Engineering Standard

SAES-A-103 30 April 2005

Discharges to the Marine Environment

Saudi Aramco DeskTop Standards

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1 Scope

1.1 This Standard defines the minimum mandatory requirements governing direct discharges into the marine environment from existing, new and modified Saudi Aramco facilities whether they are onshore or offshore. This includes treated sanitary effluents, industrial wastewater, cooling water, brine discharges, discharges from offshore drilling operations and any other types of direct discharges into the marine environment.

1.2 This Standard does not apply to marine vessels. Refer to Saudi Aramco Sanitary Code (SASC-S-09), ROPME Protocol, and MARPOL for compliance requirements and standards covering marine vessels.

2 Conflicts and Deviations

2.1 Any conflicts between this standard and other applicable Saudi Aramco Engineering Standards and Procedures (SAESs and SAEPs), specific Corporate General Instructions (GIs), Saudi Aramco Sanitary Code (SASC), Materials System Specifications (SAMSSs), Standard Drawings (SASDs), or industry standards, codes, and forms shall be resolved in writing by the Company or Buyer Representative through the Manager, Environmental Protection Department of Saudi Aramco, Dhahran.

2.2 Any conflict between this standard and the most recent government or Saudi government-ratified regional or international standards or regulations, requires compliance with the most restrictive.

2.3 Direct all requests to deviate from this standard in writing to the Company or Buyer Representative, who shall follow internal company procedure SAEP-302 and forward such requests to the Manager, Environmental Protection Department of Saudi Aramco, Dhahran.

3 References

The selection of procedure or method, material and equipment, and the design, construction, maintenance, and repair of equipment and facilities covered by this standard shall comply with the latest edition of the references listed below, unless otherwise noted.

3.1 Saudi Aramco Documents

Saudi Aramco Engineering Procedures

SAEP-302	*Instructions for Obtaining a Waiver of a Mandatory Saudi Aramco Engineering Requirement*

SAEP-327	*Disposal of Wastewater from Cleaning, Flushing, and Hydrostatic Tests*
SAEP-339	*Marine Dredging and Landfilling Approval and Permitting*

Saudi Aramco Engineering Standards

SAES-A-104	*Wastewater Treatment, Reuse and Disposal*
SAES-S-007	*Solid Waste Landfill Standard*

Saudi Aramco Sanitary Code

SASC-S-02	*Sanitary Wastewater and Sewerage Systems*
SASC-S-09	*Marine Vessels*

3.2 Industry Codes and Standards

American Public Health Association, Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1999

American Society for Testing and Materials, 2003-2004 Annual Book of ASTM Standards – Section 11, Water and Environmental Technology

3.3 Government Documents and Standards

Document No. 1409-01, and updates "Environmental Protection Standards", Presidency of Meteorology and Environment (PME) (Formerly Meteorology and Environmental Protection Administration (MEPA)

"Environmental Protection Manual", and updates Directorate General for Yanbu Project, Madinat Yanbu Al-Sinaiyah, Royal Commission for Jubail and Yanbu, 1991

"Royal Commission Environmental Guidelines, and revisions, 3rd Edition, 1994

3.4 Regional and International Protocols

"Protocol concerning Marine Pollution resulting from Exploration and Exploitation of the Continental Shelf", Regional Organization for the Protection of the Marine Environment, 1989 (ROPME)

"International Convention for the Prevention of Pollution form Ships, 1973 as modified by the Protocol of 1978 and six Annexes relating thereto", International Maritime Organizations Marine Pollution Convention, MARPOL 73/78.

"United Nations Convention of the Law of the Sea" (see Article 145 – Protection of the Marine Environment)

"Regional Convention for the Conservation of the Red Sea and the Gulf of Aden (PERSGA) (also known s the Jeddah Convention), 1992"

4 Design and Operation

4.1 Design of Wastewater Treatment Equipment

New and modified facilities shall comply with SAES-A-104 (Wastewater Treatment, Reuse and Disposal) for design criteria of wastewater treatment equipment.

