

Executive Summary

Glossary and Abbreviations

1	Introduction -----	1-1
1.0	Introduction	1-1
1.1	Project Overview	1-1
1.2	EIS Objective	1-1
1.3	Project Proponent	1-1
1.4	Proposed Project	1-2
1.5	Project Schedule	1-3
1.6	Scope of EIS	1-4
1.6.1	Project Components	1-4
1.6.2	EIS Studies	1-4
1.7	Project Objectives and Rationale	1-5
1.7.1	Project Need	1-5
1.7.2	Market Conditions	1-6
1.7.3	Project Benefits	1-7
1.8	Environmental Impact Assessment Process	1-8
1.8.1	EIS Preparation Process	1-8
1.8.2	Queensland Government Process	1-8
1.8.3	EIS Submissions	1-9
1.8.4	Public Consultation Process	1-9
1.8.5	Commonwealth Government Process	1-10
1.8.6	EIS Schedule	1-11
1.9	Project Approvals and Legislative Framework	1-11
1.9.1	Native Title Act	1-11
1.9.2	Environmental Protection Act	1-11
1.9.3	Integrated Planning Act	1-12
1.9.4	Aboriginal Cultural Heritage Act	1-13
1.9.5	Minerals Resources Act	1-13
1.9.6	Vegetation Management Act	1-13
1.9.7	Fisheries Act	1-13
1.9.8	Nature Conservation Act	1-13
1.9.9	Coastal Protection and Management Act	1-13
1.9.10	Other Approvals	1-14
1.9.11	Policies	1-14
1.9.12	GSDA Development Scheme	1-15
1.9.13	Local Government	1-15
1.9.14	Marlborough Approvals Process	1-15
1.10	Report Structure	1-15
2	Proposed Project -----	2-1
2.0	Proposed Project	2-1
2.1	Site Location	2-1
2.2	Project Components	2-1
2.2.1	Refinery	2-1
2.2.2	Residue Storage Facility	2-2
2.2.3	Pipelines	2-2

2.2.4	Wharf Facilities	2-2
2.3	Construction Phase	2-3
2.3.1	Refinery Construction Workforce	2-3
2.3.2	Site Access	2-4
2.3.3	Construction Equipment	2-4
2.3.4	Refinery Construction	2-4
2.3.5	RSF Construction	2-7
2.3.6	Pipelines Construction	2-9
2.4	Project Staging	2-15
2.5	Project Design	2-16
2.5.1	Leach Plant	2-17
2.5.2	Metals Plant	2-19
2.5.3	Reagents	2-20
2.5.4	Process Gases	2-20
2.5.5	Power Station	2-21
2.5.6	Pipelines	2-21
2.6	Project Inputs	2-24
2.6.1	Nickel Cobalt Laterite Ore	2-24
2.6.2	Sulphur	2-25
2.6.3	Ammonia	2-25
2.6.4	Limestone	2-25
2.6.5	Lime	2-26
2.6.6	Other Reagents	2-26
2.7	Project Outputs	2-32
2.7.1	Nickel and Cobalt Briquettes	2-32
2.7.2	Ammonium Sulphate	2-32
2.8	Operational Phase	2-34
2.8.1	Operational Workforce	2-34
2.8.2	Contract Personnel	2-34
2.8.3	Refinery Operations	2-35
2.8.4	Pipeline Operations	2-35
2.9	Decommissioning	2-35
2.9.1	Contaminated Land	2-36
2.9.2	Refinery	2-36
2.9.3	Residue Storage Facility	2-37
2.9.4	Pipelines	2-37
3	Project Infrastructure-----	3-1
3.0	Project Infrastructure	3-1
3.1	Water Supply	3-1
3.1.1	Raw Water	3-1
3.1.2	Potable Water	3-2
3.1.3	Seawater	3-2
3.2	Electricity	3-3
3.2.1	Refinery and Wharf Facilities	3-3
3.2.2	Fisherman's Landing Facility	3-4
3.2.3	Residue Storage Facility	3-4
3.2.4	Slurry Pipeline	3-5
3.3	Natural Gas	3-5
3.4	Sewerage	3-5
3.5	Stormwater Drainage	3-5
3.6	Telecommunications	3-6

