited to, documentation of existing site conditions within the STP site and acquisition of the necessary permits (e.g., COLs, local building permits, CWA Section 402(p) Texas Pollutant Discharge Elimination System (TPDES) permit, Construction and Industrial Stormwater Permits, a DA permit, Coastal Consistency Determination per the Coastal Zone Management Act [16 USC 1451, *et seq*.], and a CWA Section 401 Certification). After these prerequisites are completed, planned

construction activities could proceed and would include all or some or all the activities pursuant to 10 CFR 50.10(e)(1). Following construction, planned operation of the new reactors would be authorized if the Commission finds, under 10 CFR 52.103(g), that all acceptance criteria in the COLS are met.

Briefly, the construction and operation activities that could affect Federally-managed fish and shellfish species based on habitat affinities, life-history characteristics, and the nature and spatial and temporal considerations of the proposed actions are as follows:

Construction

- Refurbishment of the existing RMPF at the Colorado River
- Expansion of the barge slip on the Colorado River
- Barging heavy equipment and materials to STP site

Operation

- Operation of RMPF on Colorado River
- Operation of discharge structure on Colorado River
- Maintenance dredging of RMPF and barge slip

The footprint for proposed Units 3 and 4 would be approximately 2000 ft northwest of existing Units 1 and 2 (STPNOC 2009a). The cooling system would be the largest interface from the plant to the environment. The proposed new units cooling system would include the same systems currently in use for Units 1 and 2: RMFP, MCR, and discharge structure on the Colorado River. With the addition of the two proposed new units, additional makeup water would be provided to the MCR through refurbished intakes from the Colorado River at the RMPF. A portion of this makeup water would be returned to the environment via the discharge structure. The remaining portion of the water would be available for release into the atmosphere via evaporative cooling of the MCR. Groundwater is planned as the source for makeup water for the proposed Units 3 and 4 ultimate heat sink (UHS), service water for the power plants, and water for sanitary and potable water systems. The power transmission system for proposed Units 3 and 4 would not require new transmission lines or corridors, but it would use five of the nine 345-kV transmission lines that currently connect to existing STP Units 1 and 2, and involve upgrading a 20-mi section of the existing 345-kV Hillje transmission line (STPNOC 2009a). Below is further description of the major features of the proposed site.

3.1 Circulating Water Intake System

The circulating water intake system for the proposed new units consists of two parts. The RMPF pumps water from the Colorado River into the MCR. A new circulating water intake system (CWIS) would be constructed within the MCR for use by the proposed new units for cooling purposes.

Reservoir Makeup Pumping Facility. The RMPF is located along the west bank of the Colorado River and is an existing facility that would be modified solely within its existing footprint to supply makeup water to the MCR for operating all four nuclear units. The facility is located near NMM 8 on the Colorado River upstream from the confluence with the GIWW, and the structure is "flush" to the river bank with no projecting structures into the river. The RMPF withdraws water through a 406-ft-long intake along the shoreline. Water from the river flows through trash racks (with 4-in. spacing between the bars), then through traveling screens, and then over a weir into an embayment before entering the pumps into a pipeline delivering water to the MCR. There are 18 travelling screens, each of 13.5 ft width, with the bottom of the screens situated at 10 ft below mean sea level (MSL) in the Colorado River (water surface elevation in the Colorado River at 0 ft MSL). The area of the 18 screens would be 2430 ft^2. The existing traveling screens have a 3/8-in. mesh, and operate intermittently to coincide with the intermittent withdrawal of river water. For the purposes of this assessment, the review team is assuming that modifications to the RMPF would result in trash bars and travelling screens with identical characteristics to those that exist currently at the RMPF.

Fish collected on the traveling screens can be returned to the river via the existing sluice and fish bypass pipe. The fish return outfall is at the downstream end of the intake structure, approximately 2 ft below normal water elevation (STPNOC 2009a). During high-flow conditions, the accumulation of debris on the traveling screens is too high to open the fish bypass system, and screenwash discharge is directed to the sluice trench catch baskets rather than back to the river. Generally, the fish bypass system is closed when river flows are greater than 4000 cubic feet per second (cfs), and the system is occasionally closed when flows are greater than 2000 cfs (which has occurred from 2001-2006 only 7 percent of the time) (STPNOC 2009a, 2008b). Impingement mortality can be reduced based on the procedures for operating the RMPF. Operators at the RMPF are required to monitor for increased impingement rates on the traveling screens, and factors like river flow, salinity, and observations of impingement are used to determine if pumping should continue (STPNOC 2009a, 2008a, 2008b).

STPNOC has stated that periodic dredging in the future would be conducted in front of the RMPF (STPNOC 2009a). These activities are currently covered by existing permits with the Corps for the operation of Units 1 and 2. In addition, the Corps would be conducting maintenance dredging of the navigation channel in the river in the vicinity of the discharge structure and RMPF (Corps 2009a). Based on past dredging events, the substrate that would

be dredged is predominantly silty-clay soils with approximately 6 in. of “detritus and silt soils” on the surface. Dredged material would be placed in the designated onsite location that is currently used for storage of material removed during maintenance activities with the RMPF (STPNOC 2009b). The area to be dredged would be approximately one ac.

Main Cooling Reservoir. The MCR is a 7000-ac engineered impoundment enclosed by an engineered embankment. STPNOC has indicated that, at the maximum normal operating pool of 49 ft MSL, the reservoir contains approximately 202,700 ac-ft of water. The CWIS for Units 3 and 4 would be located within the MCR. This CWIS would be a 131-ft by 392-ft concrete structure and would house eight pumps for the two proposed units. The structure would include trash racks and traveling screens (again, the review team assumes characteristics would be identical to those described above for RMPF trash racks and screens). Pipes carrying water from the plant would run to the turbine building. As for existing Units 1 and 2, the circulating water discharge structure for Units 3 and 4 would also be located within the MCR. The water return from Units 3 and 4 turbine buildings would enter the MCR through a new discharge structure within the MCR. The simple discharge structure would include a weir and a stilling basin to dissipate the velocity of the returning water before it enters the MCR. Dikes within the MCR increase the travel time that cooling water from the circulating water system would experience. The reject heat from the existing and proposed units would enter the MCR in the form of sensible heat in circulating water in the MCR. As the heated water circulates in the MCR, the heat is gradually dissipated to the environment through evaporation, conduction, and long-wave radiative cooling.

A diverse aquatic community exists in the MCR, but the organisms are not available for harvest. No public access or use of the MCR exists. In addition, the Corps has determined that the MCR is not considered waters of the United States (Corps 2009b), and the Texas Commission on Environmental Quality (TCEQ) has stated that the MCR is not considered waters of the State (TCEQ 2007; STPNOC 2008a).

The aquatic community in the MCR was evaluated in 2007-2008 (ENSR 2008b). A total of 11,605 finfish and invertebrates were collected over the duration of the sampling program for the MCR. The most common fish species collected were with seines, and included threadfin shad (*Dorosoma petenense*, 62 percent), inland silverside (*Menidia beryllina*, 18 percent), rough silverside (*Membras martinica*, 12 percent), and blue catfish (*Ictalurus furcatus*, three percent). The macroinvertebrates were characterized using plankton tows, and a total of 5362 organisms were collected in the MCR. The most common species (84 percent of all samples) collected were Harris mud crab larvae (*Rhithropanopeus harrisii*), and more than 99 percent of all sampled organisms were crustaceans (ENSR 2008b).

The same study also evaluated the impinged and entrained aquatic resources by the CWIS in the MCR for Units 1 and 2 (ENSR 2008b). Overall, very few fish species were impinged (less than 50 percent) or entrained (less than one percent). A total of 3982 organisms representing

25 fish species, seven invertebrate species, and one reptile species were collected during impingement sampling. Impingement rates were highest during the winter and early spring months. The dominant species collected in the impingement samples were threadfin shad (42 percent), Harris mud crab (24 percent), blue crab (*Callinectes sapidus*, 24 percent), Atlantic croaker (*Micropogonias undulates*, 5 percent), and white shrimp (*Litopenaeus setiferus*, 3 percent). A total of 207,696 organisms representing nine different fish families and 12 different invertebrate classes were collected during entrainment sampling. Entrainment rates were highest during the spring months. The dominant species collected in the entrainment samples were Harris mud crab (68 percent), unidentified decapods (15 percent), and harpacticoid copepods (6 percent). Less than one percent of the total composition of entrained organisms was fish eggs (ichthyoplankton) (ENSR 2008a).

Water quality sampling in the MCR showed that there were seasonal and spatial changes within the reservoir. Water temperature was the highest at the cooling water discharge area and gradually decreased by approximately 10°F as the water traveled through the internal levee system to the CWIS. The temperature through the water column did not vary much: 65.3°F to 96.1°F for surface measurements, and 65.1°F to 95°F for bottom measurements. Through the year, the temperature did vary. Temperature data from trawl samples increased from an average 86.4°F in May to 93.4°F in August and then decreased in October to 76.8°F and then to 70.5°F in February. Salinity remained constant throughout the reservoir and the water column at approximately 1.6 ppt.

3.2 Cooling Water Discharge System

Discharge from the MCR enters the Colorado River through a series of seven 36-in.-diameter pipes directed 45 degrees from the downstream western shore. The discharge structure is located about 2 mi downstream of the RMPF, located at NMM 6 on the Colorado River upstream from the confluence with the GIWW. The pipes entering the river are spaced 250 ft apart. Discharge that is released from the MCR approaches the diffusers through a 78-in.-diameter pipeline. As mentioned above, STPNOC has only released water through the discharge system once during the operation of Units 1 and 2. No change to the existing discharge structure is proposed for the new nuclear units (STPNOC 2009a).

3.3 Barging

The existing barge slip that was built for Units 1 and 2 would be re-excavated and expanded for use with the proposed Units 3 and 4 (STPNOC 2009c). Delivery of major equipment for Units 3 and 4 would be accomplished by barging the material to the site and would include heavy equipment (prefabricated modules, large components fabricated overseas) and bulk commodities (e.g., aggregate or structural fill materials). STPNOC has stated that no firm

shipping contracts have been developed for transportation of the materials to the STP site. However, STPNOC has indicated that the current plans call for prefabricated modules and components fabricated overseas to be shipped to the Port of Freeport (or points north) where they would be transferred from ocean-going ships to inland barges. The inland barges would then enter the GIWW and move south to the confluence of the Colorado River and proceed upstream to the site. The ports in Matagorda Bay to the south of the site currently do not have adequate facilities for the transfer of heavy cargo from ocean-going vessels to inland barges. Therefore, transport of these materials would not involve the Matagorda Ship Channel or the diversion canal in Matagorda Bay (STPNOC 2009b).

STPNOC plans to ship bulk commodities via inland barge. Access to the Colorado River by the barges would depend on the source of the materials, and could be transported either from the north or south along the GIWW. However, no bulk commodity traffic is expected to traverse the diversion canal in Matagorda Bay or the Matagorda Ship Channel (STPNOC 2009b).

4.0 Essential Fish Habitat Species Descriptions

The proposed Units 3 and 4 at the STP site are located in an area that is designated as EFH in Ecoregion 5 by the Gulf of Mexico Fishery Management Council (GMFMC 2004). The NRC and the Corps conducted an evaluation by identifying and considering all designated EFH that occurs near the STP site (GMFMC 2004; NMFS 2009). Table 2 lists the species with designated EFH in Matagorda Bay, GIWW, and the Colorado River extending up to the bridge at FM 521 (located at NMM 10 on the Colorado River upstream from the confluence with the GIWW). With the exception of a few species that do not occur in the region of interest, or occupy EFH that would not be affected by the proposed actions, these species and their life stages that rely on habitats essential for species propagation are detailed below with regard to the impact of the proposed Federal actions on EFH.

During the initial review of life history and EFH requirements, some life stages were eliminated from further consideration based on depth requirements, or life history information that suggested specific life stages are unlikely in the Colorado River extending up to the bridge at FM 521, GIWW, and Matagorda Bay (Table 3). Table lists the species and life stages evaluated in this EFH assessment.

Table 2. Designated Essential Fish Habitat with Ecoregion 5

Fishery Management Plan	*Species*	Common Name	Life Stage
Coastal Migratory Pelagic	*Scomberomorus cavalla*	king mackerel	eggs, larvae, juveniles, adults
Coastal Migratory Pelagic	*Scomberomorus maculatus*	Spanish mackerel	eggs, larvae, juveniles, adults
Reef Fish	*Lutjanus griseus*	gray (mangrove) snapper	eggs, larvae, juveniles, adults
Red Drum	*Sciaenops ocellatus*	red drum	eggs, larvae, juveniles, adults
Shrimp	*Farfantepenaeus aztecus*[(a)]	brown shrimp	eggs, larvae, juveniles, adults
Shrimp	*Farfantepenaeus duorarum*[(b)]	pink shrimp	eggs, larvae, juveniles, adults
Shrimp	*Litopenaeus setiferus*[(c)]	white shrimp	eggs, larvae, juveniles, adults
Stone Crab	*Menippe adina*[(d)]	Gulf stone crab	eggs, larvae, juveniles, adults

Sources: Guillory et al. 1995; GSMFC 1995; Cascorbi 2004; NMFS 2009.
(a) This species was formerly known as *Penaeus aztecus*.
(b) This species was formerly known as *Penaeus duorarum*.
(c) This species was formerly known as *Penaeus setiferus*.
(d) *Menippe adina* has been recognized as a new species, distinct from *M. mercenaria*, and is the species most common in the Gulf along the Texas coastline.

Table 3. Species and Life Stages Excluded from Essential Fish Habitat Assessment

Common Name	Life Stages Excluded	Rationale for Exclusion
King mackerel	eggs, larvae, adults (juveniles retained)	depth requirements not present in Colorado River, GIWW, or Matagorda Bay[(a)]
Brown shrimp	eggs, adults (larvae, juveniles retained)	depth requirements not present in Colorado River, GIWW, or Matagorda Bay[(a)]
Pink shrimp	eggs, adults (larvae, juveniles retained)	depth requirements not present in Colorado River, GIWW, or Matagorda Bay[(a)]
White shrimp	eggs, adults (larvae, juveniles retained)	depth requirements not present in Colorado River, GIWW, or Matagorda Bay[(a)]

(a) GMFMC 2004

Table 4. Essential Fish Habitat Included in Evaluation

Fishery Management Plan	*Species*	Common Name	Life Stage
Coastal Migratory Pelagic	*Scomberomorus cavalla*	king mackerel	juveniles
Coastal Migratory Pelagic	*Scomberomorus maculatus*	Spanish mackerel	eggs, larvae, juveniles, adults
Reef Fish	*Lutjanus griseus*	gray (mangrove) snapper	eggs, larvae, juveniles, adults
Red Drum	*Sciaenops ocellatus*	red drum	eggs, larvae, juveniles, adults
Shrimp	*Farfantepenaeus aztecus*	brown shrimp	larvae, juveniles
Shrimp	*Farfantepenaeus duorarum*	pink shrimp	larvae, juveniles
Shrimp	*Litopenaeus setiferus*	white shrimp	larvae, juveniles
Stone Crab	*Menippe adina*	Gulf stone crab	eggs, larvae, juveniles, adults

4.1 King Mackerel

King mackerel (*Scomberomorus cavalla*) are highly migratory and are aggressive predators that prefer feeding on schooling fish. Occasionally they eat penaeid shrimp and squid. Adult king mackerels consume mainly fish around 4 to 6 in. Juveniles eat smaller fish and invertebrates, particularly bay anchovy (*Anchoa mitchilli*). King mackerel can live to at least 14 years, although most die earlier. Females grow larger than males and spawn in their third or fourth year of life, with spawning occurring in the summer months (TSFGW 2005; FMNH 2009; TPWD 2009). Adults are primarily found offshore, but juveniles occasionally frequent estuarine waters for foraging (GMFMC 2004). Although no king mackerel have been observed during sampling studies, juvenile king mackerel are likely to occur in Matagorda Bay, GIWW, and the Colorado River.

4.2 Spanish Mackerel

Adult Spanish mackerel *(Scomberomorus maculates)* forage in estuarine and marine nearshore pelagic waters, and eggs and juveniles also occur nearshore marine surface (eggs) and pelagic (juveniles) waters (GMFMC 2004). The species is often found in large schools near the water surface. Juvenile and adult Spanish mackerel are fast-moving, voracious predators that feed on other smaller schooling fish. Spawning takes place from late spring to late summer at depths of less than 50 m along the Texas inner continental shelf (DeVries et al. 1990; Patillo et al. 1997). According to an EFH assessment in Matagorda Bay by the Corps (2007), adult and juvenile Spanish mackerel are found in the Gulf and Matagorda Bay throughout the year. The surveys of the Colorado River did not report any Spanish mackerel (NRC 1986; ENSR 2008a; STPNOC 2009a).

4.3 Gray Snapper

Larval, juvenile, and adult life stages of gray snapper (*Lutjanus griseus*) are considered because these life stages primarily occupy inshore habitats, such as those in the Colorado River, GIWW, and Matagorda Bay (GMFMC 2004). Eggs are neritic and demersal, and are found primarily in marine waters. Larvae are marine, neritic, and planktonic, and are known to be in the Gulf from April through November. As they mature, gray snapper move into estuarine habitats and occupy inshore grassy areas. Juveniles and adults are found in inshore marine and estuarine habitats with SAV or near mangroves, where they forage on small fish and crustaceans (Croker 1962; Patillo et al. 1997). The Corps (2007) reported that gray snapper are found in Matagorda Bay. Patillo et al. (1997) indicated that gray snapper are rare as adults and juveniles, but other life stages were not present in Matagorda Bay. Gray snapper were collected within the first 3 mi of the Colorado River from the confluence with the GIWW during the 2007-2008 sampling events (ENSR 2008a).

4.4 Red Drum

Red drum (*Sciaenops ocellatus*) larvae and juveniles spend most of their time in estuarine soft bottom, sand/shell, and SAV habitats actively feeding on copepods, mysid shrimp (*Mysidopsis bahia*), amphipods, decapods, and small fish. All free swimming life stages of the red drum are carnivorous. Adults spend some time near inshore SAV, sandy or hard-bottom foraging habitats but are predominantly found offshore where spawning activities occur (Patillo et al. 1997; GMFMC 2004). Red drum move to deep offshore waters to spawn in the fall and then return to nearshore coastal and estuarine habitats where they spend most of their life cycle (FFWCC 2007). Tidal currents move larvae to nearshore habitats, where they grow rapidly as juveniles during the first two years, and associate with seagrass habitats, with little wave action (Buckley 1984). The Corps (2007) reported that juvenile red drum are present in Matagorda Bay throughout the year. Patillo et al. (1997) indicated that all life stages of red drum were common in Matagorda Bay. Red drum were collected in along the Colorado River in 2007-2008 with all types of sampling gear, indicating that the species was well distributed in the river (ENSR 2008a).

4.5 Shrimp

Adult brown shrimp migrate (*Farfantepenaeus aztecus*) from offshore pelagic environment as larvae to inhabit grassy, estuarine habitats as juveniles (GMFMC 2004). They spawn in offshore waters between spring and early summer. The eggs are demersal and deposited offshore. Larvae migrate into estuarine waters through passes during flood tides. Juveniles inhabit a variety of areas where they can burrow in shallow estuarine waters, ranging from areas with vegetative cover to open silty sand, nonvegetated mud substrate. Postlarvae and juveniles

can tolerate a range of salinities, from 0 to 70 ppt. Juveniles and subadults prefer soft, muddy areas. Subadult brown shrimp migrate from estuaries into the Gulf (Patillo et al. 1997; GMFMC 2004; Corps 2007). Juvenile and adult shrimp are omnivorous with diets that vary between available food sources within the occupied habitat, which is preferably soft bottom, shallow estuarine areas (FWS 1983). According to an EFH assessment in Matagorda Bay by the Corps (2007), juvenile brown shrimp are common to highly abundant in Matagorda Bay year-round, while adults are common to highly abundant from April to July and are rare from August through March. Brown shrimp were collected in sampling studies all along the Colorado River in 1983-1984 and 2007-2008 (NRC 1986; ENSR 2008a; STPNOC 2009a).

Pink shrimp (*Litopenaeus duorarum*) in the Texas coastal waters are often difficult to distinguish from brown shrimp, and pink and brown shrimp are usually reported together in information about the shrimping fishery in Texas coastal waters (Patillo et al. 1997). Adults occur offshore and migrate into estuaries in the spring and fall. Postlarvae and juvenile pink shrimp select habitats with seagrass and shoalgrass, where they burrow by day and emerge and are active at night (Patillo et al. 1997; Corps 2007). Like brown shrimp, juvenile and adult shrimp are omnivorous (Patillo et al. 1997). According to an EFH assessment in Matagorda Bay by the Corps (2007), juvenile pink shrimp are common in Matagorda Bay year-round, while adults are common from November through June. Pink shrimp were not reported in surveys of the Colorado River in 2007-2008 (ENSR 2008a).

Adult white shrimp (*Litopenaeus setiferus*) also migrate from offshore pelagic environment as larvae to inhabit grassy, estuarine habitats as juveniles (GMFMC 2004). They spawn in offshore waters from spring to fall (FWS 1983). The eggs are demersal and deposited offshore (Patillo et al. 1997). White shrimp larvae may be found in the nearshore marine water column, but they prefer estuarine habitats and migrate further upstream in estuarine waters than brown shrimp (GMFMC 2004). Juvenile and adult shrimp are omnivorous with diets that vary between available food sources within the occupied habitat, which is preferably soft-bottom, shallow estuarine areas (FWS 1983). According to an EFH assessment in Matagorda Bay by the Corps (2007), adult and juvenile white shrimp are common to abundant in Matagorda Bay throughout the year, except in July when adult white shrimp are absent. White shrimp were collected in sampling studies all along the Colorado River in 1983-1984 and 2007-2008 (NRC 1986; ENSR 2008a; STPNOC 2009a).