4.2 Discharges from Existing Facilities

4.2.1 Existing, facilities, except for sewage discharges which meet criteria in Section 4.2.4, shall comply with the point-of-discharge standards in the Presidency of Meteorology and Environment (PME) Document No. 1409-01 (see requirements in Table A). They shall also comply with the Regional Organization for the Protection of the Marine Environment (ROPME) Protocol, the Saudi Aramco Sanitary Code, and, if applicable, Royal Commission Requirements. Except in cases where only comminution and disinfection is required (as indicated in Section 4.2.4.2), the facility is only required to comply with the coliform bacteria and residual chlorine concentration standards in Table A, and those restrictions outlined in 4.2.4.5. Gas Oil Separation Plant (GOSP) platforms are individually considered separate facilities. (e.g., separate accommodation and production platforms are separate facilities).

4.2.2 No marine discharge is allowed in the Yanbu Royal Commission Area, except for untreated once-through cooling water unless approval of the General Supervisor EED is given and a permit for the discharge is issued by the Yanbu Royal Commission.

4.2.3 Under no circumstances shall hazardous waste be discharged offshore from either existing, new, or modified facilities; in quantities considered detrimental to the marine environment. The General Supervisor, Environmental Engineering Division (EED) will advise, on a case-by-case basis, on the proper disposal methods with input from the General Supervisor, Environmental Compliance Division (ECD).

4.2.4 Limitations on Sewage and Wastewater Discharges

4.2.4.1 Sewage to be discharged to the marine environment from an onshore facility, or from an offshore facility located less than 4 nautical miles from land and manned by 10 or more people, shall have a sewage treatment plant approved by the General Supervisor, Environmental Engineering Division and meeting all design criteria in SAES-A-104.

4.2.4.2 Sewage to be discharged to the marine environment from an onshore facility, or from an offshore facility located less than 4 nautical miles from land and manned by less than 10 people, shall be comminuted and disinfected. A sewage treatment plant is not required. Exceptions to this disinfection requirement will be considered on a case-by-case basis and only granted if approved by the General Supervisors of EED and ECD.

4.2.4.3 Sewage to be discharged to the marine environment from a facility which is located greater than 4 nautical miles from land, and manned by 10 or more people, shall be comminuted and disinfected. A sewage treatment plant is not required.

4.2.4.4 Sewage to be discharged to the marine environment from a facility which is located more than 4 nautical miles from land, and manned by less than 10 people, shall be comminuted but does not need to be disinfected. A sewage treatment plant is not required.

4.2.4.5 Sewage and wastewater discharges shall not produce visible floating solids or cause discoloration of the surrounding water.

4.2.4.6 Grey water to be discharged directly to the marine environment from GOSPs' accommodation platforms shall be disinfected. Grey water can be discharged without treatment, on a case by case basis, with the approval of the General Supervisors of EED and ECD.

4.2.5 Limitations on Solid Waste Discharges

4.2.5.1 Disposal of food waste from offshore facilities into the sea is prohibited closer than 12 nautical miles from the nearest land.

4.2.5.2 Food waste may be discharged from offshore platforms into the sea 12 nautical miles or more from the nearest land, but only after comminution. Disinfection is not required. Comminuted

food waste shall be capable of passing through a screen with openings no greater than 25 millimeters.

4.2.5.3 No discharge of rubbish or trash is allowed, including but not limited to plastics, paper products, glass, metal, or crockery.

4.2.5.4 Offshore domestic waste shall be brought onshore for treatment and disposed of per SAES-S-007, "Solid Waste Landfill Standard".

4.3 Discharges from New and Modified Facilities

4.3.1 New and modified facilities shall comply with the point-of-discharge standards promulgated by the Presidency of Meteorology and Environment (PME) (formerly Meteorology and Environmental Protection Administration - MEPA) in Document No. 1409-01 (see Table A), and revisions, except as specified below. They shall also comply with the Regional Organization for the Protection of the Marine Environment (ROPME) Protocol, and the Saudi Aramco Sanitary Code. Except in cases where only comminution and disinfection is required (as indicated in Section 4.2.4.2), the facility is only required to comply with the coliform bacteria and residual chlorine concentration standards in Table A, and those restrictions outlined in 4.2.4.5. Individual platforms (e.g. accommodation, production) in gas oil separation plants (GOSPs) are each considered a separate facility.

4.3.2 New and modified facilities located offshore shall comply with the limitations on sewage and solid waste discharges in Section 4.2.