3.7	Buildings	3-6
4	Waste Management -----	4-1
4.0	Waste Management	4-1
4.1	Introduction	4-1
4.2	Legal Requirements	4-1
4.2.1	Government Policy	4-1
4.2.2	Waste Definitions	4-1
4.3	Waste Minimisation	4-2
4.3.1	Waste Management Plan	4-2
4.3.2	Waste Prevention	4-3
4.3.3	Waste Separation	4-3
4.3.4	Contamination Avoidance	4-3
4.4	Waste Tracking	4-3
4.5	Construction Wastes	4-4
4.5.1	Pipeline Construction	4-4
4.5.2	Refinery and Residue Storage Facility Construction	4-4
4.5.3	Waste Generation	4-5
4.5.4	Potential Impacts and Mitigation Measures	4-6
4.6	Operational Liquid Wastes	4-7
4.6.1	RSF Thickener Overflow and Decant Liquor	4-8
4.6.2	Power Station Cooling Water	4-9
4.6.3	Sewage	4-9
4.6.4	Stormwater Runoff	4-9
4.6.5	Start-up and Shutdown Wastes	4-9
4.7	Operational Solid Wastes	4-9
4.7.1	Process Residue	4-10
4.7.2	Autoclave Scale	4-10
4.7.3	Lime Slaker Grit	4-10
4.7.4	Sulphur Filter Rejects	4-11
4.7.5	Zinc Sulphide	4-11
4.7.6	Solvent Extraction Crud	4-11
4.7.7	Acid Plant Catalyst	4-11
4.7.8	General Refuse	4-11
4.8	Operational Air Emissions	4-12
4.9	Pipeline Operational Wastes	4-13
4.10	Waste Disposal	4-13
5	Alternatives -----	5-1
5.0	Alternatives	5-1
5.1	Introduction	5-1
5.2	Ecologically Sustainable Development	5-1
5.3	Site Alternatives	5-2
5.3.1	Refinery	5-2
5.3.2	Residue Storage Facility	5-2
5.4	Ore Delivery Alternatives	5-3
5.4.1	Marlborough Ore	5-3
5.4.2	Imported Ore	5-3
5.5	Slurry Pipeline Route Alternatives	5-4
5.5.1	Identification of Preferred Route	5-4
5.5.2	Route Refinement	5-7

5.5.3	Multi-User Pipeline Corridor	5-10
5.6	Alternative Residue Pipelines Route	5-10
5.7	Process Alternatives	5-10
5.7.1	Nickel Extraction	5-10
5.7.2	High Pressure Acid Leach Process	5-11
5.7.3	Comparison of Potential Environmental Impacts	5-11
5.7.4	Intermediate Product and Refining Alternatives	5-13
5.8	Energy Alternatives	5-13
5.9	Water Alternatives	5-13
5.9.1	Process Water	5-13
5.9.2	Cooling Water	5-14
5.9.3	Marlborough Ore Slurry Water	5-14
5.10	Residue Storage Alternatives	5-15
5.11	Barren Liquor Disposal Alternatives	5-16
5.11.1	Disposal to Port Curtis	5-16
5.11.2	Pond Evaporation	5-16
5.11.3	Forced Evaporation	5-17
5.11.4	Membrane Technology	5-17
5.12	Barren Liquor Treatment Alternatives	5-17
5.12.1	Neutralisation of Alumina Refining Residues	5-17
5.12.2	Lime Neutralisation	5-18
5.12.3	Oxidative Precipitation of Manganese	5-18
5.13	Accommodation Alternatives	5-19
5.14	Modularisation	5-19
5.15	“No Project” Alternative	5-19
6	Transportation -----	6-1
6.0	Transportation	6-1
6.1	Study Background and Scope	6-1
6.2	Road Transport	6-2
6.2.1	Existing Road Network for Refinery	6-2
6.2.2	Existing Traffic	6-3
6.2.3	Project Traffic	6-4
6.2.4	Traffic Distribution and Assignment	6-6
6.2.5	Traffic Predictions	6-7
6.2.6	Intersection Analysis	6-11
6.2.7	Pavement Impact Assessment	6-21
6.2.8	Public Transport	6-23
6.3	Shipping	6-23
6.3.1	Wiggins Island	6-23
6.3.2	Fisherman’s Landing	6-24
6.3.3	Shipping Movements and De-ballasting Requirements	6-24
6.4	Rail Transport	6-25
6.5	Air Transport	6-25
6.5.1	Passenger Movements	6-25
6.5.2	Aviation Safety Assessment	6-25
7	Environmental Effects of Pipelines -----	7-1
7.0	Environmental Effect of Pipelines	7-1
7.1	Climate	7-1
7.1.1	Description of Environmental Values	7-1