4.6 Gulf Stone Crab

The Gulf stone crab (*Menippe adina*) occupies estuarine and marine SAV, sand/shell, and hard-bottom habitats as eggs, larvae, and juveniles (GMFMC 2004). Adults are both intertidal and subtidal and are typically found near oyster reefs or other hard-bottom substrate, and prefer a diet of oysters (Wilber 1989). Juveniles feed on small mollusks, worms, and crustaceans. Females maintain eggs on their abdomen until they hatch and become planktonic. As they

metamorphose to larvae, they become epibenthic, settling to areas providing cover (e.g., rubble and seagrass beds). The stone crab FMP allows harvest only of individuals with claws greater than 2.75 in. long. Florida stone crabs (*M. mercenaria*) require high salinities for juvenile growth, but the Gulf stone crab tolerates estuarine waters (GMFMC 2004). All life stages of Gulf stone crab are considered common throughout the year in Matagorda Bay (Patillo et al. 1997; Corps 2007). Gulf stone crabs were not reported in surveys of the Colorado River in 1983-1984 and 2007-2008 (NRC 1986; ENSR 2008a; STPNOC 2009a).

5.0 Potential Environmental Effects of the Proposed Federal Actions

This section describes the potential impacts from the construction and operation of proposed Units 3 and 4 at the STP site to Federally-managed estuarine and marine fish and shellfish and their habitats. Most of the construction and operation impacts to EFH would be limited to the Colorado River. Barging traffic during construction of Units 3 and 4 would be associated with Matagorda Bay, GIWW and the Colorado River.

5.1 General Construction Impacts

Construction activities in the Colorado River for the proposed Units 3 and 4 are limited to the RMPF, the barge slip and barging traffic to the STP site. Activities within the MCR are not part of this assessment because the aquatic organisms in the MCR are considered removed from the ecological system of the Colorado River, and the MCR is not included as designated EFH.

Half of the intake screens on the RMPF have not been used during the operation of STP Units 1 and 2, and they would be removed from the water and either refurbished or replaced. New pumps for proposed Units 3 and 4 would be installed behind the embayment located behind the traveling screens. These activities would involve little underwater disturbance, which would be limited to the front of the intake structure. EFH in the Colorado River would likely not be adversely affected during construction because of the minimal activity in the river that would be required by the refurbishment of the RMPF.

When the barge slip for existing STP Units 1 and 2 was built, a sheet pile wall was installed in the river to control sedimentation and limit downstream increases in turbidity and siltation. At that time, an estimated area of less than one ac of benthic habitat was destroyed during the building of the barge slip (STPNOC 2009a). The areal extent and types of disturbances to the shoreline and in the river for the re-excavation and expansion of the slip for transporting the barged materials for proposed Units 3 and 4 is anticipated to be similar to or less than the disturbances during the building of Units 1 and 2 (STPNOC 2009c). The loss of soft-bottom habitat would likely reduce the potential forage area for the penaeid shrimp and some benthic-

feeding EFH fish species. However, the area is not one of high benthic productivity, and the area that would be lost is relatively small.

STPNOC has indicated the current plans call for heavy equipment (prefabricated modules and components fabricated overseas) to be shipped to the Port of Freeport (or points north) where they would be transferred from ocean-going ships to inland barges. The inland barges would enter the GIWW, move south to the confluence of the Colorado River, and proceed upstream to the site. Bulk commodities (e.g., aggregate or structural fill material) could be barged to the STP site from ports to the north or south along the GIWW. There is no estimate for the number of barges that would deliver to the STP site (STPNOC 2009b). Based on the minimum depths and narrow channels that the barges would have to travel in the Colorado River, the barges are likely to be slow moving, and would have minimal wave disturbances along shoreline habitat. Habitat for aquatic organisms in the vicinity of the barge slip would be disturbed while barges continue to use the area. While there would be an increase in turbidity and silt in the water column associated with docking and the potential for discharge of small amounts of gas, oil, and grease from motors, the overall impact would be short in duration (STPNOC 2009b).

Erosion and sedimentation controls, are expected to minimize quantities of sediment or silt. Increase in turbidity would increase suspended sediments in the water column, but it is not likely that such sediments would be transported far down the river. Dredging would remove habitat (probably less than three ac) for organisms in the area of the barge slip, and could take individuals that cannot avoid the area. Based on the short duration and limited area of the river that would be affected, the impacts from construction activities for proposed Units 3 and 4 at STP are likely to be minor for aquatic resources in the Colorado River, the GIWW and Matagorda Bay.

5.2 General Operational Impacts

Operational activities in the Colorado River are limited to pumping water at the RMPF, discharge of the MCR water into the river, and maintenance dredging of the RMPF. Removal of water from the Colorado River at the RMPF affects aquatic organisms by impingement on screens, entrainment into the cooling system, and entrapment in the MCR. Discharging from the MCR into the Colorado River has the potential to affect the aquatic organisms because of the thermal, chemical, and physical characteristics of the discharge plume. Maintenance dredging around the RMPF and barge slip has the potential to remove habitat.

Impingement, Entrainment, and Entrapment. The RMPF has a number of design elements that are expected to minimize impingement, entrainment and entrapment of aquatic organisms during operation of all the STP units. For aquatic resources, the primary concerns related to water intake and consumption are the impacts related to the relative amount of water drawn from the cooling water source (Colorado River and MCR) and the potential for organisms to be

impinged on the intake screens entrained into the cooling water system, or entrapped in the MCR. Impingement occurs when organisms are trapped against the intake screens by the force of the water passing through the screens at the RMPF on the Colorado River and the CWIS on the MCR. Impingement can result in starvation and exhaustion, asphyxiation (water velocity forces may prevent proper gill movement or organisms may be removed from the water for prolonged periods of time), and descaling. Entrainment occurs when organisms are drawn through the RMPF from the Colorado River into the MCR, or through the CWIS from the MCR into the proposed Units 3 and 4 cooling system. Organisms that become entrained are normally relatively small benthic, planktonic, and nektonic (organisms in the water column) forms, including early life stages of fish and shellfish, which often serve as prey for larger organisms (69 FR 41576). Entrained organisms from the Colorado River have survived the stresses of the intake system and colonized the MCR, creating a rather diverse aquatic community that is removed from the rest of the ecosystem in the region. The survey of the MCR in 2007 and 2008 indicates that many individuals of numerous species have survived entrainment at the RMPF and are living in the MCR. While these entrapped organisms have survived entrainment of the pumps at the RMPF, overall the entrainment and entrapment have led to a loss of the organisms in the Colorado River, and these organisms no longer contribute to the richness of the river community as they are effectively isolated. Organisms in the MCR that pass through the CWIS into the plant's cooling system are subject to mechanical, thermal, and toxic stresses, and survival of CWIS entrainment is unlikely and assumed to be zero for the purposes of this assessment.

A number of factors, such as the type of cooling system, the design and location of the intake structure, and the amount of water withdrawn from the source water body greatly influences the degree to which impingement and entrainment affect the aquatic biota. The 7000-ac MCR is considered a closed-cycle cooling system since the water in the reservoir continues to circulate from the MCR, into the plant, and back again. Water loss from the MCR through evaporation, seepage, and discharge is made up from the Colorado River.

The RMPF is located on the Colorado River, which is designated as a tidal stream (TCEQ 2008) and includes EFH for Federally managed fish and shellfish species (GMFMC 2004). Locating intake systems in such areas with sensitive biological communities is generally considered a negative factor in protection of aquatic life (69 FR 41576). However, the segment of the river where the RMPF is situated (Segment C) has fewer organisms and less species richness than the downstream segment of the river, closer to the GIWW (Segment A)(ENSR 2008b). During 2007-2008, 18 percent of the total number of individuals collected were from Segment C as compared to 44 percent from Segment A; and 42 species were collected from Segment C as compared to 62 species from Segment A (Figures 4 and 5).

Operation of the RMPF is based on the need for makeup water in the MCR, and Section 5.2.2.1 of the EIS discusses the conditions when STPNOC would pump water from the Colorado River

into the MCR. One of these conditions is pumping makeup water during periods of high flows in the Colorado River. Pumping at high-flow conditions minimizes impacts to aquatic organisms in the water column because the organisms are likely to remain in the river flow and not likely to be caught in the influence of the water being pumped into the RMPF located on the shoreline (STPNOC 2008b, 2008c, 2009a). During the 2007-2008 aquatic ecology studies in the Colorado River, there was an inverse relationship between high-flow conditions and low densities of fish (as expressed in the catch per unit effort) (ENSR 2008a; STPNOC 2008b, 2008c). Salinity can be an indicator of an influx of estuarine species moving up the river from the GIWW. STPNOC has stated that the salinity of the water being pumped would be monitored, and when the pumped water exceeds 3 ppt, the traveling screens would be monitored for increased impingement. The operation of the fish-return system at the RMPF is a function of river flow and the amount of debris and organisms removed in the screen wash discharge (STPNOC 2008a).

Location of the RMPF and the intake screens on the shoreline of the Colorado River can minimize entrainment and entrapment (as a function of minimized entrainment). The RMPF was designed to maintain the traveling intake screens on the facility parallel with the flow in the river (69 FR 41576), or “flush” to the river bank with no projecting structures that create eddies and countercurrents that would cause entrapment (NRC 1986; STPNOC 2009a). Most organisms likely to be entrained or entrapped would be present in higher densities in the main river channel and less likely to be removed from the river by an intake facility sited on the shoreline. Entrapment of aquatic organisms in a restricted area (e.g., in the sedimentation basin between the RMPF intake screens and the pumps and in the MCR) can lead to congregation of the organisms, and if environmental conditions change, the organisms may be harmed. Under such conditions, entrapment can increase impingement of aquatic organisms.

Another important factor that influences the rate of impingement, entrainment, and entrapment of organisms at a facility is the intake design through-screen velocity. The higher the through-screen velocity, the greater the number of fish impinged, entrained, and entrapped. The Environmental Protection Agency defines the through-screen velocity as the water velocity immediately in front of the screen, and the maximum design, through-screen velocity is no more than 0.5 feet per second (fps) (69 FR 41576). STPNOC has determined that the RMPF has a maximum design approach velocity at the traveling screens of 0.5 fps based on a maximum pumping rate of approximately 538,000 gpm (STPNOC 2008b, 2009a). The review team independently calculated that the velocity directly in front of the screens was dependent on the withdrawal rate of the RMPF: for withdrawals of 60 and 1200 cfs, the average velocity in front of the screen would be 0.025 and 0.49 fps. The resulting low through-screen velocity reduces the probability of impingement because most fish can swim against such low flows to avoid or swim off of intake streams.

Other design features at the RMPF would also help to reduce impingement mortality (69 FR 41576). In front of the traveling water screens are coarse trash racks and stop-log guides that allow fish that approach the RMPF to have free passage, reducing entrapment and impingement. The traveling screens have a 3/8-in. mesh, and operate intermittently to coincide with the intermittent withdrawal of river water. Fish collected on the traveling screens can be returned to the river via the sluice and a fish bypass pipe. The discharge point of the fish bypass system is at the downstream end of the intake structure, approximately two ft below normal water elevation (STPNOC 2009a). During high-flow conditions, the accumulation of debris on the traveling screens is too high to open the fish bypass system, and screenwash discharge is directed to the sluice trench catch baskets rather than back to the river. Generally, the fish bypass system is closed when river flows are greater than 4000 cfs, and the system is occasionally closed when flows are greater than 2000 cfs (which has occurred from 2001-2006 seven percent of the time) (STPNOC 2008b, 2009a). Impingement mortality can be reduced based on the procedures for operating the RMPF. Operators at the RMPF are required to monitor for increased impingement rates on the traveling screens, and factors like river flow, salinity, and observations of impingement are used to determine whether pumping should continue (STPNOC 2008b, c, 2009a).

Entrainment and impingement studies were conducted as part of the licensing process for STP Units 1 and 2, and were discussed in the Final Environmental Statement (FES) for operation (NRC 1986). Studies conducted in 1975-1976, prior to construction of the RMPF, estimated entrainment of the larvae of the most common fish and crustacean species during an 8-month period at Station 2 on the Colorado River (Figure 3): 3.37×10^6 Atlantic croaker, 1.35×10^6 Gulf menhaden (*Brevoortia patronus*), 1.32×10^6 blue crab, 5.44×10^5 bay anchovy and 1.1×10^4 shrimp (undetermined species) larvae. There was a seasonal fluctuation of the species collected monthly during the study. Atlantic croaker larvae were entrained mainly from November through January. From January through April 1976, Gulf menhaden larvae were the predominant species. Anchovy eggs and larvae occurred sporadically throughout the sampling year. Highest numbers of juvenile and megalops of blue crab were collected in October, but there were increased numbers taken in September and April (NRC 1986).

The entrainment studies in 1983-1984 were conducted during the filling of the MCR (NRC 1986). Different species of fish and crustaceans were collected compared to the studies in 1975-1976. The primary fish species collected in the vicinity of the plant intake were bay anchovies, followed by darter goby (*Ctenogobius boleosoma*) and naked goby (*Gobiosoma bosc*). The most common crustacean collected were the zoea larval stage of the Harris mud crab, followed by the zoea and postlarval stages of the ghost shrimp (*Callianassa* spp.). Postlarval stages of the brown shrimp and white shrimp and the juvenile stages of the blue crab were collected only sporadically in river samples. The variety of species collected illustrates that the lower Colorado River is used as a nursery area by estuarine-marine organisms (NRC 1986). The seasonal variations in species and numbers of individuals found in these studies

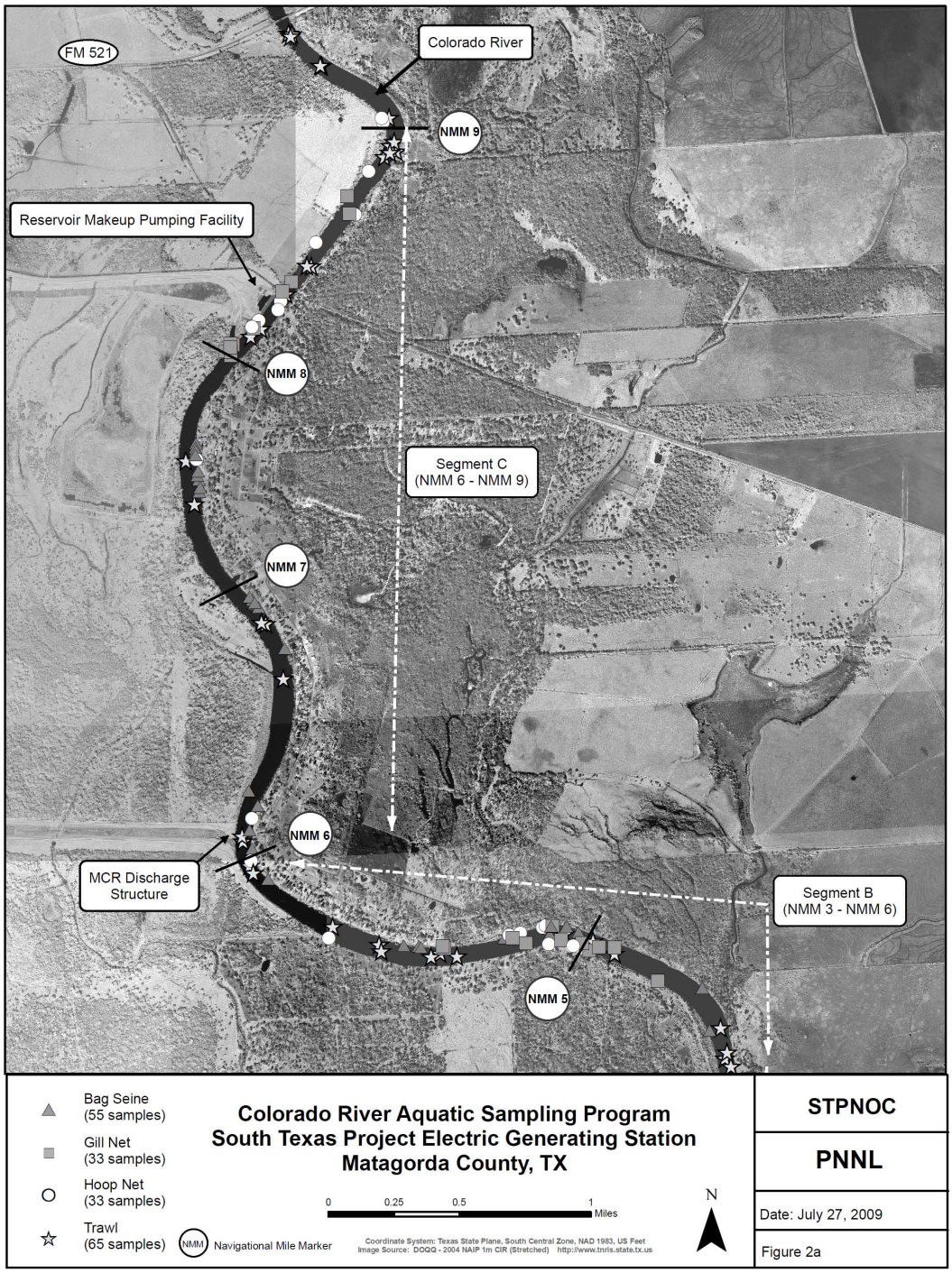

Figure 4. Aquatic Ecology Sampling Locations for 2007-2008 on the Colorado River from Navigation Mile Marker 5 to 9

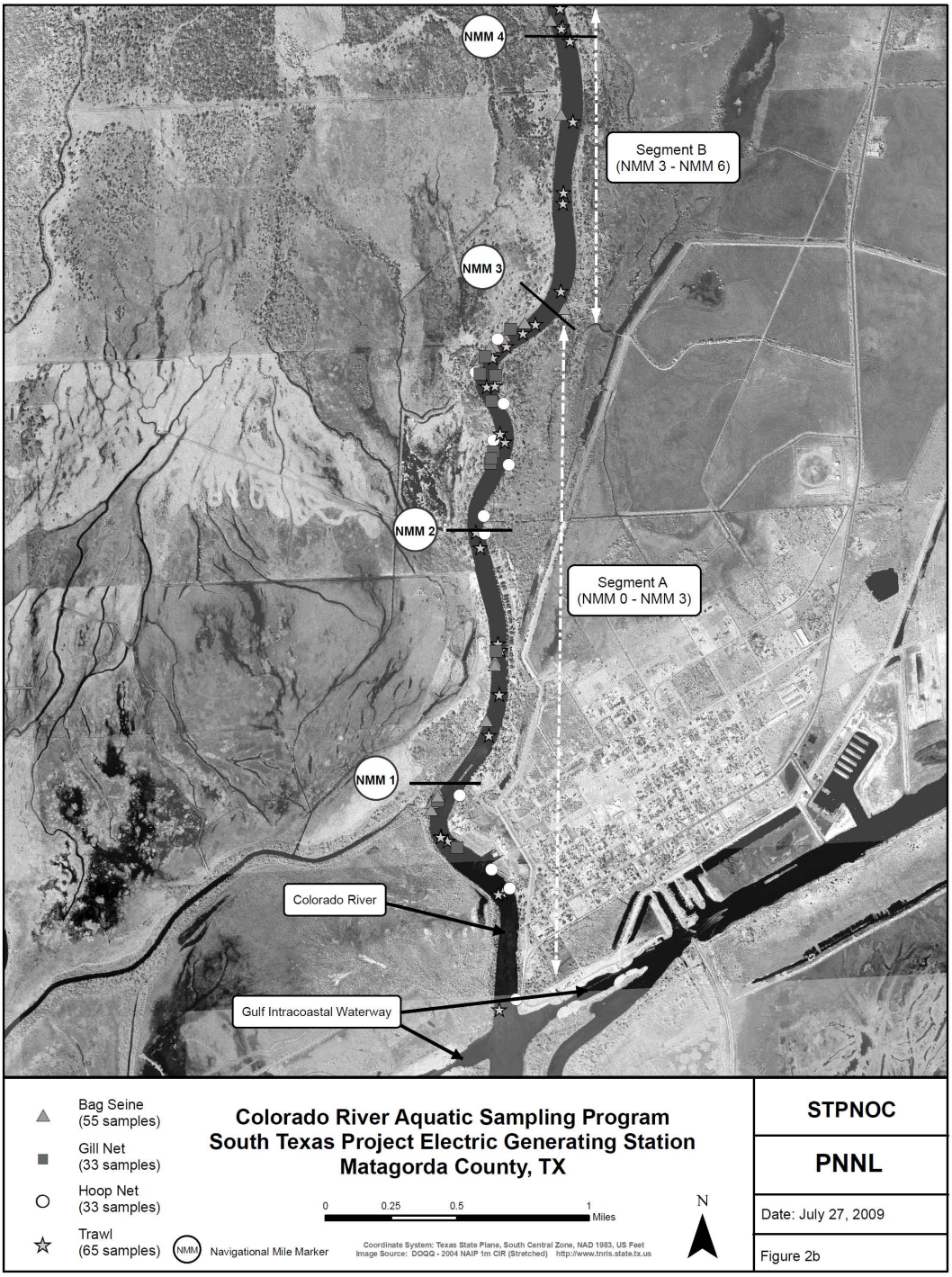

Figure 5. Aquatic Ecology Sampling Locations for 2007-2008 on the Colorado River from Gulf Intracoastal Waterway to Navigation Mile Marker 4

emphasize the complexity of the aquatic environment in the Colorado River and in the vicinity of the RMPF. These variations are a function of the species' reproductive periods, changes in the flow of the river, the mixture of freshwater coming down the river, and tidal influence of the Gulf.

