ANNEX 09: WASTE MANAGEMENT PLAN (WMP)

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ENERGEAN OIL & GAS

PRINOS OFFSHORE DEVELOPMENT PROJECT

Waste Management Plan

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PRINOS OFFSHORE DEVELOPMENT PROJECT WASTE MANAGEMENT PLAN	
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1 INTRODUCTION

1.1. OBJECTIVES

The objectives of the WMP are:

- To provide clarity regarding waste management arrangements for the Prinos Development Project and is intended to provide details of the overarching waste management procedures which will be employed by ENERGEAN and their contractors
- To ensure that all parties involved comply with legislation and regulations for the management of waste generated during operations associated with the drilling activities in Prinos Development Project and with accepted good oil and gas industry practice.

Effective waste management is not only an important safety feature, but is equally important in on-going environmental protection and meeting the required legal obligations.

The WMP is an essential tool in legal compliance and should be adhered to at all times.

1.2. SCOPE AND APPLICATION

The WMP applies to all waste that will be generated on Prinos platforms complex and its contractors during the drilling operations conducted in Prinos Development Project. Furthermore, it includes substances, which are defined or listed in MARPOL 73/78 Annex IV (sewage) and Annex V (garbage).

During the construction phase, the WMP does not replace the contractor specific WMPs, rather it is intended to ensure continuity of approach to waste management, classification, documentation and disposal.

Regarding the operation of 'Energean Force', this WMP should be used in conjunction with the contractor specific WMPs in accordance with Regulation 9(2), Annex V, MARPOL 73/78.

In the absence of specific local waste legislation the WMP will apply practices to comply with International and European Union (EU) legislation, regulations and standards.

1.3. DEFINITIONS AND ABBREVIATIONS

Within the WMP, the following definitions shall apply:

- ***Collection–***shall mean the gathering of waste, including the preliminary sorting and preliminary storage of waste for the purposes of transport to a waste treatment.
- ***Treatment***–shall mean recovery or disposal operations, including preparation prior to recovery or disposal application of physical, chemical or biological means to change the condition of waste with the aim of improving handling or the nature and characteristics of the waste.
- ***Disposal***–shall mean any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances for energy.
- **Garbage** – for the purposes of the WMP, 'garbage' shall have the same definition as 'waste'.
- **Hazardous Waste** – shall mean any waste which displays one of more of the properties listed in Annex III of EU Directive 2008/98/EC.
- **Holder** – shall mean the producer of waste or the natural or legal person who is in possession of the waste.
- **Producer** – shall mean anyone whose activities produce waste (original waste producer) or anyone who carries out pre-processing, mixing or other operations resulting in a change in the nature or composition of this waste.
- **Recovery** – shall mean any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfill a particular function, or waste being prepared to fulfill that function, in the plant or the wider economy.
- **Recycle** – shall mean any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.
- **Special Waste** – shall mean hazardous waste.
- **Waste** – shall mean any substance or object which the holder discards or intends or is required to discard.

Within the WMP, the following abbreviations shall apply:

- EC – European Commission

- EU – European Union
- EWC – European Waste Catalogue
- WMP – Waste Management Plan

2 PARTIES, RESPONSIBLITIES AND ACCOUNTABILITIES

ENERGEAN, as the Operator of the licenses held for exploitation activities covered in the WMP is responsible for ensuring all parties operate in accordance with the WMP and in compliance with the required legislation.

2.1. PROJECT DESCRIPTION

2.1.1. Geographic location

The Epsilon discovery is located in the northern part of the Aegean Sea between 2 and 5km northwest of Prinos. Water depth over the field is 35-45m.

The Epsilon Oil Field is a fault, dip and stratigraphically closed anticlinal structure, covering an area of approximately 4km^2. The penetrated reservoir is 70-85m thick and is characterized by 9% porosity, NTG of 40-90% and permeability (assessed from core) ranging from 1-100mD. The reservoir penetrated to date is the equivalent of the A1 sand in Prinos.