7.1.2	Potential Impacts and Mitigation Measures	7-3
7.2	Terrain and Soils	7-3
7.2.1	Topography	7-3
7.2.2	Geology	7-4
7.2.3	Soils	7-6
7.2.4	Acid Sulphate Soils	7-11
7.2.5	Bull Dust	7-12
7.2.6	Good Quality Agricultural Land	7-12
7.2.7	Potential Contaminated Land	7-13
7.3	Water Resources	7-14
7.3.1	Description of Environmental Values	7-15
7.3.2	Surface Water	7-15
7.3.3	Groundwater	7-19
7.3.4	Watercourse Crossings	7-22
7.4	Flora	7-32
7.4.1	Methodology	7-32
7.4.2	Vegetation Communities/Regional Ecosystems	7-33
7.4.3	Commonwealth Endangered Ecological Communities	7-34
7.4.4	Regional Ecosystems	7-34
7.4.5	Protected Vegetation	7-35
7.4.6	Commonwealth Protected Species	7-35
7.4.7	State Protected Species	7-36
7.4.8	Matters of National Environmental Significance	7-36
7.4.9	Aquatic Vegetation	7-36
7.4.10	Declared Weeds	7-37
7.4.11	Potential Impacts	7-38
7.4.12	Proposed Mitigation Measures	7-42
7.5	Fauna	7-43
7.5.1	Methodology	7-43
7.5.2	Terrestrial Fauna and Fauna Habitat	7-44
7.5.3	EVR Fauna Species	7-45
7.5.4	Other Fauna Species of Conservation Significance	7-46
7.5.5	Common Fauna	7-47
7.5.6	Aquatic Fauna	7-47
7.5.7	Matters of National Environmental Significance	7-48
7.5.8	Potential Impacts	7-49
7.5.9	Proposed Mitigation Measures	7-54
7.6	Air	7-58
7.6.1	Description of Environmental Values	7-58
7.6.2	Potential Impacts	7-58
7.6.3	Proposed Mitigation Measures	7-58
7.7	Noise	7-59
7.7.1	Description of Environmental Values	7-59
7.7.2	Potential Impacts	7-60
7.7.3	Proposed Mitigation Measures	7-61
7.8	Hazard and Risk	7-61
7.8.1	Overview	7-61
7.8.2	Preliminary Risk Assessment Methodology	7-61
7.8.3	Impact Mitigation	7-64
7.8.4	Further Risk Assessment	7-65