4.3.3 New and modified facilities which are located in areas governed by a Royal Commission shall comply with the Standards promulgated for those areas or the Standards herein, whichever are more stringent. Royal Commission boundary maps are attached (see Appendix I & II).

4.3.4 New and modified facilities shall incorporate Best Practical Technology (BPT) at the time of design for control of discharges to the marine environment.

4.3.5 Facility operators are required to submit an operating plan, in the form of an Operations Instruction Manual (OIM), to the General Supervisor, Environmental Engineering Division; to obtain approval for salinity, turbidity and other general discharge requirements and limitations.

4.3.6 Dilution of wastewater with water of a better quality shall not be acceptable as a primary method of treatment to comply with the point-of-

discharge Standards. The point of compliance is the discharge of the treatment system before any dilution water is added.

4.3.7 The General Supervisor, Environmental Engineering Division shall determine salinity and turbidity requirements for discharging wastewater directly to the marine environment on a case-by-case basis. Temperature requirements shall also be determined on a case-by-case basis with approval from PME, if required.

4.3.8 The General Supervisor, Environmental Engineering Division with input from the Coordinator, Environmental Coordination Division shall determine the necessity of more restrictive limits in biologically unique or highly sensitive areas. The General Supervisor, Environmental Compliance Division shall provide input in areas where there is a danger to public health.

4.3.9 Adverse effects of discharges to the marine environment such as bottom scour, recirculation and sediment deposition shall be avoided and will be evaluated by the General Supervisor, Environmental Engineering Division to ensure that impacts to the local oceanography and ecology are minimal.

4.4 Slop Reception Facilities

All marine loading and unloading facilities are required to provide slop reception facilities. Refer to SAES-A-104 for design requirements.

4.5 Discharges from Drilling Operations

4.5.1 No discharge of oil-based drilling fluid or alternative oil-based drilling fluid shall be allowed as per the ROPME Protocol Concerning Marine Pollution Resulting from Exploration and Exploitation of the Continental Shelf.

4.5.2 Oil-based drilling fluids shall not be used in drilling operations without consulting with EED/EPD. If an exception is made and oil-based drilling fluid is used, the cuttings shall be effectively cleaned using Best Practical Technology (BPT) to minimize the oil concentration before being discharged. The discharge point of the cuttings shall be well below the surface of the water and as near to the seafloor as possible. In any case, the discharge shall not take place in areas designated as biologically sensitive (see section 4.5.5).

4.5.3 Drill cuttings produced when alternative oil-based drilling fluids such as mineral oils have been used shall not be discharged unless they have

been determined to be non-toxic. LC50 toxicity test results shall be reviewed by the General Supervisor, Environmental Engineering Division before discharge will be allowed. In the absence of toxicity test results, the cuttings will be considered to be contaminated with oil-based drilling fluid unless other relevant toxicity data has been reviewed and accepted by the General Supervisor, Environmental Engineering Division.

4.5.4 Water-based drilling fluid shall not be discharged if it contains persistent systemic toxins.

4.5.5 Drill cuttings produced when water-based drilling fluid has been used shall not be discharged where they will have a detrimental impact on areas designated as biologically sensitive. The potential for impacts on sensitive areas from drill cuttings disposal will be determined on a case-by-case basis by the General Supervisor, Environmental Engineering Division.

4.6 Discharges from Pipeline Hydrotest Operations

Disposal of hydrotest water into the marine environment shall be in accordance with SAEP-327.

4.7 Discharges from Dredging and Landfilling Operations

Discharge of dredge spoils or discharges associated with landfilling operations shall be in accordance with SAEP-339, Marine Dredging and Landfilling Approval and Permitting.

5 Sampling and Verification

5.1 The proponent organization shall be responsible for providing information specified by the General Supervisor, Environmental Compliance Division for determining compliance of a facility with the point-of-discharge standards on a case-by-case basis.

5.2 Facilities are required to measure, at point of discharge of treated sanitary wastewater, daily effluent residual chlorine and pH and monthly effluent total coliform bacteria; and maintain records onsite for review by EPD staff as necessary.

5.2.1 Moving vessels are excluded from requirements under 5.2.

5.2.2 Discharges that are only comminuted are excluded from the requirement of effluent measurements under 5.2. However, visual checks should be

recorded to ensure compliance with 4.2.4.5.