The FES for operation (NRC 1986) concluded that entrainment losses for the species that were collected during the two studies would not constitute a significant impact to their respective populations for several reasons. They estimated that the actual entrainment losses would probably be near a median value of about 10 percent of the organisms passing the RMPF. This value represents the loss of organisms in the influence of the tidal flow in the river and does not represent the entire populations of those species in the Colorado River. The organisms that use the lower Colorado River as a nursery also use many other tidal river systems along the Texas and Gulf coast, and the area influenced by the RMPF is not unique. The most common species collected in the entrainment studies were bay anchovy, Gulf menhaden, Atlantic croaker and blue crab; the species are ubiquitous and abundant along the Texas and Gulf coast. The reproductive potential (fecundity) for the species collected during the entrainment studies is high (e.g., one female blue crab can produce over her lifetime at least as many larvae as were projected to be entrained by the studies). And finally, the most makeup water withdrawal would occur during high river flow conditions when tidal flows are low at the RMPF, which is when the concentrations of estuarine and marine organisms would be lowest (NRC 1986).

Impingement studies were conducted during 1983-1984, while river water was being pumped into the MCR. The study reported that the highest numbers of organisms impinged over a 30-minute collection period for two intake screens at the RMPF were 64 organisms in July and 13 organisms in September. The number of organisms that could be impinged for all 24 screens at the RMPF and for two pumping velocities (85 cfs and 260 cfs) was extrapolated to be from 156 to 768 individuals over a 30-minute period. Gulf menhaden was the most common species impinged, which relates to their small size (and thus, relatively low swim speed), dense schooling nature and high relative abundance at the site. The report estimated that Gulf menhaden could constitute about 65 percent of the total number of all individuals impinged at the RMPF. The other major species that could be impinged include: Atlantic croaker (16 percent), bay anchovy (10 percent) and mullet (eight percent, undetermined species). The remaining species that were collected during the impingement study were expected to make up less than one percent of all the individuals impinged.

The FES for operation concluded that impingement losses would have only a minor effect on the biota of the Colorado River. The reasons cited for the minor impacts due to impingement included those mentioned above for perspective on entrainment losses (e.g., the species are ubiquitous and the number of similar habitat areas along the Texas Gulf coast). Additional reasons cited included design elements of the RMPF that should reduce impingement losses. For example, the mounting of the intake screens on the RMPF flush with the shoreline and without protruding sidewalls into the flow of the river would reduce entrapment and

concentration of organisms ahead of the screens. Also, the location of the screens would decrease eddy currents downstream and allow free passage of the organisms into the main channel. Trash racks and the fish handling and bypass system were other features cited that would reduce impingement losses. Finally, the location of the intake structure was designed to use the upper stratum of the river water that is primarily freshwater flowing downstream in the river and not the lower portion of the river in the salt wedge where the estuarine organisms are most common (NRC 1986).

Since the impingement and entrainment studies for the RMPF were conducted, the Corps completed the Mouth of the Colorado River Project, diverting the Colorado River flow from the Gulf into Matagorda Bay (Wilbur and Bass 1998; Corps 2005). The diversity of aquatic species has increased since the diversion of the river. Of the most common species impinged during the 1983-1984 studies (NRC 1986), Gulf menhaden, striped mullet (*Mugil cephalus*) and Atlantic croaker continue to be the most common species of fish collected around the RMPF, and probably are the most common species impinged today for the same reasons speculated above. The lack of studies over time in the lower Colorado River makes it difficult to conclude if the aquatic communities are stable based on the changes in the river system and the relationship of the species distributed in the region to the flow of freshwater and tidal changes. However, the results and conclusions of the earlier impingement and entrainment studies mentioned above are still applicable because the design features of the RMPF that would minimize losses of organisms would not change with the addition of proposed Units 3 and 4 at the STP site.

The survey of fish and shellfish in the Colorado River in 2007-2008 indicates that the river has a large population of fresh- and saltwater species, with high species richness and a strong dynamic ecosystem. Impingement, entrainment, and entrapment from current operations of the RMPF have removed individuals from the river environment. A survey of only one year provides limited information about the robustness of the populations of aquatic organisms in the river. However, based on the limited information from the latest survey and what is known about the design of the RMPF, the operation of the RMPF does not appear to have changed the populations of the species currently found in the river.

Entrapment and entrainment of the smaller organisms and early life stages would be removed from the Colorado River ecosystem. Some of these organisms may survive and thrive in the MCR. There would be indirect effects for those EFH species that forage on the organisms that are lost through entrapment and entrainment. Impingement is likely to affect the EFH species that have life stages that could not swim away from the intake screens.

Thermal, Chemical, and Physical Impacts. The operation of the discharge system into the Colorado River would likely have impacts on the aquatic resources from heated effluents, chemical impacts, and physical impacts. There is a current TPDES permit for the discharge of the MCR water into the Colorado River that would be applicable for the proposed new units as

well as the existing units (TCEQ 2005). During the operation of the existing units, no discharge from the MCR to the Colorado River has been needed to maintain the dilute solutes present in MCR water quality at acceptable levels for the circulating water systems. The current TPDES permit allows an average daily MCR discharge of 144 million gallons per day (MGD) with a daily maximum of 200 MGD. The average daily MCR discharge temperature is limited to 95°F with a daily maximum of 97°F. Total residual chlorine in the MCR discharge is limited to a daily maximum of 0.05 mg/L. The pH of the MCR discharge is limited to between 6.0 and 9.0 standard units. The TPDES permit specifies that MCR discharge must not exceed 12.5 percent of the flow of the Colorado River at the discharge point. The permit also restricts the MCR discharges to periods when the flow of the Colorado River adjacent to the site is 800 cfs or greater. Whole effluent toxicity testing (i.e., biomonitoring) of the MCR water is also required prior to discharging water into the river (TCEQ 2005). The MCR discharge facility consists of seven submerged ports located on the west bank of the Colorado River approximately 2 mi downstream of the RMPF. Each port can discharge at a maximum rate of 44 cfs, for a total maximum MCR discharge of 308 cfs (STPNOC 2009a).

STPNOC stated that, as part of their operating policy, they would discharge water from the MCR into the Colorado River when they are concurrently pumping water at the RMPF (STPNOC 2009d). STPNOC would discharge water from the MCR when the specific conductivity of the water in the MCR exceeds 3000 microsiemens per centimeter (µS/cm). STPNOC would pump makeup water from the Colorado River under conditions specified by the Lower Colorado River Authority (LCRA) contract. The conditions that STPNOC would consider when planning to discharge from the MCR include: when the MCR water level is between 40 and 49 ft MSL; when the river water conductivity is less than 2100 µS/cm; and when the river flow at the discharge facility is greater than or equal to 2500 cfs. STPNOC revised these conditions and indicated that they might discharge MCR water when the river flow is as low as 800 cfs, as permitted by their TPDES permit (TCEQ 2005; STPNOC 2009e). If all these conditions are met, STPNOC would then only discharge when the MCR water had a conductivity greater than or equal to 3000 µS/cm. STPNOC would cease discharging when any of those conditions changed or when the MCR water had a conductivity less than or equal to 2100 µS/cm (STPNOC 2009d). STPNOC estimated that the need for discharging would likely be as frequent as once every 11 days and could be continuous for as nearly much as 75 days. No information was provided on the most likely time of year for discharging water (STPNOC 2009d).

STPNOC (STPNOC 2009a) as well as the NRC and Corps review team evaluated the maximum thermal plume from the discharge of the MCR water into the Colorado River using the Cornell Mixing Zone Expert System (CORMIX). The maximum thermal plume dimensions would occur when there was the greatest difference in temperatures between the MCR water and the water in the river (20.4°F) and a discharge rate from the MCR was the greatest (308 cfs). Under these discharge conditions, the minimum streamflow of the Colorado River would

be 2464 cfs based on the specifications of the TPDES permit where the discharge volume cannot be less than 12.5 percent of the streamflow in the Colorado River.

Based on the results of the CORMIX modeling of the maximum expected thermal plume dimensions, the thermal plume that is 5°F above ambient conditions would be attached to the bottom of the river from the discharge pipe to 120 ft downstream, and the plume would extend approximately 25 percent across the width of the river. Approximately 100 ft downstream of the last discharge port, the plume becomes buoyant rises to the surface of the river. The surface of the river is predicted to have an elevated temperature from approximately 1060 ft downstream of the last discharge port to about 4400 ft downstream from the discharge ports. Under these conditions, there would be a portion of the water column that would remain at ambient river temperatures as the plume rises to the surface and extends from bank to bank that would allow foraging fish (e.g., Gulf menhaden, black drum [*Pogonias cromis*], striped mullet) to move up and downstream. Also, the invertebrate species (e.g., grass [*Palaemonetes pugio*], white and brown shrimp) and other bottom dwellers would be able to pass along the bottom of the river on the far side of the discharge structure without passing through the elevated temperature plume.

The review team evaluated the possibility that the thermal plume generated by discharging the MCR water into the Colorado River could coincide with poor water quality for aquatic organisms in the river at the discharge structure. ENSR (2008a) measured water quality, e.g., salinity and dissolved oxygen, at various levels in the water column while collecting fish and shellfish. There are times of the year that ENSR reported the water at the bottom of the river was anoxic or low in dissolved oxygen (hypoxic, or with dissolved oxygen less than 2 mg/L) when the salinity was high. The conditions were most often observed at or below the mid point of the water column. The combination of the maximal thermal plume and poor river water conditions (e.g., high salinity and low dissolved oxygen) would force aquatic species to avoid the area completely. STPNOC compared the results reported by ENSR (2008a) and the flow in the river at the nearest gaging station at the time of the water sampling, and determined that the salinity at the bottom of the river during flows greater than 800 cfs had salinities ranging from 0 to 18.7 ppt (STPNOC 2008a). The review team further evaluated the river flows greater than 800 cfs and dissolved oxygen at the bottom of the river and found that there was only one occurrence during 2007-2008 when the flow was greater than 800 cfs and the dissolved oxygen was less than or equal to 2 mg/L. In addition, the salinity at this sampling time was 17.5 ppt (ENSR 2008b). Although there is limited information available on river flow and water quality, the operating policy that STPNOC has established for discharging MCR water into the river in compliance with requirements in their TPDES permit would likely result in infrequent opportunities for discharging when the combined effect of the thermal plume with river conditions would cause harm to the aquatic community. The adult and juvenile life stages of the EFH species would likely avoid the thermal plume, but there could be some impacts to the earlier life stages that would not be able to avoid the plume. Depending on the frequency and duration of the discharge, the early life stages could be lost from the effects of the thermal plume.

Chemical effects on the aquatic community from future discharges from the MCR into the Colorado River can be evaluated in terms of compliance with the STPNOC's TPDES permit. Inputs to the MCR include makeup water from the river, precipitation, dissolved solids from the operation of the condensers and UHSs for all units, and permitted chemical discharges from other operations (e.g., treated sanitary sewage, biocides, algaecides, corrosion inhibitors, pH buffering, scale inhibitors, and dispersants). The most significant chemical changes in the MCR would be the concentration of total dissolved solids from the operation of the condensers and UHSs. STPNOC does not currently evaluate the water quality of the MCR in relation to the TPDES permit conditions for chemical standards for the protection of aquatic life because it is not currently discharging to the Colorado River. The permit conditions also require evaluating acute and chronic effects on aquatic organisms from the MCR discharge prior to commencing discharge into the river.

Physical effects from the operation of the discharge system in the Colorado River could affect aquatic resources, particularly through scouring of aquatic habitat. The NRC evaluated discharge-induced scouring of the seven-port diffuser and concluded that scouring would be limited to a few feet downstream of each port and would have "no adverse impacts" on the aquatic biota in the vicinity (NRC 1975). Since the discharge pipes have not been operated except for a test in 1997 (STPNOC 2009a) and the Colorado River in the vicinity of the pipes has not been dredged recently, the initial discharge of water would disturb the sediments in the area. Because the small predicted size of the potential scour area and relative impoverishment of the benthic community that would be replaced with time, the physical effects from the operation of the would have a minor effect on the regional benthic populations or their predators.

Maintenance Dredging. STPNOC has stated that periodic dredging in the future would be conducted in front of the RMPF and barge slip. These activities are currently covered by existing permits with the Corps for the operation of existing Units 1 and 2. Dredging would remove benthic habitat and the organisms that are not highly mobile (e.g., mollusks). The area to be dredged in front of the RMPF and at the barge slip would likely be no more than 3 ac total, and would not cover the entire width of the river channel. Highly mobile organisms would likely avoid the area during dredging activities. After dredging activities, these areas would be recolonized by the aquatic community. Impacts from dredging on aquatic organisms would be minor.

5.3 Potential Effects of the Proposed Federal Actions on EFH Species

The species and life stages by the Gulf of Mexico Fishery Management Council for Ecoregion 5 rely on habitats essential for species propagation. Below, each species is discussed with regard to the impact of the proposed Federal action on EFHs. The potential impacts of the

construction and operation of the proposed STP Units 3 and 4 on Federally managed fish and shellfish species and their designated EFH, including their prey, near the site have been evaluated. Six categories of impacts related to STP construction and operation that could influence EFH are (1) siltation or turbidity during construction; (2) barge traffic creating turbidity or sedimentation; (3) impingement of juveniles or adults; (4) entrainment and entrapment of eggs, larvae, and zooplankton in the water column; (5) release of heated cooling water containing biocides or other chemicals; and (6) maintenance dredging at the RMPF and at the barge slip.

5.3.1 King Mackerel

Disruption of habitat for foraging in the Colorado River is expected to be minor, temporary, and largely mitigable. Construction activities around the RMPF and barge slip would involve a minimal area where juvenile king mackerel might be foraging. Barges moving heavy equipment and bulk commodities are likely to be moving slowly and prop wash and wave action from the vessel's movement would not affect juvenile mackerel in the vicinity. Therefore, construction would likely have a minimal adverse effect on juvenile king mackerel EFH. Operation of the RMPF is not expected to have an impact on the juveniles directly or indirectly since they and their prey should be able to swim away from the low approach velocities at the RMPF intake screens. Juvenile king mackerel and their pray are expected to avoid areas affected by thermal, chemical and physical changes in the Colorado River from the discharge of the MCR water and maintenance dredging at the RMPF. Their prey should be able to avoid the adverse effects from the discharge system as well. Operations of the RMPF and discharge system are not continuous, and their adverse effects would be relatively short in duration. Therefore, the construction and operation of the proposed Units 3 and 4 at the STP site are likely to have a minimal adverse effect on EFH for the king mackerel juveniles.

5.3.2 Spanish Mackerel

Construction activities would occur in a small proportion of available Spanish mackerel foraging habitat within the Colorado River at the site of intake and barge slip modifications. Barges moving heavy equipment and bulk commodities are likely to be moving slowly and prop wash and wave action from the vessel's movement would not affect any of the life stages of Spanish mackerel in the vicinity. Disruption of habitat for foraging in these areas of the Colorado River from construction and operation are expected to be minor and temporary. Juvenile and adult Spanish mackerel and their pray are expected to avoid areas affected by thermal, chemical and physical changes in the Colorado River from the discharge of the MCR water. Spanish mackerel eggs and larvae could be affected by the thermal or chemical characteristics of the discharge plume depending on the river conditions, frequency, and duration of the discharge. Eggs and larvae passing through the intake screens at RMPF would be lost. However, operations of the RMPF and discharge system are not continuous, and their effects would be

relatively short in duration. Maintenance dredging at the RMPF could be easily avoided by juvenile and adult Spanish mackerel, but some eggs and larvae would be lost. Because no Spanish mackerel were collected in recent surveys near the STP site, it is unlikely that the small loss (from operation of the RMPF, discharge structure, and dredges) of eggs and larvae would be detectable. Therefore, the construction and operation of the proposed Units 3 and 4 at the STP site are likely to have a minimal adverse effect on EFH for Spanish mackerel eggs, larvae, juveniles, and adults.

5.3.3 Gray Snapper

Disruption of gray snapper foraging habitat in the Colorado River is expected to be minor, temporary, and largely mitigable from construction activities. Juvenile and adult gray snapper may move into estuarine habitats, like the downstream portion of the Colorado River. Eggs and larvae are unlikely to be in the areas of the discharge structure, barge slip and RMPF. Construction activities at the barge slip and RMPF would occur in a small proportion of available potential foraging habitat within the Colorado River. Barges moving heavy equipment and bulk commodities are likely to be moving slowly and prop wash and wave action from the vessel's movement would not affect any of the life stages of gray snapper in the vicinity. Any larvae that move up the Colorado River may become entrained in the cooling water intake system; however, juveniles and adults would likely swim away from the low approach velocity at the intake screens. Juvenile and adult gray snapper and their prey are expected to avoid areas affected by thermal, chemical and physical changes in the Colorado River from the discharge of the MCR water. Eggs and larvae passing through the intake screens at RMPF would be lost. However, operations of the RMPF and discharge system are not continuous, and their effects would be relatively short in duration. Maintenance dredging at the RMPF could be easily avoided by the juvenile and adult gray snapper. Therefore, the construction and operation of the proposed Units 3 and 4 at the STP site are likely to have a minimal adverse effect on EFH for eggs, larvae, juvenile and adult life stages of the gray snapper.

5.3.4 Red Drum

Construction activities would occur in a small proportion of available potential foraging habitat within the Colorado River at the site of RMPF and barge slip modifications. There is no SAV in the Colorado River in the vicinity of the barge slip and RMPF for the younger life stages of red drum. Disruption of habitat for foraging in these areas of the Colorado River is expected to be minor and temporary. Therefore, construction activities upstream in the Colorado River are likely to have a minimal adverse effect on the red drum. Barges moving heavy equipment and bulk commodities are likely to be moving slow and prop wash and wave action from the vessel's movement would not affect any of the life stages of red drum in the vicinity. Operation of the RMPF and discharge structure are not likely to affect the juvenile and adult red drum because they are capable of swimming out of the current created by the RMPF and can avoid the

thermal, chemical and physical changes of the river water from the discharge of the MCR. However, eggs and larvae could become entrained at the RMPF and could be affected by the thermal, chemical and physical characteristics of the discharge plume, if they are transported up the Colorado River to the vicinity of the STP site. Maintenance dredging at the RMPF could be easily avoided by the juvenile and adult red drum, but some eggs and larvae would be lost. It is unlikely that the small loss (from operation of the RMPF, discharge structure, and dredges) of eggs and larvae would be detectable given the high fecundity of the red drum. Therefore, construction and operation of proposed STP Units 3 and 4 would likely have minimal adverse impact on red drum juvenile and adult EFH. STP operations would likely have a minimal adverse effect on EFH for red drum eggs, larvae, juveniles, and adults.

5.3.5 Shrimp

Juvenile and adult brown, pink, and white shrimp may forage within the Colorado River at or near the RMPF and barge slip. Disruption of habitat for foraging in these areas of the Colorado River is expected to be minor, temporary, and largely mitigable. Brown, pink, and white shrimp have been collected in the MCR and all along the Colorado River during the 1983-1984 and 2007-2008 sampling studies (ENSR 2008a, b). Construction activities at the RMPF and barge slip could remove habitat through turbidity and sedimentation resulting in siltation on the river bottom. The sheet pile wall that could be erected during barge slip modification would temporarily remove habitat for the shrimp. Barges moving heavy equipment and bulk commodities are likely to be moving slow and prop wash and wave action from the vessel's movement would not affect any of the life stages of shrimp as they are benthic. Larvae and juvenile brown, pink, and white shrimp would be lost if entrained at the RMPF. Operation of the RMPF is not likely to entrain appreciable numbers of shrimp larvae, as brown and white shrimp were more abundant at the confluence of the river and the GIWW than further up the river (ENSR 2008a), and only four pink shrimp were reported in impingement studies (NRC 1986). Maintenance dredging would remove habitat at the point where substrate is dredged and could also temporarily remove habitat from turbidity and sedimentation. Therefore, construction and operation of the proposed Units 3 and 4 at the STP site are likely to have a greater than minimal, but less than substantial, adverse effect on EFH for the brown, pink, and white shrimp larvae and juveniles EFH.

5.3.6 Gulf Stone Crab

It is possible that construction activities in the Colorado River associated with intake structure placement and barge slip modifications may disrupt foraging in these areas of the Colorado River, but the disruption is expected to be minor, temporary, and largely mitigable. Gulf stone crab eggs and larvae may drift into the upper portion of the Colorado River, and become entrained in the cooling water intake system at the RMPF. However, it is unlikely that appreciable numbers of eggs or larvae would be entrained as no Gulf stone crabs were

collected in the Colorado River during the 1983-1984 or 2007-2008 studies (NRC 1986; ENSR 2008a, b). Operation of the discharge structure would likely have minimal effect on the mobile adult and juvenile life stages. While eggs and larvae could be harmed by the thermal and chemical plume, it is unlikely that these life stages are present in the vicinity of the discharge structure. Therefore, construction and operation of the proposed STP Units 3 and 4 would likely have a minimal adverse effect on stone crab EFH for eggs, larvae, juveniles, and adults.

6.0 Mitigation Measures

Potential mitigation measures regarding water withdrawal at the RMPF, chemical and thermal reductions within the discharge to the Colorado River, frequency and conditions of discharge, and dredging techniques could reduce adverse effects on EFH and Federally-managed fish and shellfish species. Because the proposed cooling system would be closed-cycle and use the best technology available, the review team could not identify any potential mitigation measures to further reduce entrainment and entrapment. However, a potential mitigation measure that might increase impingement survival would be to alter the fish-return operational procedure such that the fish return always functions when the RMPF is withdrawing water. The review team also identified that the discharge operational procedure could be modified to reduce potential impacts on aquatic biota; such modifications could include mixing ambient river water with the discharge water before discharging it to the river to reduce the discharge temperature. Although the NRC lacks the statutory authority to require any of the above potential mitigation measures, the staff recognizes that such potential mitigation could further reduce adverse impacts on designated EFH and on Federally-managed fish and shellfish species in the Colorado River, the GIWW, and Matagorda Bay.