8	Environmental Effects of Refinery -----	8-1
8.0	Environmental Effects of Refinery	8-1
8.1	Terrain and Soils	8-1
8.1.1	Topography and Drainage	8-1
8.1.2	Site Geology	8-1
8.1.3	Soils	8-2
8.1.4	Topsoil	8-4
8.1.5	Implications for Rehabilitation	8-5
8.1.6	Soil Erosion	8-6
8.1.7	Agricultural Land Capability	8-6
8.1.8	Land Management and Rehabilitation	8-8
8.1.9	Acid Sulphate Soils	8-9
8.1.10	Soil Contamination	8-12
8.1.11	Regional Seismicity	8-14
8.2	Surface Water	8-15
8.2.1	Description of Environmental Values	8-15
8.2.2	Potential Impacts and Mitigation Measures – Construction Phase	8-24
8.2.3	Potential Impacts and Mitigation Measures – Operational Phase	8-25
8.3	Marine Environment	8-28
8.3.1	Review of Existing Information	8-28
8.3.2	Field Survey	8-29
8.3.3	Port Curtis Setting	8-30
8.3.4	Physical Characteristics of Port Curtis	8-30
8.3.5	Marine Habitat Characteristics of Port Curtis	8-31
8.3.6	Marine Conservation Areas including World Heritage	8-35
8.3.7	Threatened and Migratory Species including Matters of National Environmental Significance	8-38
8.3.8	Commercial and Recreational Fishing	8-39
8.3.9	Existing Water Quality	8-40
8.3.10	Ambient Water Quality Guidelines	8-43
8.3.11	Discharge Modelling	8-48
8.3.12	Refinery Discharge	8-49
8.3.13	Water Quality Impacts of Refinery Discharge	8-52
8.3.14	Pipeline Crossing of Calliope River	8-57
8.3.15	Potential Marine Impacts from Materials Handling	8-58
8.3.16	Shipping Impacts	8-60
8.4	Groundwater	8-63
8.4.1	Data Review	8-63
8.4.2	Groundwater Geology and Aquifer Occurrence	8-63
8.4.3	Groundwater Levels and Flow Characteristics	8-64
8.4.4	Potential Groundwater Impacts – Construction Phase	8-66
8.4.5	Potential Groundwater Impacts – Operations Phase	8-67
8.4.6	Mitigation Strategies	8-67
8.5	Terrestrial Flora	8-68
8.5.1	Study Aim and Objectives	8-68
8.5.2	Review of Existing Information	8-68
8.5.3	Field Survey	8-69
8.5.4	Regional Context	8-69
8.5.5	Survey Results	8-70
8.5.6	Environmentally Sensitive Areas	8-73

8.5.7	Vegetation of Conservation Significance and Matters of National Environmental Significance	8-74
8.5.8	Regional Connectivity	8-75
8.5.9	Vegetation Clearing	8-75
8.5.10	Management Strategies	8-76
8.6	Terrestrial Fauna	8-78
8.6.1	Introduction	8-78
8.6.2	Review of Existing Information	8-78
8.6.3	Survey	8-79
8.6.4	Species of Conservation Value	8-81
8.6.5	Exotic Animals	8-83
8.6.6	Potential Impacts	8-83
8.6.7	Management Measures	8-84
8.7	Air Quality	8-84
8.7.1	Introduction	8-84
8.7.2	Climate	8-84
8.7.3	Legislative Framework	8-87
8.7.4	Existing Air Quality Monitoring	8-90
8.7.5	Modelled Concentrations of SO ₂ and NO ₂	8-91
8.7.6	Air Emissions During Operations	8-92
8.7.7	Emission Rates	8-92
8.7.8	Dispersion Modelling	8-97
8.7.9	Emissions During Construction	8-101
8.7.10	Greenhouse Gas Assessment	8-101
8.8	Noise	8-105
8.8.1	Introduction	8-105
8.8.2	Existing Environment	8-106
8.8.3	Noise Criteria	8-107
8.8.4	Noise Model	8-110
8.8.5	Assessment	8-112
8.8.6	Construction Noise and Vibration	8-114
9	Environmental Effects of Residue Storage Facility -----	9-1
9.1	Terrain and Soils	9-1
9.1.1	Existing Environment	9-1
9.1.2	Topsoil Resources	9-5
9.1.3	Implications for Rehabilitation	9-6
9.1.4	Soil Erosion	9-7
9.1.5	Agricultural Land Capability	9-7
9.2	Residue Characterisation	9-10
9.2.1	Introduction	9-10
9.2.2	Residue Characteristics	9-10
9.3	RSF Design	9-13
9.3.1	Design Criteria	9-13
9.3.2	Embankment Design	9-14
9.3.3	Upstream Raises	9-15
9.3.4	Seepage Collection System	9-15
9.3.5	Spillway	9-16
9.4	RSF Operations	9-16
9.4.1	Residue Disposal	9-16
9.4.2	Mud Farming	9-17
9.4.3	Water Balance	9-17