5.2.3 Discharges that comminuted and disinfected should be sampled for pH, Chlorine, and Coliform bacteria as per 5.2 above.

5.2.4 Offshore facilities with STPs will be inspected, and their effluents sampled by EPD staff to monitor sanitary wastewater parameters as with onshore marine discharge STPs. Facilities are still required to monitor pH, Chlorine and Total Coliform as per 5.2 above these facilities.

5.3 The General Supervisor, Environmental Compliance Division shall validate the data and determine the compliance status of facilities.

5.4 All analytical methods shall be approved by the Manager, R&D Center. Any analytical methods other than those specified in Table B of this standard shall be validated by approved quality control (QC) methods prior to their acceptance for compliance analysis.

6 Definitions

Alternative Oil-Based Drilling Fluid: drilling fluid in which the oil-water emulsion phase contains greater than or equal to 10% of low aromatic content mineral oil or other alternative low toxicity oil.

Best Practical Technology (BPT): a term used by PME indicating pollution control technology which will provide acceptable performance in meeting approved standards, but does not reflect the most advanced technology available. BPT is typically used in the control of conventional pollutants which are normally found in sanitary, industrial and/or similar wastewaters.

Facility: any installation which may be a source of pollution or environmental deterioration. For offshore installations such as GOSPs, each platform (e.g., Accommodation, Production) is considered a separate facility.

GOSP: Gas Oil Separation Plant.

Grey Water: Sanitary wastewater other than that containing medical waste, kitchen waste or human excrete (from toilets and urinals); discharged from any appliance or fixture such as showers, sinks, or bath water.

Hazardous Waste: waste material or a mixture of waste having chemical, biological or radiological properties capable of producing adverse effects on health, safety, or the environment. Such material may be flammable, toxic, reactive, corrosive, oxidizing, carcinogenic, radioactive, or a compressed gas.

LC50: the lethal concentration at which 50% of the test population dies over a specified period of time.

Marine Environment: sea and intertidal zone area.

MEPA: the Kingdom of Saudi Arabia, Ministry of Defense & Aviation, Meteorology and Environmental Protection Administration established under Royal Decree No. 7/M/8903, dated 21/4/1401 H (25 February 1981) (presently known as the Presidency of Meteorology and Environment (PME)).

Modified Facility: this is any facility where major expenditure of funds occurs for equipment addition or replacements, or when a change in the operation or design of the facility results in an increase in the discharge of wastes. For the purpose of this definition, any replacement of equivalent kind and capacity is not considered a modification.

Nautical Mile: equivalent to 1.85 km.

New Facility: a facility which receives executive management final project approval after the issuance date of this standard.

Oil-Based Drilling Fluid: drilling fluid in which the oil-water emulsion phase contains greater than or equal to 10% diesel.

PME: the Kingdom of Saudi Arabia, Ministry of Defense & Aviation, Presidency of Meteorology and Environment [formerly known as Meteorology and Environmental Protection Administration (MEPA), established under Royal Decree No. 7/M/8903, dated 21/4/1401 H (25 February 1981)].

Point-of-Discharge: most accessible plant wastewater discharge point where final effluent can be sampled. This should be after treatment but prior to the addition of any dilution water.

Royal Commission for Jubail and Yanbu: a jurisdictional authority that administers activities within the defined areas of Madinat Yanbu Al-Sinaiyah and Madinat Jubail Al-Sinaiyah (see Appendix I & II).

Rubbish: non-putrescible domestic and commercial solid waste constituents, e.g., paper, plastic, glass, tin cans, and wood.

Sewage:

i) Drainage and other waste from any form of toilet, urinal or water closet;

ii) Drainage from medical premises such as dispensary or sick bay, via wash-basins, wash-tubs and drains located in such premises;

iii) Other wastewaters when mixed with significant quantities of the drainage defined above.

Toxic Substance: any substance which may result in death, disability or discomfort to man or animal whether by direct contact, inhalation or ingestion; and substances that may cause damage to vegetation.

Trash: similar to rubbish but primarily consists of paper, cardboard and wood.

Wastewater: any contaminated water from domestic, industrial or agricultural activities including sanitary wastewater.