The Corps permit, if issued, could include special conditions such as time-of-year restrictions or specific methods of work to ameliorate potential impacts to EFH for the authorized construction and maintenance dredging activities. EFH Conservation Recommendations necessary to protect EFH may also be included as conditions in the Corps permit, if issued. Mitigation may only be employed after all appropriate and practical steps to avoid and minimize adverse impacts to aquatic resources have been taken. All remaining unavoidable impacts must be compensated to the extent appropriate and practicable.

7.0 Conclusions

The potential impacts of the construction and operation of the proposed Units 3 and 4 at the STP site on Federally-managed fish and shellfish species and their EFH near the site have been evaluated. Based on the project design, the minimal short-term impacts associated with the construction activities, barging, operation of the RMPF and discharge structure, and maintenance dredging at the RMPF, and the mitigation measures planned for proposed Units 3

and 4, the review team concludes that construction and operation of STP would likely have more than minimal, but less than substantial, adverse effects on EFH within the Colorado River by loss of forage and/or shelter habitat for three of the eight species considered, brown, pink, and white shrimp, specifically larvae and juveniles (Table 5). Construction and operation activities would likely have minimal adverse effect on the remaining species considered. The NRC lacks the statutory authority to require any mitigation measures that would minimize adverse effects on EFH. The Corps does not recommend any mitigative measures to minimize adverse effects on EFH at this time. This determination may be modified if additional information indicates otherwise and would change the preliminary determination.

Table 1. Effects on EFH from Proposed Actions

Common Name	Life Stage	Expected Impact
king mackerel	juveniles	Minimal Adverse Effect
Spanish mackerel	eggs	Minimal Adverse Effect Release of MCR water could temporarily change water column and have short-term effects. Entrained eggs would be removed, and therefore lost, from the river.
	larvae	Minimal Adverse Effect Release of MCR water could temporarily change water column and have short-term effects. Entrained larvae would be removed, and therefore lost, from the river.
	juveniles	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.
	adults	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.
gray (mangrove) snapper	eggs	Minimal Adverse Effect Entrained eggs would be removed, and therefore lost, from the river.
	larvae	Minimal Adverse Effect Release of MCR water could temporarily change water column and have short-term effects. Entrained larvae would be removed, and therefore lost, from the river.
	juveniles	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.
	adults	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.

Table 1. Effects on EFH from Proposed Actions

Common Name	Life Stage	Expected Impact
red drum	eggs	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily. Release of MCR water could temporarily change water column and have short-term affects. Entrained eggs would be removed, and therefore lost, from the river.
	larvae	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily. Release of MCR water could temporarily change water column and have short-term affects. Entrained eggs would be removed, and therefore lost, from the river.
	juveniles	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.
	adults	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.
brown shrimp	larvae	Greater than Minimal but Less than Substantial, Adverse Effect Construction activities in Colorado River could remove habitat over the short-term. Maintenance dredging would remove habitat and could temporarily remove habitat due to turbidity and sedimentation.
	juveniles	Greater than Minimal but Less than Substantial, Adverse Effect Construction activities in Colorado River could remove habitat over the short-term. Maintenance dredging would remove habitat and could temporarily remove habitat due to turbidity and sedimentation.
pink shrimp	larvae	Greater Than Minimal but Less Than Substantial, Adverse Effect Construction activities in Colorado River could remove habitat over the short-term. Maintenance dredging would remove habitat and could temporarily remove habitat due to turbidity and sedimentation.
	juveniles	Greater than Minimal but Less than Substantial, Adverse Effect Construction activities in Colorado River could remove habitat over the short-term. Maintenance dredging would remove habitat and could temporarily remove

Table 1. Effects on EFH from Proposed Actions

Common Name	Life Stage	Expected Impact
		habitat due to turbidity and sedimentation.
white shrimp	larvae	Greater Than Minimal but Less Than Substantial, Adverse Effect Construction activities in Colorado River could remove habitat over the short-term. Maintenance dredging would remove habitat and could temporarily remove habitat due to turbidity and sedimentation.
	juveniles	Greater Than Minimal but Less Than Substantial,, Adverse Effect Construction activities in Colorado River could remove habitat over the short-term. Maintenance dredging would remove habitat and could temporarily remove habitat due to turbidity and sedimentation.
Gulf stone crab	eggs	Minimal Adverse Effect Release of MCR water could temporarily change water column and have short-term affectseffects. Entrained eggs would be removed, and therefore lost, from the river.
	larvae	Minimal Adverse Effect Release of MCR water could temporarily change water column and have short-term affectseffects. Entrained larvae would be removed, and therefore lost, from the river.
	juveniles	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.
	adults	Minimal Adverse Effect Construction activities in Colorado River could disrupt foraging habitat temporarily.

8.0 References

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Appendix G

Supporting Documentation for Socioeconomic and Radiological Dose Assessment

Appendix G

Supporting Documentation for Socioeconomics and Radiological Dose Assessment

This appendix contains supporting documentation for review team determinations described in this environmental impact statement (EIS) for the socioeconomic and radiological dose assessments.

G.1 Socioeconomic Data Tables

This section contains two data tables (Table G-1 and Table G-2) related to socioeconomics as discussed in Section 2.5.

Table G-1. Current Populations by Distance and Direction and Projections to 2080 (STPNOC 2010a)

		Radii/Distances (miles)											
Sectors		**0-1**	**1-2**	**2-3**	**3-4**	**4-5**	**5-10**	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**	**0-50**
N	2000	0	0	15	0	0	32	47	1237	536	14097	5445	21362
	2010	0	0	16	0	0	34	50	1311	563	14899	6121	22944
	2020	0	0	17	0	0	36	53	1397	596	15866	6946	24858
	2030	0	0	18	0	0	38	56	1484	629	16867	7914	26950
	2040	0	0	19	0	0	41	60	1583	667	18048	9103	29461
	2050	0	0	20	0	0	44	64	1681	706	19276	10482	32209
	2060	0	0	22	0	0	46	68	1792	744	20573	12145	35322
	2070	0	0	23	0	0	49	72	1903	783	21939	14094	38791
	2080	0	0	25	0	0	52	77	2026	828	23543	16500	42974
NNE	2000	0	0	0	0	205	542	747	21441	1120	2540	10968	36816
	2010	0	0	0	0	217	575	792	22727	1207	2917	13351	40994
	2020	0	0	0	0	232	613	845	24228	1310	3374	16273	46030
	2030	0	0	0	0	246	650	896	25729	1420	3912	19841	51798
	2040	0	0	0	0	262	694	956	27444	1545	4548	24265	58758
	2050	0	0	0	0	279	737	1016	29160	1677	5277	29545	66675
	2060	0	0	0	0	297	786	1083	31089	1829	6155	36110	76266
	2070	0	0	0	0	316	835	1151	33019	1993	7181	43962	87306
	2080	0	0	0	0	336	889	1225	35163	2177	8397	53732	100694
NE	2000	0	0	0	0	31	99	130	931	6687	11447	24758	43953
	2010	0	0	0	0	33	105	138	987	7527	13164	28556	50372
	2020	0	0	0	0	35	112	147	1052	8531	15225	33122	58077
	2030	0	0	0	0	37	119	156	1117	9682	17628	38466	67049
	2040	0	0	0	0	40	127	167	1192	10997	20376	44614	77346
	2050	0	0	0	0	42	135	177	1266	12458	23466	51565	88932

Table G-1. (contd)

Sectors		Radii/Distances (miles)											
		0-1	1-2	2-3	3-4	4-5	5-10	0-10	10-20	20-30	30-40	40-50	0-50
	2060	0	0	0	0	45	144	189	1350	14181	27129	59839	102688
	2070	0	0	0	0	48	152	200	1434	16148	31365	69435	118582
	2080	0	0	0	0	51	162	213	1527	18377	36173	80426	136716
ENE	2000	0	0	0	0	0	472	472	271	2480	16635	62994	82852
	2010	0	0	0	0	0	500	500	287	2732	19130	72443	95092
	2020	0	0	0	0	0	533	533	306	3032	22125	83782	109778
	2030	0	0	0	0	0	566	566	325	3366	25618	97011	126886
	2040	0	0	0	0	0	604	604	347	3748	29610	112129	146438
	2050	0	0	0	0	0	642	642	369	4164	34102	129138	168415
	2060	0	0	0	0	0	684	684	393	4651	39425	149296	194449
	2070	0	0	0	0	0	727	727	417	5195	45580	172604	224523
	2080	0	0	0	0	0	774	774	444	5810	52567	199061	258656
E	2000	0	0	0	15	3	245	263	83	1243	87	46	1722
	2010	0	0	0	16	3	260	279	88	1322	99	53	1841
	2020	0	0	0	17	3	277	297	94	1415	114	61	1981
	2030	0	0	0	18	4	294	316	100	1510	132	71	2129
	2040	0	0	0	19	4	314	337	106	1618	151	82	2294
	2050	0	0	0	20	4	333	357	113	1728	174	94	2466
	2060	0	0	0	22	4	355	381	120	1852	200	109	2662
	2070	0	0	0	23	5	377	405	128	1979	230	126	2868
	2080	0	0	0	25	5	402	432	136	2120	264	145	3097
ESE	2000	0	0	0	99	164	146	409	2	0	0	0	411
	2010	0	0	0	105	174	155	434	2	0	0	0	436
	2020	0	0	0	112	185	165	462	2	0	0	0	464

Table G-1. (contd)

Sectors		Radii/Distances (miles)											
		0-1	1-2	2-3	3-4	4-5	5-10	0-10	10-20	20-30	30-40	40-50	0-50
	2030	0	0	0	119	197	175	491	2	0	0	0	493
	2040	0	0	0	127	210	187	524	3	0	0	0	527
	2050	0	0	0	135	223	199	557	3	0	0	0	560
	2060	0	0	0	144	238	212	594	3	0	0	0	597
	2070	0	0	0	153	253	225	631	3	0	0	0	634
	2080	0	0	0	162	269	239	670	3	0	0	0	673
SE	2000	0	0	0	3	248	2055	2306	13	0	0	0	2319
	2010	0	0	0	3	263	2178	2444	14	0	0	0	2458
	2020	0	0	0	3	280	2322	2605	15	0	0	0	2620
	2030	0	0	0	4	298	2466	2768	16	0	0	0	2784
	2040	0	0	0	4	317	2630	2951	17	0	0	0	2968
	2050	0	0	0	4	338	2795	3137	18	0	0	0	3155
	2060	0	0	0	4	360	2680	3044	19	0	0	0	3063
	2070	0	0	0	5	382	3165	3552	20	0	0	0	3572
	2080	0	0	0	5	407	3370	3782	21	0	0	0	3803
SSE	2000	0	0	0	0	0	204	204	117	0	0	0	321
	2010	0	0	0	0	0	216	216	124	0	0	0	340
	2020	0	0	0	0	0	231	231	132	0	0	0	363
	2030	0	0	0	0	0	245	245	140	0	0	0	385
	2040	0	0	0	0	0	261	261	150	0	0	0	411
	2050	0	0	0	0	0	277	277	159	0	0	0	436
	2060	0	0	0	0	0	296	296	170	0	0	0	466
	2070	0	0	0	0	0	314	314	180	0	0	0	494
	2080	0	0	0	0	0	335	335	192	0	0	0	527

Table G-1. (contd)

Sectors		Radii/Distances (miles)											
		0-1	1-2	2-3	3-4	4-5	5-10	0-10	10-20	20-30	30-40	40-50	0-50
S	2000	0	0	0	0	0	40	40	0	0	0	0	40
	2010	0	0	0	0	0	42	42	0	0	0	0	42
	2020	0	0	0	0	0	45	45	0	0	0	0	45
	2030	0	0	0	0	0	48	48	0	0	0	0	48
	2040	0	0	0	0	0	51	51	0	0	0	0	51
	2050	0	0	0	0	0	54	54	0	0	0	0	54
	2060	0	0	0	0	0	58	58	0	0	0	0	58
	2070	0	0	0	0	0	62	62	0	0	0	0	62
	2080	0	0	0	0	0	66	66	0	0	0	0	66
SSW	2000	0	0	0	0	0	0	0	1	0	0	0	1
	2010	0	0	0	0	0	0	0	1	0	0	0	1
	2020	0	0	0	0	0	0	0	1	0	0	0	1
	2030	0	0	0	0	0	0	0	1	0	0	0	1
	2040	0	0	0	0	0	0	0	1	0	0	0	1
	2050	0	0	0	0	0	0	0	1	0	0	0	1
	2060	0	0	0	0	0	0	0	1	0	0	0	1
	2070	0	0	0	0	0	0	0	2	0	0	0	2
	2080	0	0	0	0	0	0	0	2	0	0	0	2
SW	2000	0	0	1	0	0	118	119	345	0	1111	628	2203
	2010	0	0	1	0	0	125	126	366	0	1189	672	2353
	2020	0	0	1	0	0	133	134	390	0	1255	710	2489
	2030	0	0	1	0	0	142	143	414	0	1344	760	2661
	2040	0	0	1	0	0	151	152	442	0	1433	810	2837
	2050	0	0	1	0	0	161	162	469	0	1522	860	3013

Table G-1. (contd)

Sectors		Radii/Distances (miles)											
		0-1	1-2	2-3	3-4	4-5	5-10	0-10	10-20	20-30	30-40	40-50	0-50
	2060	0	0	1	0	0	171	172	500	0	1622	917	3211
	2070	0	0	2	0	0	182	184	531	0	1722	973	3410
	2080	0	0	2	0	0	194	196	566	0	1844	1042	3648
WSW	2000	0	0	0	4	6	240	250	5671	1074	14758	3240	24993
	2010	0	0	0	4	6	254	264	5999	1142	15784	3474	26663
	2020	0	0	0	5	7	271	283	6378	1206	16676	3683	28226
	2030	0	0	0	5	7	288	300	6762	1285	17852	3953	30152
	2040	0	0	0	5	8	307	320	7186	1364	19029	4226	32125
	2050	0	0	0	5	8	326	339	7624	1446	20212	4503	34124
	2060	0	0	0	6	9	348	363	8105	1535	21538	4813	36354
	2070	0	0	0	6	9	370	385	8585	1624	22866	5126	38586
	2080	0	0	0	7	10	394	411	9124	1732	24484	5504	41255
W	2000	0	0	0	5	0	130	135	261	829	1302	3614	6141
	2010	0	0	0	5	0	138	143	275	870	1373	3925	6586
	2020	0	0	0	6	0	147	153	292	920	1457	4272	7094
	2030	0	0	0	6	0	156	162	310	970	1542	4652	7636
	2040	0	0	0	6	0	166	172	328	1020	1629	5064	8213
	2050	0	0	0	7	0	177	184	348	1078	1729	5512	8851
	2060	0	0	0	7	0	189	196	369	1136	1830	5993	9524
	2070	0	0	0	8	0	200	208	390	1194	1933	6507	10232
	2080	0	0	0	8	0	213	221	413	1260	2051	7089	11034
WNW	2000	0	0	0	0	4	878	882	1181	492	9669	1259	13483
	2010	0	0	0	0	4	931	935	1248	517	10152	1325	14177
	2020	0	0	0	0	5	992	997	1327	546	10733	1403	15006

Table G-1. (contd)

Sectors		Radii/Distances (miles)											
		0-1	1-2	2-3	3-4	4-5	5-10	0-10	10-20	20-30	30-40	40-50	0-50
	2030	0	0	0	0	5	1054	1059	1406	576	11313	1482	15836
	2040	0	0	0	0	5	1124	1129	1492	605	11893	1562	16681
	2050	0	0	0	0	5	1194	1199	1583	640	12570	1654	17646
	2060	0	0	0	0	6	1273	1279	1681	674	13247	1747	18628
	2070	0	0	0	0	6	1352	1358	1780	708	13923	1841	19610
	2080	0	0	0	0	7	1440	1447	1890	748	14697	1948	20730
NW	2000	0	0	0	19	30	227	276	477	787	1455	222	3217
	2010	0	0	0	20	32	241	293	505	826	1528	230	3382
	2020	0	0	0	21	34	257	312	537	874	1615	240	3578
	2030	0	0	0	23	36	272	331	569	921	1702	250	3773
	2040	0	0	0	24	38	291	353	606	975	1801	261	3996
	2050	0	0	0	26	41	309	376	644	1030	1903	272	4225
	2060	0	0	0	28	44	329	401	685	1085	2005	283	4459
	2070	0	0	0	29	46	350	425	725	1140	2107	295	4692
	2080	0	0	0	31	49	372	452	771	1203	2223	308	4957
NNW	2000	0	0	0	0	0	34	34	484	4469	11928	2211	19126
	2010	0	0	0	0	0	36	36	512	4692	12524	2305	20069
	2020	0	0	0	0	0	38	38	545	4961	13240	2415	21199
	2030	0	0	0	0	0	41	41	577	5229	13956	2526	22329
	2040	0	0	0	0	0	44	44	615	5542	14791	2653	23645
	2050	0	0	0	0	0	46	46	653	5854	15626	2780	24959
	2060	0	0	0	0	0	49	49	694	6167	16461	2907	26278
	2070	0	0	0	0	0	52	52	735	6480	17296	3040	27603
	2080	0	0	0	0	0	56	56	781	6838	18250	3183	29108

Table G-1. (contd)

Sectors		Radii/Distances (miles)											
		0-1	1-2	2-3	3-4	4-5	5-10	0-10	10-20	20-30	30-40	40-50	0-50
TOTAL	2000	0	0	16	145	691	5462	6314	32515	19717	85029	115385	258960
	2010	0	0	17	153	732	5790	6692	34446	21398	92759	132455	287750
	2020	0	0	18	164	781	6172	7135	36696	23391	101680	152907	321809
	2030	0	0	19	175	830	6554	7578	38952	25588	111866	176926	360910
	2040	0	0	20	185	884	6992	8081	41512	28081	123309	204769	405752
	2050	0	0	21	197	940	7429	8587	44091	30781	135857	236405	455721
	2060	0	0	23	211	1003	7620	8857	46971	33854	150185	274159	514026
	2070	0	0	25	224	1065	8412	9726	49852	37244	166142	318003	580967
	2080	0	0	27	238	1134	8958	10357	53059	41093	184493	368938	657940

Source: STPNOC 2010a

Table G-2. Total STP Workforce During Construction Period for Proposed Units 3 and 4, and 18 Months Beyond

Event[a]	Month	Unit 1 and 2 Staffing[b]	Unit 3 and 4 Staffing[c]	Construction Workforce[d]	Outage Workforce[e]	Total Workforce
Site Preparation Starts	-24	1350	99	100		1549
	-23	1353	107	200		1660
	-22	1356	116	300		1772
	-21	1359	124	400		1883
	-20	1362	133	500	45	2040
	-19	1364	142	600	310	2416
	-18	1367	150	700	1080	3297
1RE15	-17	1367	159	800	1350	3676
	-16	1368	167	900	60	2495
	-15	1368	176	1000		2544
	-14	1368	184	1100	45	2698
	-13	1369	193	1200	310	3072
	-12	1369	202	1300	1080	3951
2RE14	-11	1369	212	1400	1350	4331
	-10	1370	221	1500	60	3151
	-9	1370	230	1600		3200
[2]	-8	1370	240	1700		3310
	-7	1371	249	1800		3420
	-6	1371	258	1900		3529
	-5	1368	268	2000		3636
	-4	1365	277	2100		3742
	-3	1362	286	2200		3848
	-2	1358	296	2300	35	3989
	-1	1355	305	2400	170	4230
COL Issued/ Start Constr	1	1352	314	2500	850	5016
1RE16	2	1349	322	2650	1100	5421
	3	1346	331	2800	60	4536
	4	1343	339	2950		4632
	5	1339	348	3100	35	4822
	6	1336	356	3250	170	5112
	7	1333	365	3400	850	5948

Table G-2. (contd)

Event[a]	Month	Unit 1 and 2 Staffing[b]	Unit 3 and 4 Staffing[c]	Construction Workforce[d]	Outage Workforce[e]	Total Workforce
2RE15	8	1328	373	3550	1100	6351
	9	1324	382	3700	60	5465
	10	1319	390	3830		5539
	11	1315	399	3960		5673
	12	1310	407	4090		5807
	13	1306	431	4220		5957
	14	1301	455	4350		6106
	15	1296	479	4480		6256
	16	1292	503	4610		6405
	17	1287	527	4740	35	6590
	18	1283	552	4870	170	6874
	19	1278	576	5000	850	7704
1RE17	20	1272	600	5130	1100	8102
	21	1267	624	5260	60	7210
	22	1261	648	5390		7299
	23	1255	672	5520	35	7482
	24	1250	696	5650	170	7766
	25	1244	715	5800	850	8609
2RE16	26	1238	733	5950	1100	9021
	27	1233	752	5950	60	7994
	28	1227	770	5950		7947
	29	1221	789	5950		7960
	30	1216	807	5950		7973
	31	1210	826	5950		7986
	32	1204	844	5950		7998
	33	1199	863	5950		8011
	34	1193	881	5950		8024
	35	1187	900	5950	35	8072
	36	1181	918	5850	170	8119
	37	1176	921	5750	850	8697
1RE18	38	1170	925	5650	1100	8845
	39	1164	928	5450	60	7602
	40	1158	932	5250		7340
	41	1153	935	5050	35	7173
	42	1147	939	4850	170	7105
	43	1141	942	4650	850	7583

Table G-2. (contd)

Event[a]	Month	Unit 1 and 2 Staffing[b]	Unit 3 and 4 Staffing[c]	Construction Workforce[d]	Outage Workforce[e]	Total Workforce
2RE17	44	1135	945	4450	1100	7630
U3 Fuel Load	45	1128	949	4250	60	6387
	46	1122	952	4050		6124
	47	1115	956	3900		5971
	48	1109	959	3800		5868
	49	1102	959	3700		5761
	50	1096	959	3600		5655
	51	1089	959	3500		5548
	52	1083	959	3400		5442
	53	1076	959	3300	35	5370
CO U3	54	1070	959	3200	170	5399
	55	1063	959	3000	850	5872
1RE19	56	1063	959	2800	1100	5922
	57	1063	959	2600	60	4682
U4 Fuel Load	58	1063	959	2400		4422
	59	1063	959	2200	35	4257
	60	1063	959	2000	170	4192
	61	1062	959	1800	850	4671
2RE18	62	1062	959	1600	1100	4721
	63	1062	959	1400	60	3481
	64	1062	959	1200		3221
	65	1062	959	1100		3121
U4 CO	66	1062	959	525		2546
	67	1062	959	0		2021
	68	1062	959	0		2021
	69	1062	959	0	35	2056
	70	1062	959	0	170	2191
	71	1062	959	0	885	2906
3REO1	72	1062	959	0	1270	3291
	73	1062	959	0	910	2931
1RE20	74	1062	959	0	1100	3121
	75	1062	959	0	60	2081
	76	1062	959	0		2021
	77	1062	959	0	35	2056
	78	1062	959	0	170	2191
	79	1062	959	0	850	2871

Table G-2. (contd)

Event[(a)]	Month	Unit 1 and 2 Staffing[(b)]	Unit 3 and 4 Staffing[(c)]	Construction Workforce[(d)]	Outage Workforce[(e)]	Total Workforce
2RE19	80	1062	959	0	1135	3156
	81	1062	959	0	230	2251
	82	1062	959	0	850	2871
4REO1	83	1062	959	0	1100	3121
	84	1062	959	0	60	2081
	85	1062	959	0		2021

Source: STPNOC 2010a

(a) Events at indicated months are from Table 3.10S-2, Environmental Report Rev 3, and South Texas Project Long Range Outage Plan, Rev 4b, 10/15/07. Outages numbering convention: for example, for 1RE15, 1 = Unit 1 (or 2, 3 or 4); RE = refueling; 15 = this is the 15th refueling for Unit 1.