9.4.4	Monitoring	9-19
9.4.5	Risk Management	9-20
9.5	RSF Closure	9-20
9.5.1	Overview	9-20
9.5.2	Cover Design	9-21
9.5.3	Seepage Modelling	9-22
9.5.4	Stormwater Management	9-23
9.6	Surface Water	9-25
9.6.1	Catchment Context	9-25
9.6.2	Rainfall and Evaporation	9-25
9.6.3	Catchments, Drainage and Topography	9-26
9.6.4	Streamflow and Flow Regime	9-26
9.6.5	Water Quality	9-26
9.6.6	Water Use	9-27
9.6.7	Summary of Environmental Values	9-27
9.6.8	Potential Impacts and Mitigation Measures – Construction Phase	9-27
9.6.9	Potential Impacts and Mitigation Measures – Operational Phase	9-29
9.7	Groundwater	9-30
9.7.1	Existing Groundwater Data	9-30
9.7.2	Groundwater Geology and Aquifer Occurrence	9-30
9.7.3	Groundwater Levels and Flow Characteristics	9-31
9.7.4	Hydraulic Parameters	9-31
9.7.5	Water Quality	9-32
9.7.6	Groundwater Use in Neighbouring Areas	9-33
9.7.7	Potential Groundwater Impacts – Construction Phase	9-34
9.7.8	Potential Groundwater Impacts – Operations Phase	9-34
9.8	Land Management and Rehabilitation	9-35
9.8.1	Rehabilitation Goals	9-35
9.8.2	Post-Project Land Use and Suitability	9-36
9.8.3	Rehabilitation Strategy	9-36
9.9	Terrestrial Flora	9-38
9.9.1	Study Aim and Objectives	9-38
9.9.2	Data Review and Field Survey	9-38
9.9.3	Regional Context	9-39
9.9.4	Existing Conservation Values	9-40
9.9.5	Potential Impacts and Mitigation Measures	9-45
9.10	Terrestrial Fauna	9-47
9.10.1	Study Aim and Objectives	9-47
9.10.2	Data Review and Field Survey	9-48
9.10.3	Survey Results	9-49
9.10.4	Species of Conservation Value and Matters of National Environmental Significance	9-51
9.10.5	Exotic Animals	9-53
9.10.6	RSF Habitat Conservation Values	9-54
9.10.7	Potential Impacts and Mitigation Measures	9-55
9.11	Freshwater Ecology	9-58
9.11.1	Introduction	9-58
9.11.2	Overview	9-58
9.11.3	Farmer Creek	9-60
9.11.4	Larcom Creek	9-60
9.11.5	Discussion	9-61
9.12	Air Quality	9-62
9.12.1	Existing Air Quality	9-62

9.12.2	Emissions	9-62
9.12.3	Dust	9-63
9.13	Noise	9-63
10	Socio-Economic Effects	10-1
10.0	Socio-Economic Effects	10-1
10.1	Introduction	10-1
10.2	Methodology	10-1
10.3	Existing Demographic Profile	10-2
10.3.1	Existing Population	10-2
10.3.2	Age Structure	10-3
10.3.3	Family Structure	10-3
10.3.4	Residency	10-4
10.3.5	Indigenous Population	10-4
10.3.6	Labour Force and Unemployment	10-4
10.3.7	Employment by Industry and Occupation	10-5
10.3.8	Income	10-5
10.3.9	Education Profile	10-5
10.3.10	Population Projections	10-6
10.4	Existing Housing and Accommodation Facilities	10-6
10.4.1	Introduction	10-6
10.4.2	Dwelling Structure	10-7
10.4.3	Household Size	10-7
10.4.4	Home Ownership	10-7
10.4.5	Residential Land Supply	10-7
10.4.6	Approval and Construction of Dwellings	10-8
10.4.7	Property Prices	10-8
10.4.8	Rental Property	10-9
10.4.9	Public Housing	10-9
10.4.10	Hotel and Motel Accommodation	10-10
10.4.11	Caravan Parks	10-10
10.4.12	Workers' Villages	10-10
10.5	Project Workforce	10-10
10.5.1	Construction Workforce	10-10
10.5.2	Operational Workforce	10-12
10.5.3	Indirect Workforce	10-12
10.5.4	Workforce Requirements of Other Projects	10-14
10.5.5	Workforce Availability	10-15
10.6	Demographic Effects	10-16
10.6.1	Origin of Imported Workers	10-16
10.6.2	Living Arrangements of Imported Workers	10-17
10.6.3	Population Associated with Imported Workers	10-18
10.7	Effects on Housing and Accommodation Facilities	10-19
10.7.1	Predicted Housing Requirements	10-19
10.7.2	Housing Strategy	10-22
10.7.3	Mitigation Initiatives	10-25
10.8	Community Services, Facilities and Lifestyle	10-26
10.8.1	Health Facilities and Services	10-26
10.8.2	Education and Training	10-27
10.8.3	Community Facilities and Services	10-29
10.8.4	Childcare	10-29
10.8.5	Sport and Recreation	10-29