Water-Based Drilling Fluid: drilling fluid in which the oil- water emulsion phase contains less than 10% diesel.

Revision Summary

30 April2005	Revised the "Next Planned Update". Reaffirmed the contents of the document, and reissued with minor changes.

Table A – Effluent Discharge Limitations[1]

(MEPA vs. Jubail & Yanbu Royal Commission Limits)

	PME [2]	Jubail Royal Commission [3]		Yanbu Royal Commission [4]	
Parameter [5]	**Allowable Effluent Level**	**Maximum Allowable Effluent Leavel**	**Mo. Average Effluent Level**	**Maximum Allowable Effluent Level**	**Mo. Average Effluent Level**
Physio-Chemical Pollutants					
Floatables	None	Nil	Nil	Nil	Nil
pH	6-9 units	6-9 units	6-9 units	6-9 units	6-9 units
Total Suspended Solids (TSS)	15 mg/l (max.)	40 mg/l	25 mg/l	40 mg/l	25 mg/l
Temperature [6]	Case/Case	10°C	-	Case/Case	Case/Case
Turbidity [7]	75 NTU (max.)	75 NTU	50 NTU	15 NTU	8 NTU
Salinity (above ambient)	-	-	-	±2.0 ppt	±1.0 ppt
Organic Pollutants (mg/L)					
Biochemical Oxygen Demand (BOD)	25	50	25	30	15
Chemical Oxygen Demand (COD)	150	350	150	200	75
Total Organic Carbon (TOC)	50	150	50	150	50
Total Kjeldahl Nitrogen (TKN)	5	10	5	5	2.5
Total Chlorinated Hydrocarbons	0.1	-	-	0.5	0.1
Oil & Grease [8]	8	15	8	10	8
Phenols	0.1	1.0	0.1	0.5	0.1
Non Organic Pollutants (mg/L)	**30-day Average:**				
Aluminum	-	25	15	25	15
Ammonia (total, as Nitrogen)	1.0	3	1	3	1
Arsenic	0.1	0.5	0.1	0.5	0.1
Barium	-	2.0	1.0	2.0	1.0
Cadmium	0.02	0.05	0.01	0.05	0.01
Chlorine (residual) [9]	0.5	2.0	0.5	0.3	<0.2
Chromium (total)	0.1	1.0	0.1	1.0	0.1
Cobalt	-	2.0	0.1	2.0	0.1
Copper	0.2	0.5	0.2	0.5	0.2
Cyanide	0.05	0.1	0.05	0.1	0.05
Dissolved Oxygen	-	2 min.[10]	-	4 min.[10]	5 min.[10]
Fluoride	-	25	15	25	15
Iron	-	10	5	10	5
Lead	0.1	0.5	0.1	0.5	0.1
Manganese	-	1.0	0.2	1.0	0.2
Mercury	0.001	0.005	0.001	0.005	0.001
Nickel	0.2	0.5	0.2	0.5	0.2
Phosphates (total, as P) [9]	1.0	2	1	2	1.0
Sulfide	-	0.1	0.05	0.1	0.05
Zinc	1.0	5.0	2.0	5.0	1.0
Biological Pollutants (MPN/100 ml [11]	**30-day Average:**				
Total Coliform	1000	2400	1000	2400	1000

Table A - Effluent Discharge Limitations[(1)] (Cont'd)
(MEPA vs. Jubail & Yanbu Royal Commission Limits)

Notes For Table A:

1) Royal Commission Standards shall apply to Saudi Aramco facilities within the Royal Commission jurisdictions. See Appendices I and II for Royal Commission boundary maps.
2) Limits taken from Section 13 – Performance Standards for Direct Discharge; Environmental Protection Standards (General Standards) Document No. 1409-01; Meteorology and Environmental Protection Administration (MEPA).
3) Limits taken from the Royal Commission Environmental Guidelines – 3rd Edition.
4) Limits taken from Environmental Protection Manual, Royal Commission for Jubail and Yanbu/Yanbu Project, Madinat Yanbu Al-Sinaiyah.
5) See Table B for analytical methods.
6) Delta of 10°C for Jubail Royal Commission limits.
7) Nephelometric Turbidity Units. Also to be determined on a case-by-case basis; in areas deemed by EED to be biologically sensitive.
8) Not to exceed 15 mg/l in any individual discharge.
9) Not applicable for wastewater reuse applications or discharge into evaporation ponds.
10) Whereas all other parameters set maximum levels, oxygen depletion is detrimental to organisms such that the mg/l value for dissolved oxygen is to be considered a minimum value.
11) Most Probable Number.

