CONTENTS

	Project team List of tables	i ii
	List of figures	iv
1.5.2 1.5.3 1.5.4 1.5.5 1.5.6	INTRODUCTION Background Objectives Scope of work Approach strategy Studies undertaken Period of study Station locations Sampling frequency Physical processes Water quality Sediment quality Flora and fauna	1 1 2 2 4 5 5 6 6 6 7 9
2.1.2 2.1.3 2.2 2.3 2.3.1 2.3.2 2.3.3 2.4 2.5 2.5.1 2.5.2 2.6 2.7 2.8 2.8.1		13 13 14 14 14 15 15 15 16 16 16 18 18 19 19
3.3.2 3.3.3	GULF OF KACHCHH Land environment Meteorological conditions Marine environment Physical processes Water quality Sediment quality Flora and fauna	20 20 21 22 22 23 24 25
4 4.1 4.2	SITE SPECIFIC MARINE ENVIRONMENT Area description Physical processes	29 29 31

4.2.1	Tides	31
4.2.2	Currents	32
4.2.3	Circulation	32
4.3	Water quality	32
4.3.1	Temperature	32
4.3.2	рН	33
4.3.3	Suspended Solids	34
4.3.4	Salinity	35
4.3.5	DO and BOD	35
4.3.6	Nitrogen and phosphorous compounds	36
4.3.7	Phenols and PHc	37
4.4	Sediment quality	38
4.4.1	Texture	38
4.4.2	Heavy metals	38
4.4.3	Organic carbon and phosphorus	39
4.4.4	Phosphorus	40
4.4.5	Petroleum hydrocarbon	40
4.5	Flora and fauna	41
4.5.1	Seaweeds, seagrasses and mangrove ecosystem	42
4.5.2	Phytoplankton	44
4.5.3	Zooplankton	46
4.5.4	Macrobenthos	50
4.5.5	Fishery	52
4.5.6	Corals and associated biota	55
4.5.7	Birds	55
4.5.8	Reptiles	55
4.5.9	Mammals	56
5	EFFLUENT RELEASE	57
5.1	Modeling of temperature	57
6	POTENTIAL MARINE ENVIRONMENTAL IMPACTS	59
6.1	Construction phase of the effluent channel	59
6.1.1	Hydrodynamics characteristics	59
6.1.2	Water quality	59
6.1.3	Sediment quality	61
6.1.4	Flora and fauna	61
6.1.5	Miscellaneous	63
6.2	Operational phase of the effluent channel	64
6.2.1	Release of biocides	64
6.2.2	Water quality	65
6.2.3	Sediment quality	65
6.2.4	Flora and fauna	65
6.3	Dumping of dredged materials	66
6.4	Construction phase of the coal conveyer belt	67
6.4.1	Impact of air quality	67
6.4.2	Noise impact	67
6.4.3	Water quality	68
	Land impact	68
6.5	Operational phase of the coal conveyer belt	69

7	MITIGATION MEASURES AND ENVIRONMENT MANAGEMENT PLAN	70
7.1	Construction phase of the effluent channel	70
7.2	Operational phase of the effluent channel	71
7.3	Construction phase of coal belt conveyer	72
7.4	Operational phase of the coal belt conveyer	73
7.4.1	Dust Suppression (DS) system	73
7.4.2	Coal Yard Drainage	74
7.5	Environmental Management Plan (EMP)	74
7.5.1	Environmental Management Cell	75
7.5.2	Environmental Monitoring Programme	75
7.5.3	Afforestation program	77
8	SUMMARY AND CONCLUSION	78
8.1	Project information	78
8.2	Gulf of Kachchh	79
8.3	Site specific marine environment	81
8.4	Effluent release	83
8.5	Potential marine environmental impacts	84
8.6	Mitigation measures and EMP	88

TABLES