(b) Units 1/2 estimates are from STP Staffing Plan, June 2007

(c) Units 3/4 estimates are from Owner's Estimate, 10/25/07

(d) Construction Workforce estimates are from Table 3.10S-2, ER, Rev 3

(e) Outage Supplemental Workforce estimates are based on South Texas Project 1RE14 Outage Report, 2008

G.2 Supporting Documentation on Radiological Dose Assessment

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed and performed an independent dose assessment of the radiological impacts from normal operations of the new and existing nuclear units at the South Texas Project Electric Generating Station (STP). The results of the assessment are presented in this appendix and are compared to the results from STP Nuclear Operating Company's (STPNOC's) assessment found in the Environmental Report (ER) (STPNOC 2010a), Sections 4.5, Radiation Exposure to Construction Workers, and 5.4, Radiological Impacts of Normal Operation. This appendix is divided into five sections: (1) dose estimates to the public from liquid effluents; (2) dose estimates to the public from gaseous effluents; (3) cumulative dose estimates; (4) dose estimates to biota from gaseous and liquid effluents, and (5) dose to construction workers.

G.2.1 Dose Estimate to the Public from Liquid Effluents

The NRC staff used the dose assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the LADTAP II computer code (Strenge et al. 1986) to estimate doses to the maximally exposed individual (MEI) and the population from the liquid effluent pathway of proposed Units 3 and 4. The NRC staff used the projected radioactive effluents release values from the Final Safety Analysis Report (STPNOC 2010b).

G.2.1.1 Scope

Doses from each new unit to the MEI were calculated and compared to the regulatory criteria for the following:

- Total Body – Dose was the total for the ingestion of aquatic organisms and cow meat and external exposure to contaminated sediments deposited along the shoreline (shoreline exposure). Water downstream from the STP site is used for neither drinking water nor irrigation.
- Organ – Dose was the total for each organ for ingestion of aquatic food and cow meat and shoreline exposure with the highest value for adult, teen, child, or infant.

The NRC staff reviewed the assumed exposure pathways and input parameters and values used by STP for appropriateness. Default values from Regulatory Guide 1.109 (NRC 1977) were used when site-specific input parameters were not available. The NRC staff concluded that the assumed exposure pathways were appropriate – ingestion of aquatic organisms and shoreline exposure only – because water downstream of the site is not used for drinking or irrigation. In addition, the input parameters and values used by STPNOC were appropriate. NRC staff assessment added the meat cow pathway from livestock drinking water from groundwater wells.

G.2.1.2 Resources Used

To calculate doses to the public from liquid effluents the NRC staff used a personal computer version of the LADTAP II code entitled NRCDOSE, version 2.3.10 (Chesapeake Nuclear Services, Inc. 2006) obtained through the Oak Ridge Radiation Safety Information Computational Center (RSICC). The meat cow dose was estimated using LADTAP parameters.

G.2.1.3 Input Parameters

Table G-3 lists the major parameters used in calculating dose to the public from liquid effluent releases during normal operation. It should be noted that the 50-mi population was assumed to be for the year 2060, which is an overestimate of the population and is considered to be conservative. Section 5.4.1 of the Environmental Standard Review Plan (ESRP) (NRC 2000) guidance suggests that populations be projected only five years out from the date of the licensing action under consideration. Groundwater concentration at the livestock well was assumed to be that predicted for the nearest offsite well, 1600 pCi/L (STPNOC 2010a).

G.2.1.4 Comparison of Results

NRC staff's dose calculations confirmed the doses estimated by STPNOC. Dose from consumption of meat from cows consuming groundwater contaminated with tritium was estimated to be 0.0037, 0.0022, and 0.0026 mrem/yr for adults, teens, and children, respectively.

Table G-3. Single Unit Source Term for Liquid Effluent Pathways

Parameter	Staff Value				Comments
	Single new unit liquid effluent source term (Ci/yr)	Fraction Reaching Colorado River	Fraction Reaching Matagorda Bay	Fraction Reaching Little Robbins Slough	(STPNOC 2010b)
I-131	9.05×10^{-3}	1.40×10^{-5}	2.31×10^{-5}	8.56×10^{-6}	
I-132	1.93×10^{-3}	0.00	0.00	0.00	
I-133	3.73×10^{-2}	6.99×10^{-11}	1.15×10^{-10}	4.27×10^{-11}	
I-134	1.14×10^{-4}	0.00	0.00	0.00	
I-135	1.09×10^{-2}	7.64×10^{-22}	1.26×10^{-21}	4.67×10^{-22}	
H-3	8.00	7.87×10^{-2}	1.30×10^{-1}	4.81×10^{-2}	
Na-24	5.05×10^{-3}	6.61×10^{-13}	1.09×10^{-12}	4.04×10^{-13}	
P-32	5.68×10^{-4}	4.22×10^{-5}	6.96×10^{-5}	2.57×10^{-5}	
Cr-51	1.70×10^{-2}	1.13×10^{-4}	1.87×10^{-4}	6.93×10^{-5}	
Mn-54	3.97×10^{-3}	1.64×10^{-3}	2.71×10^{-3}	1.00×10^{-3}	
Mn-56	2.04×10^{-3}	0.00	0.00	0.00	
Co-58	8.38×10^{-3}	3.54×10^{-4}	5.84×10^{-4}	2.16×10^{-4}	
Co-60	1.54×10^{-2}	7.64×10^{-3}	1.26×10^{-2}	4.67×10^{-3}	
Fe-55	9.46×10^{-3}	4.60×10^{-3}	7.60×10^{-3}	2.81×10^{-3}	
Fe-59	2.23×10^{-3}	2.07×10^{-4}	3.42×10^{-4}	1.27×10^{-4}	
Ni-63	1.70×10^{-3}	2.17×10^{-2}	3.59×10^{-2}	1.33×10^{-2}	
Cu-64	1.26×10^{-2}	3.33×10^{-14}	5.49×10^{-14}	2.03×10^{-14}	
Zn-65	4.41×10^{-4}	1.30×10^{-3}	2.14×10^{-3}	7.92×10^{-4}	
Sr-89	3.14×10^{-4}	2.41×10^{-4}	3.97×10^{-4}	1.47×10^{-4}	
Sr-90	2.68×10^{-5}	1.74×10^{-2}	2.86×10^{-2}	1.06×10^{-2}	
Y-90	0.00	4.14×10^{-7}	6.83×10^{-7}	2.53×10^{-7}	
Sr-91	1.25×10^{-3}	5.14×10^{-17}	8.48×10^{-17}	3.14×10^{-17}	
Y-91	2.35×10^{-4}	2.85×10^{-4}	4.70×10^{-4}	1.74×10^{-4}	
Sr-92	4.43×10^{-4}	0.00	0.00	0.00	
Y-92	1.69×10^{-3}	0.00	0.00	0.00	
Y-93	1.36×10^{-3}	2.40×10^{-16}	3.96×10^{-16}	1.46×10^{-16}	
Zr-95	1.11×10^{-3}	3.16×10^{-4}	5.22×10^{-4}	1.93×10^{-4}	
Nb-95	3.14×10^{-4}	1.54×10^{-4}	2.54×10^{-4}	9.42×10^{-5}	
Mo-99	2.61×10^{-3}	4.71×10^{-7}	7.77×10^{-7}	2.88×10^{-7}	
Tc-99M	5.68×10^{-3}	2.42×10^{-23}	4.00×10^{-23}	1.48×10^{-23}	
Ru-103	3.27×10^{-4}	1.78×10^{-4}	2.93×10^{-4}	1.09×10^{-4}	
Ru-106	8.89×10^{-3}	1.92×10^{-3}	3.17×10^{-3}	1.17×10^{-3}	
Ag-110M	1.20×10^{-3}	1.33×10^{-3}	2.19×10^{-3}	8.12×10^{-4}	
Sb-124	0.00	2.95×10^{-4}	4.86×10^{-4}	1.80×10^{-4}	
Te-129M	8.43×10^{-5}	1.46×10^{-4}	2.40×10^{-4}	8.89×10^{-5}	
Te-131M	8.38×10^{-5}	3.10×10^{-9}	5.12×10^{-9}	1.90×10^{-9}	
Te-132	1.35×10^{-5}	9.68×10^{-7}	1.60×10^{-6}	5.91×10^{-7}	
Cs-134	1.13×10^{-2}	3.67×10^{-3}	3.67×10^{-3}	0.00	
Cs-136	7.51×10^{-4}	3.64×10^{-5}	3.64×10^{-5}	0.00	
Cs-137	1.78×10^{-2}	1.76×10^{-2}	1.76×10^{-2}	0.00	
Cs-138	8.00×10^{-7}	0.00	0.00	0.00	
Ba-140	1.68×10^{-3}	3.48×10^{-5}	5.74×10^{-5}	2.12×10^{-5}	
Ce-141	2.97×10^{-4}	1.39×10^{-4}	2.30×10^{-4}	8.52×10^{-5}	
Ce-144	3.89×10^{-3}	1.49×10^{-3}	2.47×10^{-3}	9.13×10^{-4}	
Pr-143	8.11×10^{-5}	3.85×10^{-5}	6.36×10^{-5}	2.35×10^{-5}	
Nd-147	2.00×10^{-6}	3.41×10^{-10}	5.62×10^{-10}	2.08×10^{-10}	
W-187	2.23×10^{-4}	2.20×10^{-7}	3.62×10^{-7}	1.34×10^{-7}	
Np-239	9.49×10^{-3}	2.56×10^{-4}	4.23×10^{-4}	1.57×10^{-4}	

Table G-3. (contd)

Parameter	Staff Value	Comments
Discharge Flow Rate	18.3 cfs 16.5 cfs 10700 cfs	From MCR to Little Robbins Slough Blowdown Four Unit discharge flow into MCR
Evaporation Rate	146.35 cfs	MCR evaporation rate – used for tritium calculations only
Source Term multiplier	2 x 2.7027 x10^{-5} = 5.41 x 10^{-5}	Converts from MBq/yr to Ci/yr and adjusts for two ABWR units.
Site Type	Fresh water	MCR to Little Robbins Slough
Reconcentration Model	None	Site-specific from Table 5.4-1 of ER (STPNOC 2010a)
Impoundment Volume	0; 7.35 x 10^9 ft^3	Set to "0" for no impoundment at Little Robbins slough, Second value is MCR volume.
Shore width factor	0.2 and 0.3	Little Robbins slough and MCR, respectively.
Dilution factors for aquatic food and boating, shoreline and swimming	1	Liquid discharge assumed fully mixed with annual average dilution flows at Little Robbins slough. For MCR calculations Partially Mixed
Transit time to nearest drinking water	Not considered for Little Robbins slough calculations 0.1 h for MCR calculations	No drinking water downstream from STP. 0.1 h to simulate doses to biota exposed to MCR concentrations.
Consumption and usage factors for adults, teens, child, and infant	Shoreline usage (hr/yr) 12 Adult 67 Teen 14 Child 0 Infant Fish Consumption (kg/yr) 21 Adult 16 Teen 6.9 Child 0 Infant	
50-mi population[(a)]	5.14 x 10^5 Fractions: Adult 0.71, Teen 0.11, Child 0.18	Assumes 2060 population
50-mi sport fishing	4.5 x 10^4 kg/yr	Site Specific from Table 5.4-1 of ER (STPNOC 2010a)
50-mi invertebrate catch	1.8 x 10^6 kg/yr	Site Specific from Table 5.4-1 of ER (STPNOC 2010a)
50-mi shoreline usage	7.84 x 10^6 person-hr/yr	Site Specific from Table 5.4-1 of ER (STPNOC 2010a)
50-mi swimming, boating usage	3.92 x 10^6 person-hr/yr	Site Specific from Table 5.4-1 of ER (STPNOC 2010a)

G.2.2 Dose Estimates to the Public from Gaseous Effluents

The NRC staff used the dose assessment approach specified in Regulatory Guide 1.109 (NRC 1977) and the GASPAR II computer code (Strenge et al. 1987) to estimate doses to the MEI and to the public within 50 mi of the STP site from the gaseous effluent pathway for the proposed units. The NRC staff used the projected radioactive gaseous effluents release values from the Final Safety Analysis Report (STPNOC 2010b).

G.2.2.1 Scope

The NRC staff and STPNOC calculated the MEI dose at 2.18 mi west-southwest of the new units. Pathways included were plume, ground, inhalation, and ingestion of locally grown meat and vegetables. Milk consumption was not considered because there are no milk animals within 5 mi of the plant.

The NRC staff reviewed the parameters and values used by STPNOC (2010a), for appropriateness. Default values from Regulatory Guide 1.109 were used when site or design specific input parameters were not available. The NRC staff concluded that the assumed exposure pathways and input parameters were appropriate. These pathways and parameters were used by the NRC staff in its independent calculations using GASPAR II.

Joint frequency distribution data of wind speed and wind direction by atmospheric stability class for the STP site provided in ER Table 2.7-10 (STPNOC 2010a) were used as input to the XOQDOQ code (Sagendorf et al. 1982) to calculate the average X/Q and D/Q values for routine releases. XOQDOQ output from the applicant were examined and determined to be appropriate.

Population doses were calculated for all types of releases (i.e., noble gases, particulates, iodines H-3 and C-14) using the GASPAR II code for the following: plume immersion, direct radiation from radionuclides deposited on the ground, inhalation, ingestion of vegetables, milk, and meat.

G.2.2.2 Resources Used

To calculate doses to the public from gaseous effluents, the NRC staff used a personal computer version of the XOQDOQ and GASPAR II computer codes entitled NRCDOSE version 2.3.10 (Chesapeake Nuclear Services, Inc. 2006) obtained through the Oak Ridge RSICC.

G.2.2.3 Input parameters

Table G-4 lists the major parameters used in calculating doses to the public from gaseous effluents during normal operation. It should be noted that the 50-mi population was assumed to be for the year 2060, which is an overestimate of the population and is considered to be conservative. ESRP guidance suggests that populations be projected only five years out from the date of the licensing action under consideration (NRC 2000).

Table G-4. Parameters Used in Calculating Dose to Public from Gaseous Effluent Releases

Parameter	Staff Value		Comments
Single new unit gaseous effluent source term (Ci/yr)	Kr-83m	8.37×10^{-4}	STPNOC (2010a) references these values in Table 3.5-2 of the ER for a single new unit. These values are converted from the original SI units in MBq/yr to Ci/yr
	Kr-85m	2.11×10^{1}	
	Kr-85	5.67×10^{2}	
	Kr-87	2.51×10^{1}	
	Kr-88	3.78×10^{1}	
	Kr-89	2.40×10^{2}	
	Kr-90	3.24×10^{-4}	
	Xe-131m	5.13×10^{1}	
	Xe-133m	8.64×10^{-2}	
	Xe-133	2.40×10^{3}	
	Xe-135m	4.05×10^{2}	
	Xe-135	4.59×10^{2}	
	Xe-137	5.13×10^{2}	
	Xe-138	4.32×10^{2}	
	Xe-139	4.05×10^{-4}	
	I-131	2.59×10^{-1}	
	I-132	2.19	
	I-133	1.70	
	I-134	3.78	
	I-135	2.40	
	H-3	7.29×10^{1}	
	C-14	9.18	
	Na-24	4.05×10^{-3}	
	P-32	9.18×10^{-4}	
	Ar-41	6.75	
	Cr-51	3.51×10^{-2}	
	Mn-54	5.40×10^{-3}	
	Mn-56	3.51×10^{-3}	
	Fe-55	6.48×10^{-3}	
	Fe-59	8.10×10^{-4}	
	Co-58	2.40×10^{-3}	
	Co-60	1.30×10^{-2}	
	Ni-63	6.48×10^{-6}	
	Cu-64	9.99×10^{-3}	
	Zn-65	1.11×10^{-2}	
	Rb-89	4.32×10^{-5}	
	Sr-89	5.67×10^{-3}	
	Sr-90	7.02×10^{-5}	
	Y-90	4.59×10^{-5}	
	Sr-91	9.99×10^{-4}	
	Sr-92	7.83×10^{-4}	
	Y-91	2.40×10^{-4}	

Table G-4. (contd)

Parameter	Staff Value		Comments
	Y-92	6.21×10^{-4}	
	Y-93	1.11×10^{-3}	
	Zr-95	1.59×10^{-3}	
	Nb-95	8.37×10^{-3}	
	Mo-99	5.94×10^{-2}	
	Tc-99m	2.97×10^{-4}	
	Ru-103	3.51×10^{-3}	
	Rh-103m	1.11×10^{-4}	
	Ru-106	1.89×10^{-5}	
	Rh-106	1.89×10^{-5}	
	Ag-110m	2.00×10^{-6}	
	Sb-124	1.81×10^{-4}	
	Te-129m	2.19×10^{-4}	
	Te-131m	7.56×10^{-5}	
	Te-132	1.89×10^{-5}	
	Cs-134	6.21×10^{-3}	
	Cs-136	5.94×10^{-4}	
	Cs-137	9.45×10^{-3}	
	Cs-138	1.70×10^{-4}	
	Ba-140	2.70×10^{-2}	
	La-140	1.81×10^{-3}	
	Ce-141	9.18×10^{-3}	
	Ce-144	1.89×10^{-5}	
	Pr-144	1.89×10^{-5}	
	W-187	1.89×10^{-4}	
	Np-239	1.19×10^{-2}	
Population distribution	Table 2.5-2 of the ER (STPNOC 2010a)		Population distribution used by STP and the staff was for year 2060.
Wind Speed and Direction	Table 2.7-7 of the ER (STPNOC 2010a)		Site-specific data for 1997, 1999, and 2000.
Joint Frequency distribution of wind speed and direction by stability class	Table 2.7-10 of the ER (STPNOC 2010a)		Site specific data for 1997, 1999, and 2000.
Atmospheric Dispersion factors (sec/m^3)	Tables 2.7-15 and 2.7-16 of the ER (STPNOC 2010a)		
Ground Deposition factors	Tables 2.7-15 and 2.7-16 of the ER (STPNOC 2010a)		
Vegetable Production rate within 50 mi of STP site	9,640,000 kg/yr		Site-specific data provided by STPNOC in Table 5.4-2 of the ER (STPNOC 2010a)
Meat Production Rate within 50 mi of STP site	40,500,000 kg/yr		Site-specific data provided by STPNOC in Table 5.4-2 of the ER (STPNOC 2010a)
Milk Production rate within 50 mi of STP site	2,130,000 L/yr		Site-specific data provided by STPNOC in Table 5.4-2 of the ER (STPNOC 2010a)
Pathway receptor locations (direction, and distance) – nearest	Table 5.4-4 of the ER (STPNOC 2010a)		

Table G-4. (contd)

Parameter	Staff Value	Comments
site boundary, MEI location		
Consumption factors for milk, meat, leafy vegetables, and vegetables	Milk (L/yr) 310 Adult 400 Teen 330 Child 330 Infant Meat (kg/yr) 110 Adult 65 Teen 41 Child 0 Infant Leafy Vegetable (kg/yr) 64 Adult 42 Teen 26 Child 0 Infant Vegetable (kg/yr) 520 Adult 630 Teen 520 Child 0 Infant	Table 5.4-3 of the ER (STPNOC 2010a) Section 5.4.2.2of the ER states that there are no milk cows within 5 mi of the STP site.
Fraction of leafy vegetables grown	0.917	Table 5.4-3 of the ER (STPNOC 2010a)
Fraction of year that milk cows are on pasture	0.917	Table 5.4-3 of the ER (STPNOC 2010a)
Fraction of MEI vegetable intake from own garden	0.76	Table 5.4-3 of the ER (STPNOC 2010a)
Fraction of year beef cattle are on pasture	0.917	Table 5.4-3 of the ER (STPNOC 2010a)
Fraction of year beef cattle intake is from pasture while on pasture	1	Default value of GASPAR II code (Strenge et al. 1987).