Table B – Recommended Analytical Methods for Compliance Testing

Parameter	APHA-Standard Methods [1] or Other Approved Method [3]	ASTM Standards [2]
Physico-Chemical Pollutants		
pH		D1293-84
Filterable Residue (TDS)	Method 2540-B	
Non-Filterable Residue	Method 2540-D	
Temperature	Method 2550-B	
Turbidity	Method 2130-B	
Organic Pollutants		
Biochemical Oxygen Demand	Method 5210-B	
Chemical Oxygen Demand	Method 5220-C	
Total Organic Carbon	Method 5310-C	
Total Kjeldahl Nitrogen		D3590-89
Total Chlorinated Hydrocarbons	APHA 509 [4]	
Oil and Grease	Method 5520-C	
Phenols	Method 5530-D	
Non Organic Pollutants		
Ammonia as N		D1426-89
Arsenic	Method 3500-As-B, 3500-As-D	
Cadmium	Method 3500-Cd-B, 3500-Cd-C	
Chlorine (Residual)	Method 4500-CI-B, 4500-CI-I, 4500-CI-G	
Chromium	Method 3500-Cr-B, 3500-Cr-C	
Copper	Method 3500-Cu-B, 3500-Cu-C	
Cyanide (Total)	Method 4500-Cn-E	
Dissolved Oxygen	Method 4500-O-G	
Lead	Method 3500-Pb-B, 3500-Pb-C	
Mercury	Method 3500-Hg-B	
Nickel	Method 3500-Ni-B, 3500-Ni-C	
Phosphate (Total as P)		D515-88
Sulfide	Method 4500-S2-E	
Sulfite	Method 4500-SO3-B	
Zinc	Method 3500-Zn-B, 3500-Zn-C	
Biological Pollutants		
Total Coliform	Method 9221-B, 9221-C	

Notes:

(1) American Public Health Association, Standard Methods for The Examination of Water And Wastewater.

(2) American Society for Testing and Materials, Annual Book of ASTM Standards.