10.8.6	Shopping Facilities	10-29
10.8.7	Community Vitality, Lifestyle and Values	10-30
10.9	Economic Effects	10-31
10.9.1	Economic Profile	10-31
10.9.2	Economic Impact	10-32
10.9.3	Other Economic Effects	10-35
10.10	Land Tenure	10-35
10.10.1	Refinery	10-35
10.10.2	Residue Storage Facility	10-36
10.10.3	Pipelines	10-37
10.10.4	Conveyor and Seawater Pipelines	10-38
10.10.5	Native Title	10-38
10.11	Land Use	10-39
10.11.1	Refinery	10-39
10.11.2	Residue Storage Facility	10-40
10.11.3	Pipelines	10-40
10.11.4	Regional Land Uses	10-43
10.12	Land Use Planning	10-45
10.12.1	Gladstone State Development Area	10-45
10.12.2	Calliope Shire Council	10-47
10.12.3	Fitzroy Shire	10-48
10.12.4	Central Queensland Regional Growth Management Framework	10-49
10.12.5	Curtis Coast Regional Management Plan	10-51
10.13	Visual Impacts	10-53
10.13.1	Visual Features	10-53
10.13.2	Existing Landscape Character	10-54
10.13.3	Landscape Character Zones	10-55
10.13.4	Landscape Quality	10-58
10.13.5	Scenic Quality Rating	10-59
10.13.6	Visual Assessment Methodology	10-61
10.13.7	Viewing Situations Descriptions	10-61
10.13.8	Visual Impact Assessment Criteria	10-69
10.13.9	Summary	10-71
10.13.10	Mitigation Measures	10-73
10.13.11	Conclusion	10-73
11	Cultural Heritage	11-1
11.0	Cultural Heritage	11-1
11.1	Background	11-1
11.1.1	Methodology	11-1
11.1.2	Legislative Framework	11-1
11.2	Desktop Heritage Assessment	11-2
11.2.1	Register Searches	11-3
11.2.2	Review of Documentation	11-4
11.3	Potential Impacts and Mitigation Measures	11-5
11.4	Cultural Heritage Management Plans	11-6
11.4.1	Engagement with Aboriginal Parties	11-6
11.4.2	Progress to Date	11-6
11.4.3	CHMP Description	11-7

12	Community Consultation-----	12-1
12.1	Introduction	12-1
12.2	Objectives	12-1
12.2.1	Approach	12-2
12.3	Methodology	12-2
12.3.1	Overview	12-2
12.3.2	Stakeholder Identification	12-2
12.3.3	Consultation Methods	12-5
12.3.4	Feedback Process	12-6
12.3.5	Consultation Database	12-6
12.4	Consultation Program	12-6
12.4.1	Public Release of Key Project Documents	12-6
12.4.2	Stakeholder Meetings and Briefings	12-7
12.4.3	Industry Affiliations	12-10
12.4.4	Project Newsletters and Brochures	12-10
12.4.5	Media Releases and Advertising	12-11
12.4.6	Website Updates	12-11
12.4.7	Enquiry and Feedback System	12-12
12.5	Key Issues and Responses	12-12
12.6	Ongoing Consultation	12-15
13	Risk and Safety-----	13-1
13.0	Risk and Safety	13-1
13.1	Introduction	13-1
13.2	Health and Safety Management	13-1
13.2.1	Policies and Objectives	13-1
13.2.2	Legislative Compliance	13-1
13.2.3	Dangerous Goods	13-2
13.2.4	Safety Management System	13-3
13.2.5	HSE Management Standards	13-3
13.2.6	Audits and Inspections	13-4
13.2.7	HSE Risk Management	13-4
13.3	Risk Management Approach	13-4
13.4	Risk Analysis	13-5
13.4.1	Risk Matrix	13-5
13.4.2	Analysis Methodology	13-7
13.4.3	Hazard Identification	13-7
13.4.4	Workshop Review	13-7
13.4.5	Consequence Modelling	13-7
13.5	Risk Analysis Results	13-8
13.6	Risk Mitigation	13-12
13.6.1	Solvent Extraction	13-12
13.6.2	Ammonia Areas	13-12
13.6.3	Nickel and Cobalt Reduction	13-13
13.6.4	Hydrogen Sulphide Areas	13-13
13.7	Emergency Planning and Management	13-13
13.7.1	Emergency Services	13-13
13.7.2	First Response Teams	13-14
13.7.3	First Aid	13-15
13.7.4	Emergency Response Plans	13-15