G.2.2.4 Comparison of Doses to the MEI from Gaseous Effluents

NRC staff's dose calculations confirmed the doses estimated by STPNOC, replicating the values shown in Table G-5.

Table G-5. Comparison of Cumulative Doses to the MEI with 40 CFR Part 190 Criteria (mrem per year)

	STP Units 1 and 2[a]			STP Units 3 and 4					
DOSE	Liquid	Gaseous	Total	Direct[b] Radiation	Liquid[c]	Gaseous	Total	Site Total	40 CFR Part 190 Criteria
Total Body	0.0042	0.0080	0.012	5	0.000525	0.70[d]	5.7	5.71	25
Thyroid	0.0041	0.0097	0.014	NA	0.000406	4.54[e]	4.54	4.55	75
Bone	0.00077	0.0011	0.0019	NA	0.00230	1.94[d]	1.94	1.94	25

(a) Doses from liquid and gaseous effluent releases for two existing units are taken from ER Table 5.4-8 (STPNOC 2010a).
(b) Doses from direct radiation are based on plant shielding design acceptance criteria for the ABWR that specify a maximum dose rate from direct and scattered radiation of 2.5 mrem/y at the Exclusion Area Boundary (STPNOC 2010a).
(c) Liquid pathway MEI is a combination of teen (total body and thyroid) and child (bone)
(d) Gaseous pathway MEI dose for bone and total body is a child located at 2.18 mi WSW of new units with meat animal and vegetable garden.
(e) Gaseous pathway MEI dose for thyroid is a child located 3.03 mi NNW of new units with meat animal and vegetable garden.

G.2.3 Cumulative and Population Dose Estimates

Based on parameters shown for the liquid pathway and the gaseous pathway, Table G-3 and Table G-4, respectively, doses from the two proposed units were calculated using LADTAP and GASPAR to the MEI. Doses from the existing units are taken from ER Table 5.4-8 (for the MEI) and Table 5.4-9 (for the population) (STPNOC 2010a). Table G-5 is the same table as ER Table 5-12 and compares cumulative dose estimates to the MEI with EPA's dose criteria in 40 CFR Part 190. Table G-5 includes doses from all pathways (i.e., external, liquid effluent and gaseous effluent) summed for existing Units 1 and 2 and proposed Units 3 and 4.

Based on parameters shown for the liquid pathway and gaseous pathway (Table G-3 and Table G-4, respectively), doses were calculated using LADTAP and GASPAR to the population within 50 mi of the STP site (as discussed in Section G.2.1.3 and G.2.2.3). Table G-6 shows dose estimates to the population within 50-mi of the STP site from operation of proposed Units 3 and 4. It should be noted that the 50-mi population was assumed to be for the year 2060, which is an overestimate of the population and is considered to be conservative. ESRP guidance suggests that populations be projected only five years out from the date of the licensing action under consideration. For comparison, the collective background dose to the regional population is estimated to be approximately 159,000 person-rem. This estimate is the product of the annual average dose rate to individuals from natural sources of 311 mrem/yr, as stated in NCRP Report 160 (NCRP 2009), and the estimated 2060 population of 5.14×10^5.

Table G-6. Doses to Population Within 50-mi Radius of the STP Site (Person-Rem)

	STP Units 3 and 4		
	Liquid	**Gaseous**	**Total**
Noble gases	0	0.11	0.11
Iodines and particulates	0.0030	0.14	0.14
Tritium and C-14	0.0000056	0.32	0.32
Total[(a)]	0.0030	0.58	0.58

(a) Differences between sum of components and totals are due to rounding.

G.2.4 Dose Estimates to the Biota from Liquid and Gaseous Effluents

To estimate doses to the biota from the liquid and gaseous effluent pathways, the NRC staff used the LADTAP II computer code (Strenge et al. 1986), the GASPAR II computer code (Strenge et al. 1987), and input parameters supplied by STPNOC in response to RAIs (STPNOC 2009).

G.2.4.1 Scope

It is acceptable to NRC staff to estimate radiation doses to representative biota species. Fish, invertebrates, and algae are used as reference aquatic biota species. Muskrats, raccoons, herons, and ducks are used as reference terrestrial biota species. The NRC staff recognizes the LADTAP II computer program as an appropriate method for calculating dose to the aquatic biota and for calculating the liquid-pathway contribution to terrestrial biota. The LADTAP II code calculates an internal dose component and an external dose component and sums them for a total body dose. Default values from Regulatory Guide 1.109 (NRC 1977) are used when site-specific input parameters are not available. The NRC staff concluded that all of the input parameters used by STPNOC were appropriate.

G.2.4.2 Resources Used

To calculate doses to the biota from liquid effluents, the NRC staff used a personal computer version of the LADTAP II entitled NRCDOSE Version 2.3.10 (Chesapeake Nuclear Services, Inc. 2006). NRCDOSE was obtained through the Oak Ridge RSICC.

Most of the LADTAP II input parameters are specified in Section G.2.1.3 to include the source term, the discharge flow rate to the receiving freshwater system, the shore-width factor, and fractions of radionuclides in the Main Cooling Reservoir (MCR) reaching offsite bodies of water. These parameter values are appropriate to use in calculating biota dose in the MCR. The NRC staff's dose analysis confirmed the liquid pathway doses to biota shown in Table 5-13 and Table G-7.

Table G-7. Dose Estimates to Biota from Liquid and Gaseous Effluents

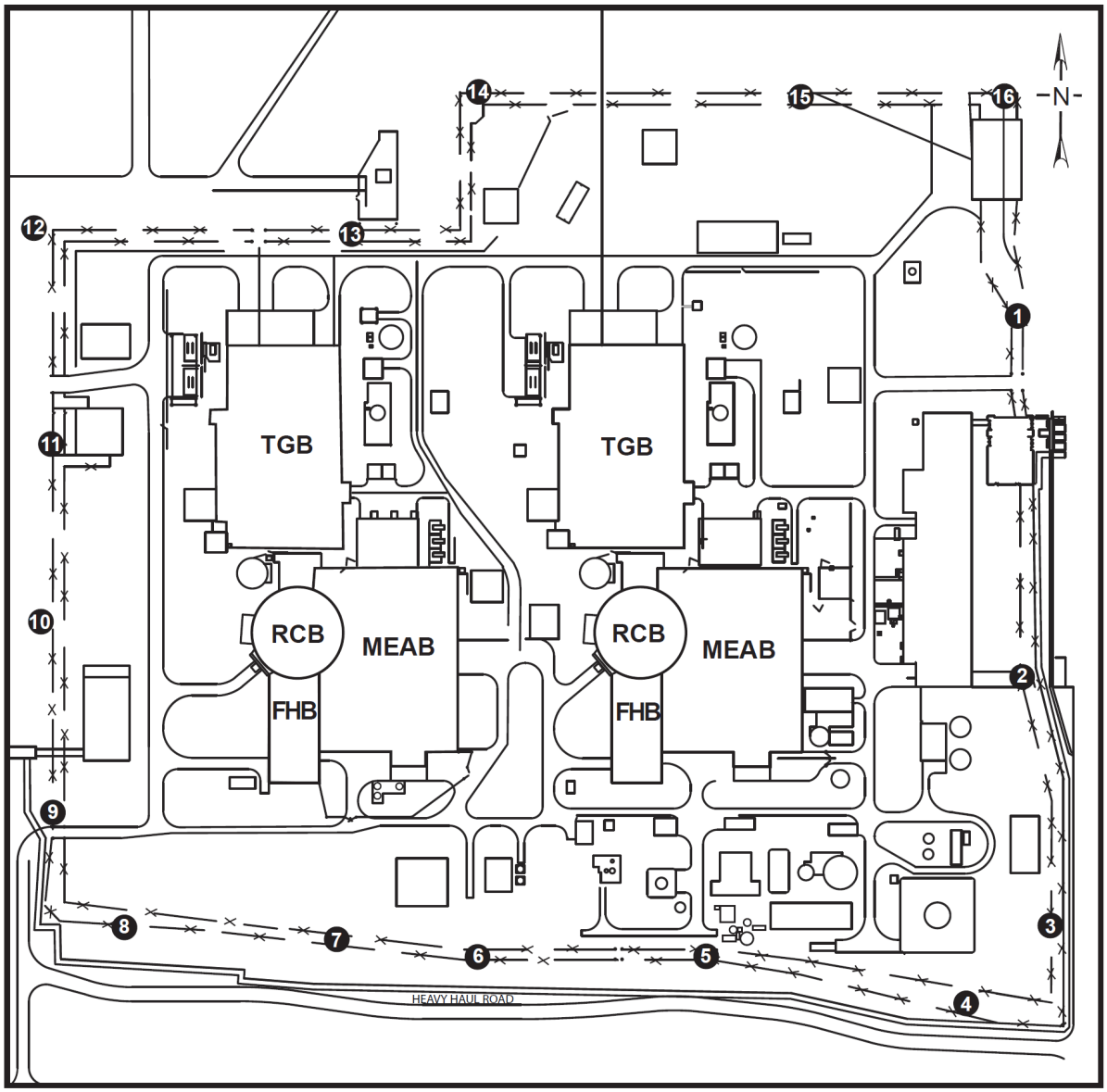
	Liquid (mrad/yr)	Gaseous (mrad/yr)	Combined (mrad/yr)
Fish	2.50	0.00	2.50
Invertebrate	5.30	0.00	5.30
Algae	0.54	0.00	0.54
Muskrat	2.4	14	16
Raccoon	1.3	17	18
Heron	2.4	14	16
Duck	3.2	17	20

NRC staff assessed dose to terrestrial biota from the gaseous effluent pathway using GASPAR by assuming doses for raccoons and ducks were equivalent to adult human doses for inhalation, vegetation ingestion, plume and twice the ground pathways at the exclusion area boundary (EAB) at 0.52 mi northwest. STPNOC estimated the gaseous pathway doses to biota at the site boundary in the direction that resulted in the largest doses (maximum site boundary). The NRC staff concluded that terrestrial biota could live on the STP site and receive higher doses from the gaseous effluents. Therefore, the NRC staff estimated the doses at the exclusion area boundary (0.52 mi NW) to achieve a more reasonable estimate of doses to terrestrial biota that might live on the STP site (Table G-7). The doubling of doses from ground deposition reflects the closer proximity of these organisms to the ground. Muskrats and herons do not consume terrestrial vegetation, so that pathway was not included for those organisms.

G.2.5 Dose to Construction Workers

STPNOC used fenceline thermoluminescent dosimeters (TLDs) and environmental TLDs to measure direct radiation levels at locations in and around the STP Units 1 and 2 protected area (STPNOC 2010a). Sixteen TLDs are located along the protected area fence around existing Units 1 and 2 (Figure G-1). All TLDs are read quarterly and measure the contribution to dose from any source, either natural or anthropogenic, including the current reactor buildings and Onsite Staging Facility (OSF) (Figure G-2). Data from 2002 through 2006 are provided in Table G-8 through Table G-12. Data from this five-year period provide information indicative of plant conditions. Table G-12also contains data collected from around the Old Steam Generator Storage Facility (OSGSF) see Figure G-2. These tables show the maximum measured dose rate at monitoring stations 9 to 16 over the five years was 18.9 mR/quarter.

The difference between the maximum protected area fence reading (18.9 mR/quarter) and the average background reading yields a net maximum dose rate of 6.4 mR/quarter, as shown in Table G-13.



Not to scale

FHB = Fuel Handling Building
MEAB = Mechanical Equipment Auxillary Building
RCB = Reactor Containment Building
TGB = Turbine Generator Building
# = Approximate Thermoluminescent Dosimeter Monitoring Location
= Fence

Figure G-1. STP Units 1 and 2 Protected Area Monitoring Stations (STPNOC 2010a)

Table G-8. TLD Measurements at STP Units 1 and 2 Monitoring Stations in 2002

Station Number	Average Dose by Quarter (mR)			
	1	2	3	4
9	12.9	11.8	18.9	12.2
10	12.4	11.1	14.1	13.2
11	11.5	11	12	11.4
12	12.5	11.3	13.3	11.9
13	12.3	11.1	13.1	11.7
14	12.2	11.4	13.3	11.3
15	13	12.1	13.9	11.9
16	12.7	11.1	13	12.1

Source: STPNOC 2010a

Table G-9. TLD Measurements at STP Units 1 and 2 Monitoring Stations in 2003

Station Number	Average Dose by Quarter (mR)			
	1	2	3	4
9	12.9	13.1	12.7	13
10	12.5	13	12.5	12.6
11	11.7	11.4	12	11.8
12	12.7	12.5	12.6	11.8
13	12.6	12.5	12.1	12.2
14	12.6	12.6	12.4	12.3
15	13.2	12.8	13.2	12.9
16	12.5	12.5	13	12.7

Source: STPNOC 2010a

Table G-10. TLD Measurements at STP Units 1 and 2 Monitoring Stations in 2004

Station Number	Average Dose by Quarter (mR)			
	1	2	3	4
9	13.1	13.1	13.4	12.9
10	12.5	12.6	13.5	12.1
11	11.5	11.5	12.3	11.2
12	12.1	12.3	12.9	12.5
13	12	12.3	13.1	12.8
14	12.3	12.1	13.2	12.3
15	13.5	12.9	13.5	13.3
16	13.2	12.4	13.4	12.8

Source: STPNOC 2010a

Table G-11. TLD Measurements at STP Units 1 and 2 Monitoring Stations in 2005

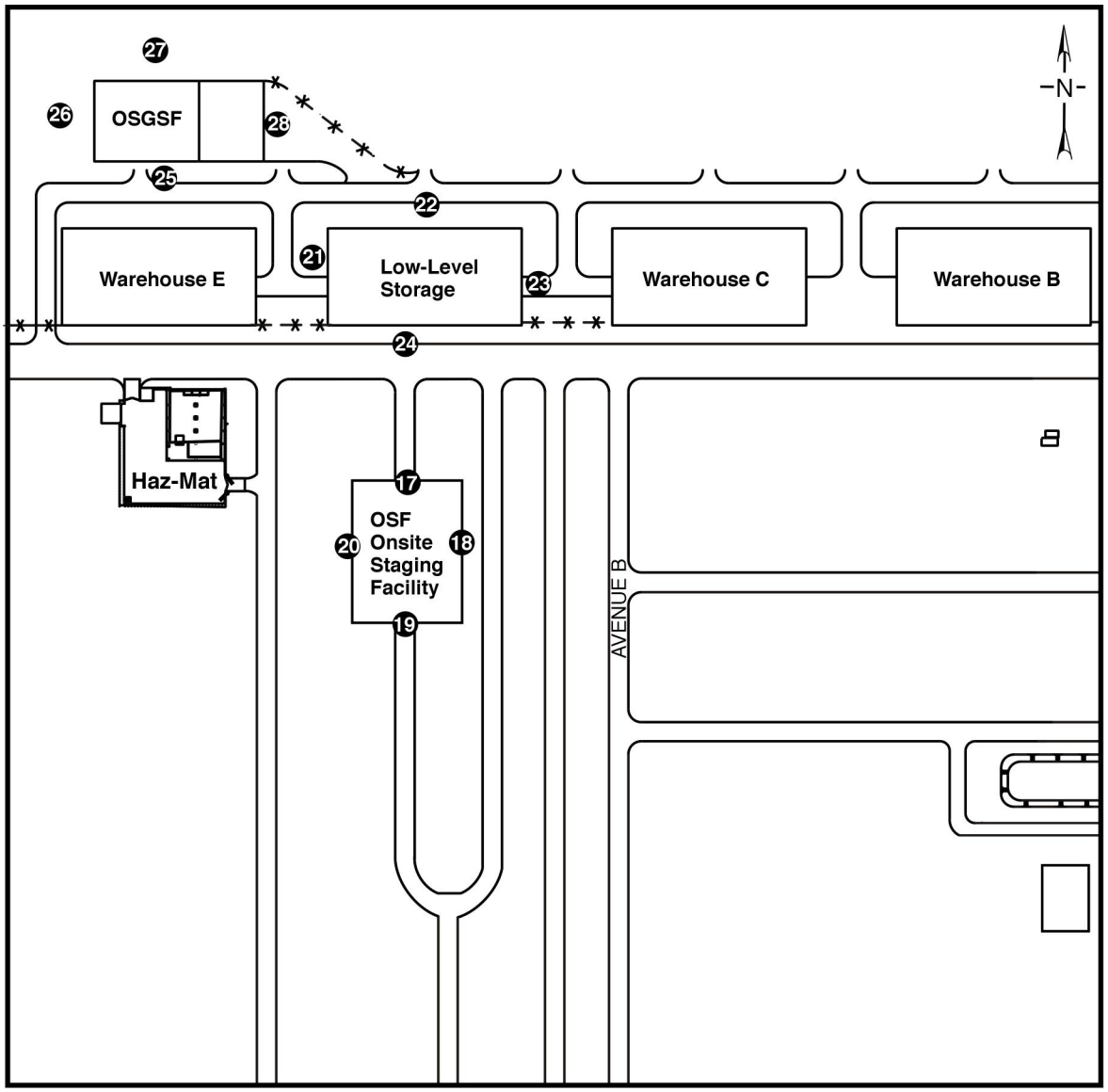
Station Number	Average Dose by Quarter (mR)			
	1	2	3	4
9	14.7	13.7	11.5	11.6
10	14.6	12.9	11.2	11.4
11	13.8	12.6	10.5	10.7
12	13.9	13.7	11.2	11.3
13	14.5	13.6	11.8	12.1
14	14.2	13.6	11.1	11.6
15	15	14.6	11.7	12.3
16	14.7	13.1	10.9	12.1

Source: STPNOC 2010a

Table G-12. TLD Measurements at STP Units 1 and 2 and Old Steam Generator Storage Facility Monitoring Stations in 2006

Station Number	Average Dose by Quarter (mR)			
	1	2	3	4
9	12.8	12.2	12.4	13.4
10	11.9	11.5	12.1	12.2
11	11.4	11.5	11.7	13.3
12	12.3	13.1	12.2	13
13	12.9	12.7	12.3	13.1
14	12.3	11.6	12.1	12.4
15	12.8	12.5	13.6	14
16	12	12.1	12.7	13
OSGSF 25	13.8	12.6	12.5	12.6
OSGSF 26	16.7	15.1	15.9	15.3
OSGSF 27	15.6	13.6	14.1	14.7
OSGSF 28	14.1	12.1	12.1	13.8

Source: STPNOC 2010a



Not to scale

Haz-Mat = Hazardous Material
OSF = Onsite Staging Facility
OSGSF = Old Steam Generator Storage Facility
 # = Approximate Thermoluminescent Dosimeter Monitoring Location
-✳-✳- = Fence

Figure G-2. Locations of TLD Monitoring Stations at OSGSF (STPNOC 2010a)

Table G-13. Maximum Quarterly Measured Dose Rates at STP Units 1 and 2 and OSGSF

Location	Dose Rate (mrem/quarter)		
	Maximum Measured	Background	Net
STP Units 1 and 2 Protected Area Fence	18.9	12.5	6.4
OSGSF	16.7	12.5	4.2

Note: The maximum measured dose rates are from Tables 4.5-3 to 4.5-7 in the ER (STPNOC 2010a). The net dose rate is calculated by subtracting the background dose rate from the maximum dose rate.

A primary source of direct radiation exposure to the workers on STP Unit 4 will be the gamma radiation from nitrogen-16 in the STP Unit 3 steam lines and steam-bearing components such as turbines, moisture separators, and re-heaters (STPNOC 2010a). The plant shielding design acceptance criteria for the ABWR specify a maximum dose rate due to direct and scattered radiation of 2.5 mrem/yr at the EAB. The distances from STP Unit 3 to the EAB and to the STP Unit 4 reactor are 0.52 and 0.17 mi, respectively. The ABWR DCD does not describe the outside condensate storage tank that STPNOC proposes (STPNOC 2009). The dose rate from this tank was evaluated by NRC staff using the Microshield computer code and was encompassed by the 2.5 mrem/yr acceptance criteria.

In 1986, prior to operation of STP Units 1 and 2, the background exposure rate measured at the site boundary was 15.4 mR/quarter. However, some of the current protected area fence line direct radiation measurements are lower than the 1986 site boundary measurements because the protected area was excavated and backfilled with sand and gravel that contained less naturally occurring radioactive material than exists in the native clay found near the site boundary. Between 2002 and 2006, the exposure rate along the protected area fence averaged 12.5 mR/quarter; this will be used as the reference background exposure rate, see Table G-14.

Worker dose rates presented in Table G-14 were estimated by the NRC staff in a manner similar to that used by STPNOC (2010a), except the NRC used the revised background rates as follows:

- STP Units 1 and 2 – The dose rate from the waste monitor tanks at the construction area was calculated in the ER by multiplying the net quarterly dose rate by a factor of four, to convert to an annual dose rate, and then it was doubled for conservatism, yielding 51.2 mrem/yr at the TLD on the protected area fence. Figures 4.5-1 and 4.5-2 in the ER show the distance from Unit 2 waste monitor tanks to the protected area fence to be about 600 ft and the distance to the center of STP Unit 3 construction area is about 2300 ft. Setting D_{TLD} = 51.2 mrem/yr, R_{TLD} = 600 ft, and R_{loc} = 2300 ft, gives a dose rate of 13.4 mrem/yr at the center of the construction area of Unit 3, for 100 percent occupancy. This can be reduced by the ratio of 2080 hr (worked)/8766 hr (per yr), yielding 3.2 mrem/yr to a worker (Table G-14).