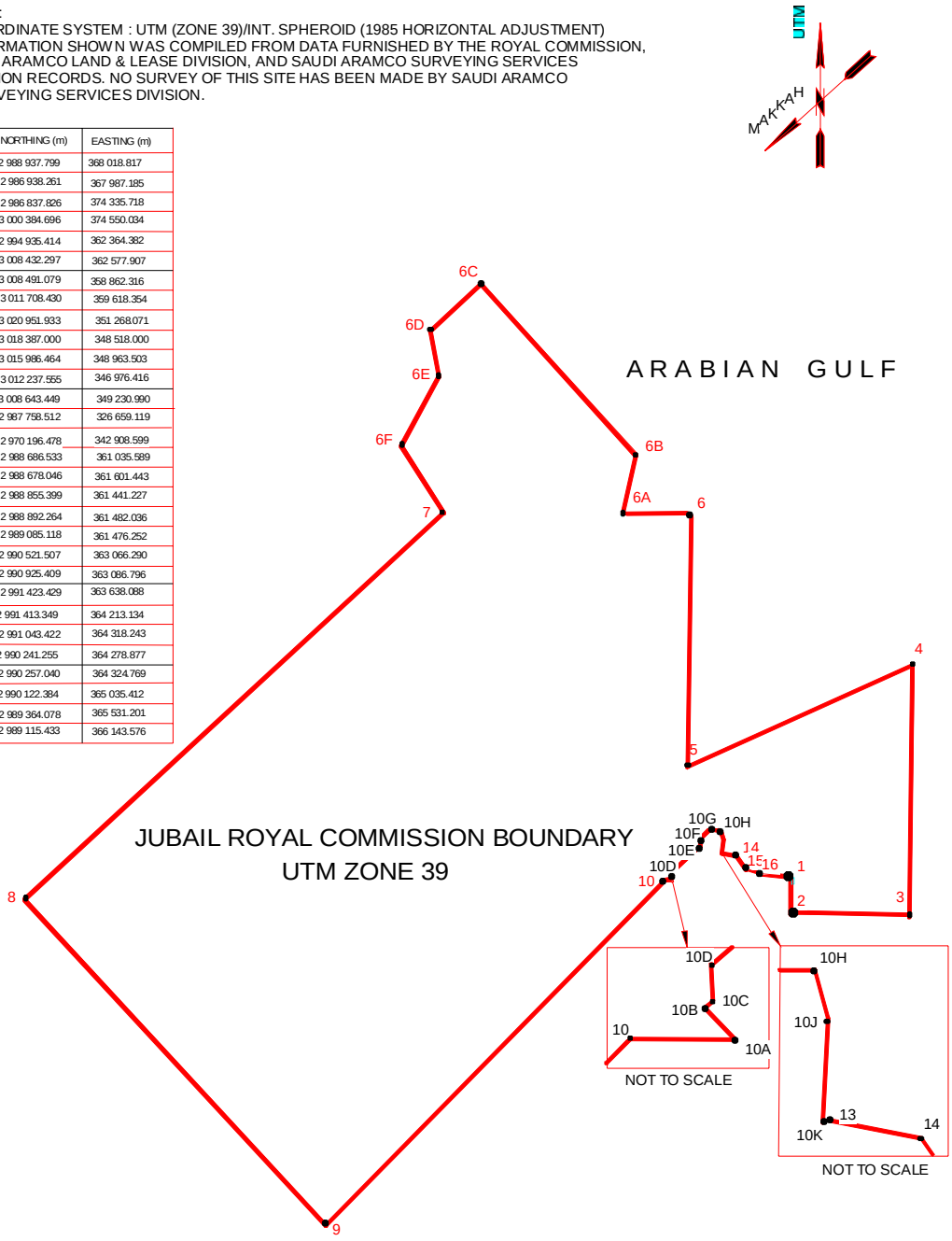
(3) The Saudi Aramco Research & Development Center shall approve other analytical procedures for environmental monitoring.

(4) American Public Health Association, Standard Methods for the Examination of Water and Wastewater.

Appendix I

NOTE:
1. COORDINATE SYSTEM : UTM (ZONE 39)/INT. SPHEROID (1985 HORIZONTAL ADJUSTMENT)
2. INFORMATION SHOWN WAS COMPILED FROM DATA FURNISHED BY THE ROYAL COMMISSION, SAUDI ARAMCO LAND & LEASE DIVISION, AND SAUDI ARAMCO SURVEYING SERVICES DIVISION RECORDS. NO SURVEY OF THIS SITE HAS BEEN MADE BY SAUDI ARAMCO SURVEYING SERVICES DIVISION.