13.8	Workplace Health and Safety	13-17
13.9	Workplace Hazards	13-18
13.9.1	Hazardous Substances	13-18
13.9.2	Noise	13-19
13.9.3	Heat	13-19
13.9.4	Confined Spaces	13-19
13.9.5	Working at Heights	13-19
13.9.6	Fires	13-19
13.9.7	Vehicle Safety	13-20
13.9.8	Equipment Failure	13-20
13.9.9	Manual Handling	13-20
13.9.10	Natural Hazards	13-20
13.9.11	Pests	13-22
13.9.12	Monitoring of Workplace Hazards	13-23
13.9.13	Personal Protective Equipment	13-23
13.9.14	Workplace Health and Safety Training	13-23
14	Environmental Management Plan -----	14-1
14.0	Environmental Management Plan	14-1
14.1	Introduction	14-1
14.2	Objectives	14-1
14.3	Legislation	14-1
14.4	Responsibilities	14-2
14.4.1	Construction Phase	14-2
14.4.2	Operations Phase	14-2
14.5	Reporting and Auditing	14-2
14.6	Training and Communications	14-3
14.7	Review	14-3
14.8	Pipelines Construction Environmental Management Plan	14-4
14.8.1	Objectives	14-4
14.8.2	EMP Structure	14-4
14.8.3	Construction Management	14-5
14.8.4	Issue Specific Management	14-12
14.8.5	Special Area Plans	14-26
14.9	Pipelines Operations Environmental Management Plan	14-28
14.9.1	Operational Activities	14-28
14.9.2	Development of Operations EMP	14-28
14.10	Refinery and RSF Construction Environmental Management Plan	14-29
14.10.1	Waste Management Plan	14-29
14.10.2	Air Quality Management Plan	14-30
14.10.3	Noise Management Plan	14-31
14.10.4	Soil Contamination Management Plan	14-32
14.10.5	Acid Sulphate Soil Management Plan	14-33
14.10.6	Groundwater Management Plan	14-34
14.10.7	Surface Water Management Plan	14-35
14.10.8	Flora Management Plan	14-36
14.10.9	Fauna Management Plan	14-37
14.10.10	Mosquito Management Plan	14-38
14.10.11	Pest Management Plan	14-39
14.10.12	Chemical and Dangerous Goods Management Plan	14-39
14.10.13	Traffic Management Plan	14-40
14.10.14	Housing Management Plan	14-41

14.10.15 Cultural Heritage Management Plan	14-42
14.10.16 Health and Safety Management	14-43
14.10.17 Emergency Response Management	14-44
14.10.18 Recruitment and Training Management	14-44
14.10.19 Incidents and Complaints Management	14-45
14.11 Refinery and RSF Operations Environmental Management Plan	14-47
14.11.1 Waste Management Plan	14-47
14.11.2 Air Quality Management Plan	14-48
14.11.3 Greenhouse Gas Management Plan	14-49
14.11.4 Noise Management Plan	14-50
14.11.5 Surface Water Management Plan	14-51
14.11.6 Groundwater Management Plan	14-52
14.11.7 Water Discharge Management Plan	14-53
14.11.8 Chemical and Dangerous Goods Management Plan	14-55
14.11.9 Health and Safety Management Plan	14-56
14.11.10 Emergency Response Management Plan	14-57
14.11.11 Recruitment and Training Management Plan	14-58
14.11.12 Incidents and Complaints Management Plan	14-58
14.12 Decommissioning Environmental Management Plan	14-59
14.12.1 Decommissioning Management Plan	14-59
15 References -----	15-1