Table G-14. Direct Radiation Doses to Unit 4 Construction Workers

Source	Distance from Source (ft)		Dose Rate (mrem/yr)		Annual Dose to Worker (mrem)
	To TLD Location	To Construction Location	TLD Location	Construction Location	
STP Units 1 and 2	600	2300	51.2	13.4	3.18
OSGSF	92.6	700	33.6	4.5	1.07
LTSF	-	700		1	0.24
OSF	-	-*		1	0.24
STP Unit 3	-	900		23	5.5
Total for STP Units 1 and 2	-	-		19.9	4.72
Total for STP Units1, 2, and 3	-	-		42.9	10.2

* Location of the Onsite Storage Facility has not been specified; therefore, dose rate to construction workers is only an estimate.

- OSGSF – The dose rate from the OSGSF was calculated by multiplying the net quarterly dose by four to get an annual dose rate, and then it was doubled for conservatism, yielding 33.6 mrem/yr at the TLD. The distance from the exterior wall of the OSGSF is about 93 ft and the distance from the OSGSF to the center of STP Unit 4 construction area is about 700 ft. Setting D_{TLD} = 33.6 mrem/yr, R_{TLD} = 93 ft, and R_{loc} = 700 ft gives a dose rate of 4.5 mrem/yr at the center of the construction area of Unit 4, for 100 percent occupancy. This can be reduced by the ratio of 2080 hr (worked) / 8766 hr (per yr), yielding 1.07 mrem/yr to a worker (Table G-14).
- LTSF – The Long Term Storage Facility is not yet built yet but plans are to build it adjacent to the OSGSF. It is therefore assumed that the distance from the LTSF to the center of the construction area of STP Unit 4 is also 700 ft. Contamination smears and exposure measurements taken from the reactor vessel heads that will be stored in the LTSF and using MicroShield and MicroShine software yielded an exposure rate of 8×10^{-6} mR/hr at 700 ft away. With fulltime occupancy, this results in a dose rate of 0.07 mrem/yr. This is conservatively rounded up to 1 mrem/yr for the construction location, and the annual dose to the construction worker of 0.24 mrem was obtained by multiplying by the ratio of 2080 hr (worked) / 8766 hr (per yr) (Table G-14).
- OSF – As indicated above, the OSF will be relocated and have additional shielding provided such that the dose rate from this source will be negligible at the STP Units 3 and 4 construction location. However, the dose rate from the OSF is conservatively assumed to be 1 mrem/yr at the construction location, and the annual dose to the construction worker of 0.24 mrem was obtained by multiplying by the ratio of 2080 hr (worked) / 8766 hr (per yr) (Table G-14).
- STP Unit 3 – STP Unit 3, including the CST, must be considered as a source of direct radiation to construction workers at STP Unit 4 during the timeframe between STP Unit 3

becoming operational and STP Unit 4 becoming operational. The plant shielding design acceptance criteria for the ABWR specify a maximum dose rate due to direct and scattered radiation of 2.5 mrem/yr at the EAB. Distances from STP Unit 3 to the EAB and to the STP Unit 4 reactor are 0.52 and 0.17 mi, respectively. Assuming the distances were great enough to consider the source a point source, the dose rate at the construction site was estimated at 23 mrem/yr. Adjusting the calculated dose rate at STP Unit 4 from operations of STP Unit 3 for worker occupancy (2080 hr worked / 8766 hr per yr) yields a worker dose rate of 5.5 mrem/yr. Adding the total direct radiation dose rate from STP Units 1 and 2 (4.72 mrem/yr) to the Unit 3 direct radiation dose yields a total of 10.2 mrem/yr for the Unit 4 construction worker (Table G-14).

G.3 References

40 CFR 190. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 190, “Environmental Radiation Protection Standards for Nuclear Power Operations.”

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Appendix H

Authorizations, Permits, and Certifications

Appendix H

Authorizations, Permits, and Certifications

This appendix contains a list of the environmental-related authorizations, permits, and certifications potentially required by STP Nuclear Operating Company (STPNOC) from Federal, State, regional, and local agencies related to the combined licenses for the two proposed new nuclear units, Units 3 and 4, at the South Texas Project (STP) site. The table is derived from Tables 1.2-1 through 1.2-4 of the Environmental Report submitted to the U.S. Nuclear Regulatory Commission (NRC).

Table H-1. Other Authorizations, Permits, and Certifications Potentially Required by STPNOC

Agency	Authority	Requirement	Activity Covered	Permit Issued or Authorization Obtained/Status
NRC	10 Code of Federal Register (CFR) Part 30	Byproduct License	Approval to receive, possess, and use byproduct material.	To be issued as part of COLs
NRC	10 CFR Part 40	Source Materials License	Approval to receive, possess, and use source material.	To be issued as part of COLs
NRC	10 CFR Part 52, Subpart C	Combined Licenses	Construction and operation of two new nuclear units.	Application submitted 09/20/07
NRC	10 CFR 70	Special Nuclear Materials License	Approval to receive, possess, and use special nuclear material.	To be issued as part of COLs
NRC	10 CFR 61	Licensing Requirements for Land Disposal of Radioactive Wastes	Procedures, criteria, and terms and conditions for the licensing of land disposal facilities intended to contain byproduct source, and SNM.	If required
NRC	10 CFR 71	Packaging and Transportation of Radioactive Material	The regulations in this part provide requirements, procedures, and standards for packaging, preparation for shipment, and transportation of licensed material.	If required
NRC	10 CFR 72	Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste	The issuance of licenses to receive, transfer, and possess power reactor spent fuel and other associated radioactive materials in an independent spent fuel storage installation and the terms under which the Commission will issue such a license.	If required

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
NOAA Fisheries	Endangered Species Act of 1973	Consultation regarding potential to adversely impact protected marine species	Concurrence with no adverse impact or consultation on appropriate mitigation measures.	Complete
US Fish and Wildlife Service (FWS)	Endangered Species Act of 1973	Consultation regarding potential to adversely impact protected species (non-marine species)	Concurrence with no adverse impact or consultation on appropriate mitigation measures. Triggering Activity: Cannot modify habitat of endangered or threatened species without authorization from FWS, including clearing of vegetation or earth-moving activities.	Complete
FWS	Migratory Bird Treaty Act, 50 CFR 21	Compliance with requirements of Act	Adverse impacts on protected species and/or their nests.	Complete
Department of Energy (DOE)	Nuclear Waste Policy Act (42 United States Code (U.S.C) 10101 et seq.) and 10 CFR Part 961	Spent Fuel Contract	The DOE Standard Contract for disposal of spent nuclear fuel contained in 10 CFR Part 961 is being modified by the DOE.	2008 DE-CR01-09RW09007 (Unit 3) DE-CR01-09RW09008 (Unit 4)

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
US Army Corps of Engineers (Corps)	Federal Clean Water Act (FCWA), Section 404, 33 CFR 323	Section 404 Permit	Disturbance or crossing wetland areas or navigable waters.	Permit Determination Request submitted 06/04/2009 Second Permit Determination Request submitted 10/28/2009 Individual Permit Application submitted 03/09/2010
Corps	FCWA, Section 404, 33 CFR 323	Dredge and Fill Discharge Permit	Maintenance dredging of intake structure on Colorado River.	Covered under Permit No. SWG-1992-02707 Exp. Date: 12/31/2019
Corps	Rivers and Harbors Act	Section 10 Permit	Maintenance dredging of barge slip.	Covered under Permit No. 10570 Exp. Date: 12/31/2014
United States Department of Transportation	49 CFR 107, Subpart G Registration for Hazardous Materials Transportation	Certificate of Registration	Renew existing two-year registration for transportation of hazardous materials.	Covered under Permit No. 061506 551 0960P
Federal Aviation Administration	14 CFR 77	Construction Notice	Notice of erection of structures (>200 feet high) potentially impacting air navigation.	12/2011

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
Texas Commission on Environmental Quality (TCEQ)	Federal Clean Air Act (FCAA), General Air Quality Rules (Texas Administrative Code (T.A.C.) Title 30, Part 1, Chapter 101, 111, 116)	Air Quality Construction Permit	Construction of air emission sources – diesel combustion generator, diesel generators, vents and other air sources regulated by TCEQ. Triggering Activity: Permit must be obtained before excavation for or construction of foundation or footings supporting air emitting facilities.	Complete
TCEQ	FCAA, General Air Quality Rules (T.A.C. Title 30, Part 1, Chapter 101, 111, 116)	Air Quality Construction Permit	Construction air emission sources: Concrete batch plant (CBP) Sand blast facility and surfacing coating facility. Triggering Activity: Authorization must be obtained before excavation for or construction of foundation or footings supporting air emitting facilities.	12/2010 (Obtained by Constructor)
TCEQ	Federal Clean Water Act (FCWA) (33 U.S.C. 1251 et seq.); T.A.C. Title 30, Part 1, Chapter 307, 308	Section 401 Certification	Certify that issuance of the COL will not result in a violation of state water quality standards.	Waiver received on Feb 2, 2010.

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
TCEQ	FCWA, Texas Water Code (TWC) Chapter 26; T.A.C. Title 30, Part 1, Chapter 205, 279, 307, 308	Renewal of or amendment to existing Texas Pollutant Discharge Elimination System (TPDES) Permit	Regulates discharge of pollutants to surface water. Triggering Activity: Amended TPDES permit must be issued prior to excavation for or construction of foundation or footings to support wastewater treatment plant components for expanded capacity.	12/2009
TCEQ	FCWA, TWC Chapter 26	General Permit for Stormwater Discharges Associated With Construction Activity	Discharge stormwater from site during construction. Triggering Activity: Authorization must be obtained prior to exposure of soils from activities such as clearing, grading and excavating.	10/2009 (Obtained by Constructor)
TCEQ	T.A.C. Title 30, Part 1, Chapter 290	TCEQ approval of modification of public water system	Modify treatment, storage, distribution of potable water system as needed for expansion Approval of plans and specifications or TCEQ determination that approval is not required must occur before construction commences on any new or expanded component of water system, including water well, storage, treatment or distribution lines.	As required

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
TCEQ	FCWA, TWC, Ch. 26	TPDES General Permit	Discharge of uncontaminated groundwater encountered during construction will be included in TPDES General Permit for construction activities.	12/2009 (Obtained by Constructor)
TCEQ	T.A.C. Title 30, Part 1, Chapter 334	Certificate of Annual Tank Registration	All underground storage tanks that are in use or capable of being used for petroleum products and certain chemicals.	As required
TCEQ	T.A.C. Title 30, Part 1, Chapter 335	Notice of Registration	Onsite disposal of Class III industrial solid waste consisting of earth and earth-like products, concrete, rock, bricks, and land clearing debris.	Registration No. 30651
TCEQ	T.A.C. Title 30, Part 1, Chapter 335	Notice of Registration	Offsite disposal of industrial solid wastes.	Registration No. 30651
TCEQ	T.A.C. Title 30, Part 1, Chapter 295, 297	Water Rights	Use of additional makeup water from Colorado River.	Covered under existing water rights. Registration No. 14-5437
TCEQ	T.A.C. Title 30, Part 1, Chapter 321; FCWA; TWC, Chapter 26	Notice of Registration	Relocation of existing pond related to car wash and vehicle washdown.	12/2010
TCEQ	T.A.C. Title 30, Part 1, Chapter 290	Revision or new permit to operate a public water system - Notice of Termination	Operate a public noncommunity water system.	As required

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
TCEQ	RCRA, T.A.C. Title 30, Part 1, Chapter 334	Certificate of Annual Tank Registration - Notice of Termination	All underground storage and aboveground storage tanks that are in use or capable of being used for petroleum products and certain chemicals. Tank removal/abandonment	As required
TCEQ	FCWA, T.A.C. Title 30, Part 1, Chapter 307, 308, 309, and 317	Amendment to existing TPDES Permit	Regulates limits of pollutants in liquid discharge to surface water TPDES Permit No. 01908. Expiration date: 12/1/09.	Renewal review in process by TCEQ
TCEQ	Revision of existing Title V Operating Permit	Operation of air emission sources	Update existing permit as necessary.	Permit No. 0801 Expiration Date: 1/25/2011
TCEQ	T.A.C. Title 30, Part 1, Chapter 335	Revision/new permit for Industrial/ Hazardous Waste	Industrial/Hazardous waste generation, storage, and disposal activities.	As required
TCEQ	T.A.C. Title 30, Part 1, Chapter 327	Spill Prevention and Control	Procedures for reporting spills of hazardous materials onsite (Covered in the STPEGS Integrated Spill Contingency Plan)	As required
TCEQ	T.A.C. Title 30, Part 1, Chapter 328	Waste Minimization and Recycling	Program for waste reduction (Covered in the STPEGS Source Reduction and Waste minimization Program)	As required

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
TCEQ	Multi-sector stormwater Permit	Revision of Stormwater Pollution Prevention Plan	Areas meeting the definition of industrial activity to be added to current program.	As required
Texas Historical Commission (THC)	National Historic Preservation Act, (36 Code of Federal Regulations (CFR) 800), Texas Historical Commission T.A.C. Title 13, Part 2	Consultation regarding potential to adversely affect historic resources	Confirm site construction or operation would not affect protected historic resources. Triggering Activity: Authorization must be obtained before excavation or soil disturbance in area where historic resources are located.	Complete
NOAA, Texas Coastal Coordination Council (CCC)	Coastal Zone Management Act, Texas Coastal Management Plan implemented through CCC	Consistency review	NRC license, any individual Section 404 permit.	Complete Consistency Determination received 06/09/08
Texas Parks and Wildlife Division	Resource Protection (T.A.C. Title 31, Part 2, Chapter 69) Wildlife (T.A.C. Title 31, Part 2, Chapter 65)	Consultation regarding potential to adversely impact State-listed protected species	Adverse impacts on state-listed protected species and/or their habitat.	Complete

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
Texas Department of State Health Services	FCAA, 40 CFR Part 61, Subpart M, Texas Asbestos Health Protection (T.A.C. Title 25, Part 1, Chapter 295, Subchapter C)	Notice of intent for asbestos renovation, encapsulation, or demolition	Building demolition or renovation activities and asbestos abatement projects.	As required
State of Tennessee Department of Environment and Conservation Division of Radiological Health	Tennessee Department of Environment and Conservation Rule 1200-2-10.32	Revision of existing Tennessee Radioactive Waste License-for-Delivery	Transportation of radioactive waste into the State of Tennessee.	If required
State of Utah Department of Environmental Quality Division of Radiation Control	R313-26 of the Utah Radiation Control Rules	Revision of existing General Site Access Permit	Transportation of radioactive materials into the State of Utah.	If required
Coastal Plains Groundwater Conservation District (CPGCD)	Rules of the CPGCD, Chapter 3, Subchapter A	Groundwater Well Permit	New groundwater well installation and operation.	Issued 02/07/2008 Expires 02/28/2011

Table H-1. (contd)

Agency	Authority	Requirement	Activity Covered	Status
CPGCD	Rules of the CPGCD, Chapter 8	Capping and plugging of groundwater wells	Capping and plugging of monitoring wells at completion of subsurface investigation.	As required
Matagorda County	Flood Plain Management Plan C Zone Requirements	Land Disturbing Activity and Construction Permit	Land disturbing activities within the boundaries of Matagorda County including new construction and renovation of buildings.	As required

Appendix I

Carbon Dioxide Footprint Estimates for a 1000 MW(e) Light Water Reactor (LWR)

Appendix I

Carbon Dioxide Footprint Estimates for a 1000 MW(e) Light Water Reactor (LWR)

The review team has estimated the carbon dioxide (CO_2) footprint of various activities associated with nuclear power plants. These activities include building, operating, and decommissioning the plant. The estimates include direct emissions from the nuclear facility and indirect emissions from workforce transportation and the uranium fuel cycle.

Construction equipment estimates listed in Table I-1 are based on hours of equipment use estimated for a single nuclear power plant at a site requiring a moderate amount of terrain modification. Equipment usage for a multiple unit facility would be larger, but it is likely that it would not be a factor of 2 larger. A reasonable set of emissions factors used to convert the hours of equipment use to CO_2 emissions are based on carbon monoxide emissions (UniStar 2007) scaled to CO_2 using a scaling factor of 165 tons of CO_2 per ton of CO. This scaling factor is based on emissions factors in Table 3.3-1 of AP-42 (EPA 1995). Equipment emissions estimated for decommissioning are one half of those for construction.

Table I-1. Construction Equipment CO_2 Emissions (metric tons equivalent)

Equipment	Construction Total[(a)]	Decommissioning Total[(b)]
Earthwork and Dewatering	1.1×10^4	5.4×10^3
Batch Plant Operations	3.3×10^3	1.6×10^3
Concrete	4.0×10^3	2.0×10^3
Lifting and Rigging	5.4×10^3	2.7×10^3
Shop Fabrication	9.2×10^2	4.6×10^2
Warehouse Operations	1.4×10^3	6.8×10^2
Equipment Maintenance	9.6×10^3	4.8×10^3
TOTAL[(c)]	3.5×10^4	1.8×10^4

(a) Based on hours of equipment usage over 7-yr period.
(b) Based on equipment usage over 10-yr period.
(c) Total not equal to the sum due to rounding.

Workforce estimates are typical workforce numbers for new plant construction and operation based on estimates in various COL applications, and decommissioning workforce emissions estimates are based on decommissioning workforce estimates in NUREG-0586 S1, *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1*

Regarding the Decommissioning of Nuclear Power Reactors (NRC 2002). A typical construction workforce averages about 2500 for a 7-year period with a peak work force of about 4000. A typical operations workforce for the 40-year life of the plant is assumed to be about 400, and the decommissioning workforce during a decontamination and dismantling period of 10 years is assumed to be 200 to 400. In all cases, the daily commute is assumed to involve a 100-mi round trip with 2 individuals per vehicle. Considering shifts, holidays, and vacations,1250 roundtrips per day are assumed each day of the year during construction; 200 round trips per day are assumed each day during operations; and 150 round trips per day are assumed 250 days per year for the decontamination and dismantling portion of decommissioning. If the SAFSTOR decommissioning option is included in decommissioning, 20 round trips each day of the year are assumed for the caretaker workforce.

Table I-2 lists the review team's estimates of the CO_2 equivalent emissions associated with workforce transport. The table lists the assumptions used to estimate total miles traveled by each workforce and the factors used to convert total miles to metric tons CO_2 equivalent. CO_2 equivalent accounts for other greenhouse gases, such as methane and nitrous oxide, that are emitted by internal combustion engines. The workers are assumed to travel in gasoline powered passenger vehicles (cars, trucks, vans, and SUVs) that get an average of 19.7 mi per gallon of gas (FHWA 2006). Conversion from gallons of gasoline burned to CO_2 equivalent is based on Environmental Protection Agency emissions factors (EPA 2007a; 2007b).

Table I-2. Workforce CO_2 Footprint Estimates

	Construction Workforce	Operational Workforce	Decommissioning Workforce	SAFSTOR Workforce
Roundtrips per day	1250	200	150	20
Miles per roundtrip	100	100	100	100
Days per year	365	365	250	365
Years	7	40	10	40
Miles traveled	3.2×10^8	2.9×10^8	3.8×10^7	2.92×10^7
Miles per gallon[(a)]	19.7	19.7	19.7	19.7
Gallons fuel burned	1.6×10^7	1.5×10^7	1.9×10^6	1.58×10^6
Metric tons CO_2 per gallon[(b)]	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}	8.81×10^{-3}
Metric tons CO_2	1.4×10^5	1.3×10^5	1.7×10^4	1.3×10^4
CO_2 equivalent factor[(c)]	0.971	0.971	0.971	0.971
Metric tons CO_2 equivalent	1.5×10^5	1.3×10^5	1.7×10^4	1.3×10^4

(a) FHWA 2006
(b) EPA 2007b
(c) EPA 2007a

Published estimates of uranium fuel cycle CO_2 emissions required to support a nuclear power plant range from about 1 percent to about 5 percent of the CO_2 emissions from a comparably sized coal-fired plant (Sovacool 2008). A coal-fired power plant emits about 1 metric ton of CO_2 for each megawatt hour generated (Miller and Van Atten 2004). Therefore, for consistency with Table S-3 of Title10 of the Code of Federal Regulations (CFR) Part 51.51, the review team estimated the uranium fuel cycle CO_2 emissions as 0.05 metric tons of CO_2 per MWh generated. Finally, the review team estimated the CO_2 emissions directly related to plant operations from the typical usage of various diesel generators onsite using EPA emissions factors (EPA 1995). The review team assumed an average of 600 hrs of emergency diesel generator operation per year (total for 4 generators) and 200 hrs of station blackout diesel generator operation per year (total for 2 generators).

Given the various sources of CO_2 emissions discussed above, the review team estimates the total life CO_2 footprint for a reference 1000 MW(e) nuclear power plant with an 80 percent capacity factor to be about 18 million metric tons. The components of the footprint are summarized in Table I-3. The uranium fuel cycle component of the footprint dominates all other components. It is directly related to power generated. As a result, it is reasonable to use reactor power to scale the footprint to larger reactors.

Table I-3. 1000 MW(e) LWR Lifetime Carbon Dioxide Footprint

Source	Activity Duration (yr)	Total Emissions (metric tons)
Construction Equipment	7	3.5×10^4
Construction Workforce	7	1.5×10^5
Plant Operations	40	1.9×10^5
Operations Workforce	40	1.3×10^5
Uranium Fuel Cycle	40	1.7×10^7
Decommissioning Equipment	10	1.8×10^4
Decommissioning Workforce	10	1.7×10^4
SAFSTOR Workforce	40	1.3×10^4
TOTAL		1.8×10^7

In closing, the review team considers the footprint estimated in Table I-3 to be appropriately conservative. The CO_2 emissions estimates for the dominant component (uranium fuel cycle) are based on 30 year old enrichment technology assuming that the energy required for enrichment is provided by coal-fired generation. Different assumptions related to the source of energy used for enrichment or the enrichment technology that would be just as reasonable could lead to a significantly reduced footprint.