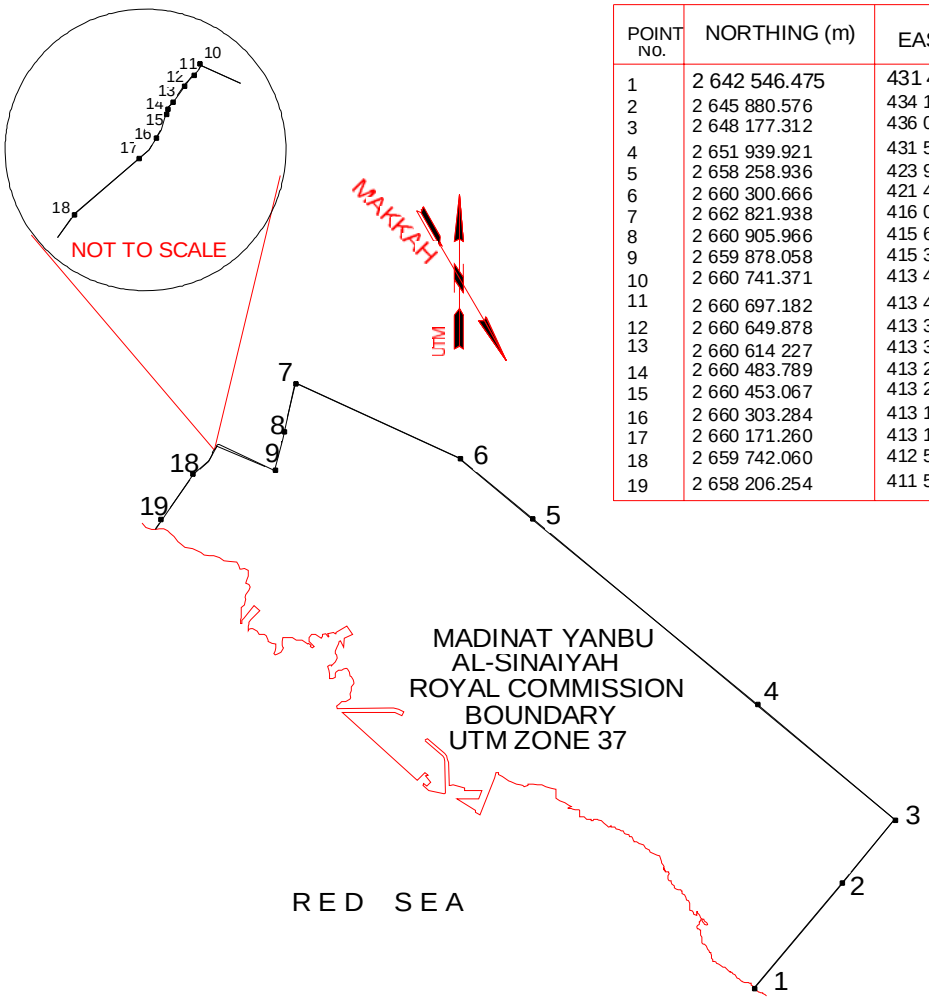
POINT #	NORTHING (m)	EASTING (m)
1	2 988 937.799	368 018.817
2	2 986 938.261	367 987.185
3	2 986 837.826	374 335.718
4	3 000 384.696	374 550.034
5	2 994 935.414	362 364.382
6	3 008 432.297	362 577.907
6A	3 008 491.079	358 862.316
6B	3 011 708.430	359 618.354
6C	3 020 951.933	351 268.071
6D	3 018 387.000	348 518.000
6E	3 015 986.464	348 963.503
6F	3 012 237.555	346 976.416
7	3 008 643.449	349 230.990
8	2 987 758.512	326 659.119
9	2 970 196.478	342 908.599
10	2 988 686.533	361 035.589
10A	2 988 678.046	361 601.443
10B	2 988 855.399	361 441.227
10C	2 988 892.264	361 482.036
10D	2 989 085.118	361 476.252
10E	2 990 521.507	363 066.290
10F	2 990 925.409	363 086.796
10G	2 991 423.429	363 638.088
10H	2 991 413.349	364 213.134
10J	2 991 043.422	364 318.243
10K	2 990 241.255	364 278.877
13	2 990 257.040	364 324.769
14	2 990 122.384	365 035.412
15	2 989 364.078	365 531.201
16	2 989 115.433	366 143.576



Appendix II

NOTE:

1. COORDINATE SYSTEM : UTM (ZONE 37) SAUDI ARABIA NATIONAL GRID.
2. INFORMATION SHOWN WAS COMPILED FROM DATA FURNISHED BY THE ROYAL COMMISSION. NO SURVEY OF THIS SITE HAS BEEN MADE BY SAUDI ARAMCO SURVEYING SERVICES DIVISION.
3. SCALE = 1 : 200,000



POINT NO.	NORTHING (m)	EASTING (m)
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2	2 645 880.576	434 192.737
3	2 648 177.312	436 098.579
4	2 651 939.921	431 564.245
5	2 658 258.936	423 948.316
6	2 660 300.666	421 496.690
7	2 662 821.938	416 022.384
8	2 660 905.966	415 602.850
9	2 659 878.058	415 320.853
10	2 660 741.371	413 442.393
11	2 660 697.182	413 422.084
12	2 660 649.878	413 379.735
13	2 660 614 227	413 347.200
14	2 660 483.789	413 248.554
15	2 660 453.067	413 229.323
16	2 660 303.284	413 177.535
17	2 660 171.260	413 101.903
18	2 659 742.060	412 598.905
19	2 658 206.254	411 528.518