Emissions estimates presented in the body of this EIS have been scaled to values that are appropriate for the proposed project. The uranium fuel cycle emissions have been scaled by reactor power using the scaling factor determined in Chapter 6 and by the number of reactors to be built. Plant operations emissions have been adjusted to represent the number of large CO_2 emissions sources (diesel generators, boilers, etc.) associated with the project. The workforce emissions estimates have been scaled to account for differences in workforce numbers and commuting distance. Finally, equipment emissions estimates have been scaled by estimated equipment usage. As can be seen in Table I-3, only the scaling of the uranium fuel cycle emissions estimates makes a significant difference in the total carbon footprint of the project.

I.1 References

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U.S. Environmental Protection Agency (EPA). 2007b. "Conversion Factors to Energy Units (Heat Equivalents) Heat Contents and Carbon Content Coefficients of Various Fuel Types." *Inventory of U. S. Greenhouse Gas Emissions and Sinks: Fast Facts 1990-2005*. EPA-430-R-07-002. U.S. Environmental Protection Agency. Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2002. *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1 Regarding the Decommissioning of Nuclear Power Reactors*. NUREG-0586 Supplement 1, Vols. 1 and 2, Washington, D.C.

Appendix J

U.S. Army Corps of Engineers Cumulative Effect Resource Analysis Table

Table J-1. U.S. Army Corps of Engineers (Corps) Cumulative Effect Resource Analysis Table

Corps Resource/Issue	Summary of Direct Impacts of the Proposed Action	Included in Analysis	Explanation of Impact	Considered in South Texas Project (STP) EIS
Land Use Resources				
Local Land Plans and Policies	Compatible with all local Land Use plans and policies.	No	Documentation, not a resource	NA
Local and Regional Area Land Use	About 540 acres within the existing STP site would be cleared and excavated.	Yes	Area was previously disturbed by construction on Units 1 and 2. No new offsite transmission corridors are planned.	Section 7.1
Social and Economic Resources				
Environmental Justice	Disproportionate adverse effects to health or welfare of minority or low income groups	Yes	No disproportionate adverse effects of the proposed project.	Section 7.4.2
Community Cohesion	The proposed location is entirely within the existing STP site.	No	Not a pertinent resource	NA
ROW Requirements, Relocations, Displacements	A new heavy haul road would be installed for access to the barge slip. However, the activity is all onsite and there are no new ROW associated with the haul road.	No	All impacts from heavy haul road would be entirely within the existing STP site	NA
Public Facilities and Services	Hard and soft infrastructure	Yes	Moderate adverse impact to Matagorda County in housing, schools and possibly emergency services.	Section 7.4.1

Table J-1. (contd)

Corps Resource/Issue	Summary of Direct Impacts of the Proposed Action	Included in Analysis	Explanation of Impact	Considered in South Texas Project (STP) EIS
Visual Resources	Addition of structures and cooling towers.	Yes	Minimal impact due to proximity to existing facility.	Section 7.4.1
Existing Circulation Patterns	All current circulation patterns would remain after construction	No	Not a pertinent resource	
Traffic	Will generate additional traffic on roadways.	Yes	Peak traffic would result in congestion.	Section 7.4.1
Noise	Project would result in noise that could impact sensitive receptors	Yes	Workers, residents and recreational uses would not experience elevated noise levels.	Section 7.4.1
Recreational Boating	Project would include delivery of large components by barge	Yes	Construction and maintenance-dredging related impact.	Section 7.4.1
Marine Navigation	Project would include delivery of large components by barge	Yes	Construction and maintenance-dredging related impact.	Section 7.4.1
Natural Resources				
Prairie Uplands	No Direct Impacts	No	Not a pertinent resource, no coastal prairie as defined by FWS identified within the project area	NA
Riparian Habitat	No Direct Impacts	No	Not a pertinent resource	NA
Wildlife Habitat	Areas that may have formerly been used for habitat would be permanently or temporarily	Yes	Incremental contribution of impacts to terrestrial resources from building and operating proposed Units 3 and 4 would	Section 7.3.1

Table J-1. (contd)

Corps Resource/Issue	Summary of Direct Impacts of the Proposed Action	Included in Analysis	Explanation of Impact	Considered in South Texas Project (STP) EIS
	displaced, and migration routes may be temporarily or permanently blocked by construction and/or construction practices.		be SMALL.	
Threatened and Endangered Species	Construction disturbs existing habitats.	Yes	Impacts on terrestrial State and Federally listed threatened and endangered species from building activities on the STP site would be negligible.	Section 7.3.1
Migratory and Resident Birds	New structures create collision hazards.	Yes	Largest structure (cooling tower) is similar in height to other existing structures.	Section 7.3.1
Farmland	No Direct Impacts	No	Not a pertinent resource	NA
Water Quality	Water discharges to the Colorado River, minor stormwater runoff.	Yes	Construction and operations impacts would be SMALL	Section 7.2.2
Hazardous Materials	Radioactive and nonradioactive materials.	Yes	Radiological and nonradiological health impacts would be SMALL	Sections 7.7 and 7.8
Air Quality	Matagorda County is in attainment of all criteria pollutants.	Yes	Construction and operations impacts would be SMALL	Section 7.6
Wetlands: Estuarine	No Direct Impacts	No	Not a pertinent resource	NA
Wetlands: Dune Swale	No Direct Impacts	No	Not a pertinent resource	NA
Wetlands: Sand Flat	No Direct Impacts	No	Not a pertinent resource	NA
Floodplains	No Direct Impacts	No	Not a pertinent resource	NA

Table J-1. (contd)

Corps Resource/Issue	Summary of Direct Impacts of the Proposed Action	Included in Analysis	Explanation of Impact	Considered in South Texas Project (STP) EIS
Bay Bottom	No Direct Impacts	No	Discharge to Colorado River. Not a pertinent resource	NA
Coastal Hazards	No Direct Impacts	No	Discharge in to Colorado River. Not a pertinent resource	NA
Cultural Resources				
Archeology	No known resources anticipated to be impacted.	Yes	STPNOC has agreed to follow SHPO-approved procedures if cultural or historic resources are discovered during ground-disturbing activities associated with building Units 3 and 4. These procedures are detailed in STPNOC's Addendum #5 to procedure No. OPGP03-ZO-0025 Rev. 12 (Unanticipated Discovery of Cultural Resources); the procedures include notification of the SHPO at the Texas Historic Commission	Section 7.5
Historical Resources	No known resources anticipated to be impacted.	Yes		Section 7.5

Appendix K

U.S. Army Corps of Engineers
Public Notice Comments

Appendix K

U.S. Army Corps of Engineers Public Notice Comments

On March 25, 2010, the U.S. Army Corps of Engineers (Corps) published a public notice pursuant to Section 404 of the Federal Water Pollution Control Act (Clean Water Act) and Section 10 of the Rivers and Harbors Appropriation Act of 1899. The purpose of the public notice was to solicit comments from the public on STP Nuclear Operating Company's proposal to perform site preparation activities and construct supporting facilities at the South Texas Project Electric Generating Station site. Comments received on the public notice are listed in Table K-1. In addition, full copies of the comments (ML103130352) are provided in this appendix.

Table K-1. Corps Public Notice Comments

Source	Date of Comment
Texas Commission on Environmental Quality (Charles Maguire)	April 14, 2010
U.S. Fish and Wildlife Service (Catherine Yeargan)	April 26, 2010
U.S. Environmental Protection Agency (Sharon Fancy Parrish)	April 26, 2010
Texas Parks and Wildlife (Rebecca Hensley)	April 26, 2010

APR 19 2010

Bryan W. Shaw, Ph.D., *Chairman*
Buddy Garcia, *Commissioner*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 14, 2010

Mr. Jayson Hudson
U.S. Army Corps of Engineers
Galveston District CESWG-PE-RE
P.O. Box 1229
Galveston, Texas 77553-1229

Re: USACE Permit Application Number SWG-2007-00786

Dear Mr. Hudson:

As described in the Joint Public Notice (PN), dated March 25, 2010, the applicant, South Texas Nuclear Operating Company, proposes to dredge and expand two existing barge slips and construct a heavy-haul road by placing six culverts into waters of the United States. The project is located at the South Texas Nuclear Power Plant, eight miles west of Wadsworth, Matagorda County, Texas.

In addition to the information contained in the public notice, the following information is needed for review of the proposed project. Responses to this letter may raise other questions that will need to be addressed before a water quality certification determination can be made.

1. The site plan (Sheet 2 of 17), provided as an attachment to the PN, prominently identifies the location of the six proposed culverts and proposed stream crossings. However, the site plan does not provide any identification for significant project and infrastructure components or landmarks. In addition, various items presented on the site plan (printed and electronic versions) are unrecognizable or illegible. Please provide an updated site plan with project information provided in a clear and identifiable context.

2. The PN states that stream crossing impacts resulting from the placement of the six culverts are expected to total approximately 7,360 sq. ft. or 0.17 acres. No information is provided in the PN for the location and sizing of construction staging areas and heavy equipment access areas that will be required for construction activities within the stream channels. Please have the applicant provide any additional information if staging and access activities have the potential to adversely impact waters of the United States.

P.O. Box 13087 Austin, Texas 78711-3087 512-239-1000 Internet address: www.tceq.state.tx.us

printed on recycled paper using soy-based ink

Mr. Jayson Hudson
U.S. Army Corps of Engineers
USACE Permit Application Number SWG-2007-00786
Page 2
April 14, 2010

3. Mitigation of impacts is considered for "... all unavoidable adverse impacts that remain after all practicable avoidance and minimization has been completed ..." (30 TAC §279.11(c)(3)). According to the information provided in the 401 Certification Questionnaire, no compensatory mitigation is proposed due to the small scale of the proposed impacts and overall low quality nature of the aquatic resources. Please have the applicant provide additional information on potential mitigation/enhancement opportunities in the vicinity of the proposed impacts that can be incorporated into the project design to provide mitigation and improve the quality of the aquatic resources.

4. The Water Quality Impacts section of the 401 Certification Questionnaire states that concrete head walls will be constructed around the proposed culverts for long-term protection to prevent bank and shoreline erosion. Since no information is provided in the PN attachment sheets, it is unclear if the construction and placement of the concrete head walls will be conducted in conjunction with the current proposed project or if the concrete head walls will be constructed as a separate project at a future date. Please provide additional information concerning the long-term erosion and sediment controls and structures.

The Texas Commission on Environmental Quality (TCEQ) looks forward to receiving and evaluating other agency or public comments. Please provide any agency comments, public comments, as well as the applicant's comments, to Mr. Robert Hansen of the Water Quality Division MC-150, P.O. Box 13087, Austin, Texas 78711-3087. Mr. Hansen may also be contacted by e-mail at *rhansen@tceq.state.tx.us*, or by telephone at (512) 239-4583.

Sincerely,

Charles W. Maguire, Director
Water Quality Division
Texas Commission on Environmental Quality

CWM/RSH/sp

cc: Mr. Ben Rhame, Secretary, Coastal Coordination Council, P.O. Box 12873, Austin, Texas 78711-2873

Hudson, Jayson M SWG

From: Catherine_Yeargan@fws.gov
Sent: Monday, April 26, 2010 5:29 PM
To: Hudson, Jayson M SWG
Subject: SWG-2007-00786

Jayson,

The U.S. Fish and Wildlife Service (Service) has reviewed the Department of Army Public Notice for permit SWG-2007-00786. We can take NO ACTION on this permit at this time. Should future revisions require additional permits or amendments, we would appreciate the opportunity to provide you with our comments.

If you have any questions, please contact me at 281/286-8282 ext 249.

Sincerely,
Catherine Yeargan
Fish and Wildlife Service
Clear Lake ESFO
17629 El Camino Real #211
Houston, TX 77058-3051
(281) 286-8282 ext 249
(281) 488-5882 FAX

1

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

Jayson M. Hudson
Regulatory Branch, CESWG-PE-RB
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229

APR 26 2010

Dear Jayson M. Hudson:

The Environmental Protection Agency (EPA) has reviewed the Public Notice (PN) SWG-2007-00786, dated March 25, 2010, submitted by South Texas Nuclear Operating Company. The comments that follow are being provided for use in reaching a decision relative to compliance with the EPA's *404(b)(1) Guidelines for Specifications of Disposal Sites for Dredged or Fill Material (40 CFR Part 230)* (Guidelines).

The applicant, South Texas Nuclear Operating Company, is proposing impacts to an unspecified amount of acres of waters of the U.S., for the purpose of expanding South Texas Nuclear Operating Company. No compensatory mitigation is being offered by the applicant for impacts to waters of the U.S.

The draft environmental impact statement (dEIS) for the expansion of the South Texas Nuclear Operating Company project is currently under review and has not been approved. EPA understands the dredging and installation of culverts to be dependent on the approval of the dEIS and not as a separate project. It appears that the PN for the culverts and dredging is premature.

The purpose of the CWA Section 404(b)(1) Guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States. These goals are achieved, in part, by prohibiting discharges of dredged or fill material into the aquatic ecosystem that would result in avoidable or significant adverse impacts on the aquatic environment unless it can be demonstrated that there is no less environmentally damaging practicable alternative that achieves the project purpose [40 CFR 230.10(a)]. The applicant bears the burden for demonstrating that the proposed project is the least environmentally damaging practicable alternative that achieves the project purpose. The determination of the least environmentally damaging practicable alternative is achieved by performing an alternatives analysis that evaluates the direct, secondary, and cumulative impacts to waters of the U.S. resulting from each alternative considered. PN SWG-2007-00786, nor the associated draft EIS for the project, stated the amount of impacts to waters of the United States that would result from the proposed project or from each alternative presented and an accurate comparison of the alternatives could not be preformed.

If any impacts to waters of the United States occurs from the proposed dredging and

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instillation of the culverts (according to the draft EIS it is 7 culverts, according to the PN it is 6 culverts), there is no compensatory mitigation presented in either the draft EIS or the PN SWG-2007-00786. Proper mitigation of impacts to waters of the United States is a requirement of the CWA Section 404(b)(1) Guidelines.

It is EPA's decision that the project may not comply with the Guidelines and therefore EPA recommends that this Department of the Army permit be denied until the applicant addresses the alternatives analysis for the project and the amount of impacts to waters of the United States, the compensatory mitigation (including avoidance, minimization, and mitigation for impacts), and agrees to provide compensatory mitigation, within the project watershed, for the replacement of habitat value and wetland functions that would be lost. The amended information should be presented to all commenting agencies for review and comment, and EPA reserves the right to make further comments on the draft EIS. Thank you for the opportunity to review and comment on this public notice. If you have any questions regarding these comments, please contact Jenelle Hill of my staff at 214-665-9737.

Sincerely yours,

Sharon Fancy Parrish

Sharon Fancy Parrish
Chief
Wetlands Section

cc:
Jan Culbertson, Texas Parks & Wildlife Department, Dickinson, TX
Catherine Yeargan, U.S. Fish and Wildlife Services, TX

2

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April 26, 2010

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Re: Permit Application Number SWG-2007-00786
South Texas Nuclear Operating Company

Texas Parks and Wildlife Department (TPWD) has reviewed permit application number SWG-2007-00786 dated March 25, 2010. The applicant proposes to construct and operate two new nuclear units at the South Texas Project Site. The U.S Nuclear Regulatory Commission (NRC) has completed the "Draft Environmental Impact Statement for the Combined Licenses for South Texas Project Electric Generating Station Units 3 and 4" (NURGEG-1973). The U.S Army Corps of Engineers, Galveston District (Corps), is a cooperating agency on the Draft Environmental Impact Statement (DEIS). A Department of the Army Permit is required for the applicant to conduct maintenance dredging and expansion of the two existing barge slips located on the Colorado River and to construct a heavy-haul road from the barge-slip to the construction site by placing six culverts into waters of the United States. Dredged material will be placed in an existing confined dredge material placement area with no return water. The project would result in direct impacts to less than three acres of waters of state and less than 1,500 linear feet of stream. The project is located at the existing South Texas Nuclear Power Plant (STP) on FM 521, approximately 8 miles west of Wadsworth, Matagorda County, Texas.

Please be aware that a written response to a TPWD recommendation or informational comments received by a state governmental agency on or after September 1, 2009 may be required by state law. For further guidance, please see Texas Parks & Wildlife Code Section 12.0011 at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm.

A site visit to the barge slip located on the Colorado River that is proposed to be expanded and undergo maintenance dredging was conducted on February 6, 2008. The barge slip depth has been reduced by siltation. The shoreline of the slip has naturalized and is now vegetated with emergent vegetation that is dominated by *Phragmites australis*. Water depths adjacent to the vegetated shoreline are shallow and gradually become deeper toward the middle of the barge slip. During the site visit, numerous avian species were observed at the project site, including the barge slip area. The species observed at the barge slip area were Carolina chickadee, American kestrel, great-blue heron, red-shouldered hawk, and red-tailed hawk. An un-identified snake was also observed at the barge slip area.

It is unclear in the proposed plans whether the proposed heavy-haul road (and associated wetland impacts) from the barge-slip to the construction site is a new road or an expansion of the existing road. An existing road from the existing STP area to the existing barge slip was present during the site visit. A long portion of this road

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Mr. Hudson
Mr. Fisher
Page 2 of 2
April 26, 2010

had a vegetated ditch running parallel to it. Crawfish and crawfish chimneys were observed along the road/vegetated ditch. Numerous avian species were also observed feeding within this area including snowy egrets, white egrets, great-blue herons, black-crowned night herons and American coots. Avian species viewed in other areas of the STP site included common snipes, American pipit, Sprague's pipit, meadow larks, killdeer, crested caracaras and brown and white pelicans. White-tailed deer and alligators were also observed at the project site.

TPWD staff was not able to locate a specific compensatory mitigation plan for the project's proposed wetland impacts or any other habitats proposed to be impacted in the Department of the Army Public Notice or in the DEIS. TPWD's review of Section 4.11 of the DEIS, Measures and Controls to Limit Adverse Impacts During Construction Activities, provides some very generalized measures and controls that the review team considered in its evaluation of impacts of building Units 3 and 4. Table 4-6 also provides the team's list of measures and controls proposed by South Texas Project Electric Generating Station Nuclear Operating Company to limit adverse impacts during building Units 3 and 4. Section 4.12 of the DEIS, Summary of Preconstruction and Construction Impacts, and Table 4-7 provide a summary of the impact levels determined by the review team which categorizes the impacts as small, moderate or large. The review team's determination of the impact category levels is based on the assumption that the mitigation measures identified in the Environmental Report (ER) or activities planned by various State and county governments, such as infrastructure upgrades (discussed throughout this chapter), are implemented. Failure to implement these upgrades might result in a change in the impact category. Possible mitigation measures of adverse impacts, where appropriate, are presented in Section 4.11. However, none of the mitigation measures and controls include compensatory mitigation for the project's proposed impacts to fish and wildlife habitat including waters of the U.S.

TPWD recommends that the applicant formulate a compensatory mitigation plan for all impacts to wetlands and shallow water habitat from the proposed project. TPWD requests the opportunity to review and comment on the compensation plan prior to the issuance of the permit.

Questions can be directed to Ms. Cherie O'Brien at (281) 534-0132 or Mr. Jamie Schubert at (281) 534-0135 in our Dickinson Marine Laboratory.

Sincerely,

Rebecca Hensley
Regional Director, Ecosystem Resources Program
Science and Policy Branch
TPWD Coastal Fisheries Division

RH:WJS:COB

NRC FORM 335
(9-2004)
NRCMD 3.7

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

(See instructions on the reverse)

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.)

NUREG-1937 Vol. 2

2. TITLE AND SUBTITLE

Environmental Impact Statement for Combined Licenses (COLs) for South Texas Project Electric Generating Station Units 3 and 4
Final Report

3. DATE REPORT PUBLISHED

MONTH	YEAR
February	2011

4. FIN OR GRANT NUMBER

5. AUTHOR(S)

See Appendix A

6. TYPE OF REPORT

Technical

7. PERIOD COVERED *(Inclusive Dates)*

8. PERFORMING ORGANIZATION - NAME AND ADDRESS *(If NRC, provide Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)*

Division of Site and Environmental Reviews
Office of New Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS *(If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)*

Same as above

10. SUPPLEMENTARY NOTES

Docket Nos. 52-012, 52-013

11. ABSTRACT *(200 words or less)*

This environmental impact statement (EIS) has been prepared in response to an application submitted by Nuclear Innovation North America LLC (NINA) to the U.S. Nuclear Regulatory Commission (NRC) for combined licenses (COLs) for Units 3 and 4 at the South Texas Project Electric Generating Station (STP) site in Matagorda County, Texas. This EIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action and mitigation measures for reducing and avoiding adverse impacts.

The NRC staff's recommendation to the Commission, considering the environmental aspects of the proposed action, is that the COLs be issued. This recommendation is based on (1) the COL application, including the Environmental Report submitted by NINA; (2) consultation with Federal, State, Tribal, and local agencies; (3) the review team's independent review; (4) the consideration of public comments; and (5) the assessments summarized in this EIS, including the potential mitgation measures identified in the ER and this EIS.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*

South Texas Project, STP,
Environmental Impact Statement, EIS,
National Environmental Policy Act, NEPA,
COL, COLA, combined licenses,
environmental review

13. AVAILABILITY STATEMENT

unlimited

14. SECURITY CLASSIFICATION

(This Page)

unclassified

(This Report)

unclassified

15. NUMBER OF PAGES

16. PRICE

PRINTED ON RECYCLED PAPER

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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NUREG-1937, Vol. 2
Final

Environmental Impact Statement for Combined Licenses (COLs) for
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