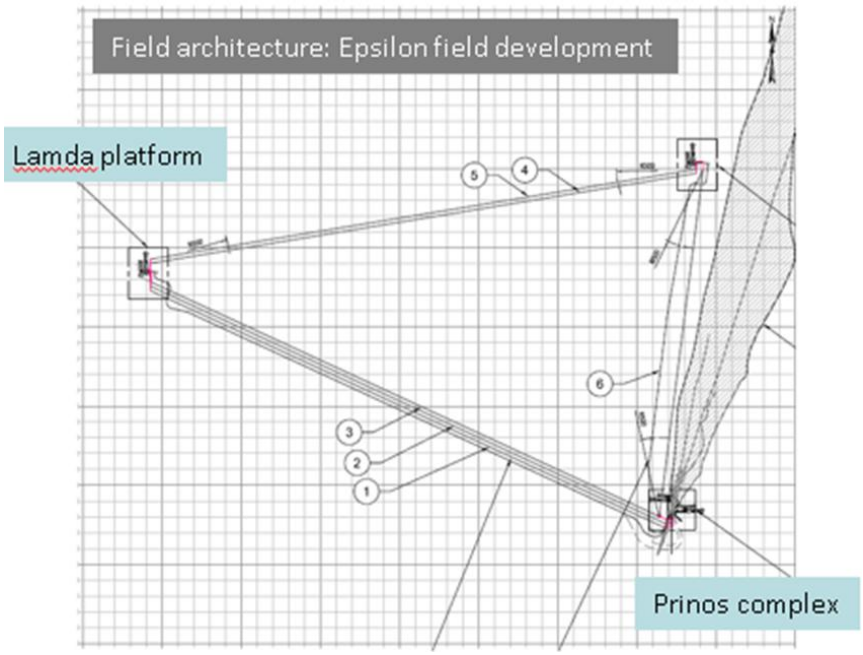


Figure 1: Epsilon Field Development

The Prinos deposit is located in the Kavala Gulf, approximately 8 km to the west - northwest of the Prinos lighthouse of the island of Thasos, at the southern edge of the Kavala Bay and approximately 18 km to the south of the city of Kavala.

2.1.2. Prinos platforms complex

One processing platform - Delta, where the following procedures are performed:

- Separation of the production phases - sour crude oil, water and natural gas;
- Dehydration of the crude oil via electrostatic separation;
- Transport of sour crude oil to the land facilities by means of a pump and an 8" submarine pipeline;
- Dehydration of sour natural gas with triethylene glycol (TEG);
- Transport of sour natural gas from the platform Delta to the land facilities, via a submarine pipeline with a diameter of 12";
- Processing of the water produced (removal of hydrocarbon residues and removal of hydrogen sulfide) and disposal at sea;
- Injection of seawater into the Prinos reservoir, in order to maintain pressure;
- Compression of sweet gas transported offshore from Sigma to be used as gas lift in the Prinos wells.

Photo 1: Platform Delta

Two production platforms-Lamda and Omicron (future),

The development of the new Oil Fields (satellite fields), the plan currently foresees the installation of two Self-Installing Platforms (SIP2s) in two different project execution phases. During the first phase, Lamda platform will be installed at the Epsilon field.

The Lamda and Omicron (if installed) SIP2's consist of 4 cylindrical legs each equipped with a suction pile to fix the legs (and hence topsides) to the seabed

The SIP2 platform concept has been developed by a Netherlands based company, SPT Offshore BV. Those platform types can be employed cost effectively in shallow water depths up to about 45m. Some typical examples are shown below:

Stage 10 F3FA As-installed

Calder Installed

Photo 2: Examples of SIP-2 platforms installed

The platforms will be equipped with all required support systems for proper and safe operation.

During the development of Epsilon, the Lamda platform will be installed and production drilling will begin. Production flow will be **directed to the Delta complex**. Gas lift and water injection will not be required initially however relevant pipelines and facilities will be pre-installed.

In total five (5) production and four (4) injection wells are envisaged in the P50 (including deeper volumes) case. The base plan envisages use of water injection for pressure support. All water injection wells will be back produced initially. This will increase early production rates as well as providing an area of lower pressure into which water can be injected with existing pumps. The facility has been designed to enable conversion of the production wells from gas lift to ESP lift at some point when pressures and water cuts have stabilized. Room for a gas injection compressor has also been allocated should a sour WAG scheme be implemented in the future. The platform will be equipped with a spare set of risers to enable a subsequent satellite (notionally Athos) to be tied back to Delta via Lamda.

New Installations in Epsilon Field comprise the following:

- Lambda Platform – SIP2 type (Self-Installing Platform 2) and attendant equipment (topside facilities)
- Connection of Lambda Platform with the existing Delta platform through offshore hydrocarbon pipelines (buried)
- Umbilical between Lambda and Delta Platform transporting power, data and chemicals
- Modifications to Delta Platform
- **The enterprise is supported by the towable barge "LIMIN PRINOS", with a length of 54 m, a width of 15,54 m and depth of 3 m.**

It is equipped with fifteen compartments (tanks) with a capacity of 150 m^3 each. Four of them always remain empty, six of them contain water and the remaining five serve the platforms Lamda and Omicron, when repair or cleaning activities are performed at the wells, in addition at Delta, when vessel cleaning activities take place.

The barge is equipped with a small gas / liquid separator from which flashed gasses are routed via flexible pipe to the Prinos complex flare. Vapors from the fixed compartment are passed through a caustic scrubber to remove hydrogen sulfide before being vented to atmosphere.

Photo 3: Barge 'Limin Prinos'

2.2. LAMDA PLATFORM AND DELTA COMPLEX RESPONSIBLE PERSON

The 'Energean Force' shall appoint a competent person or persons responsible for waste management and implementation of the WMP and their specific WMP procedures. Their responsibilities shall include but not be limited to:

- Ensuring all appropriate precautions are taken in waste management;
- Ensuring all containers, their storage, treatment and transfers are suitable and practices are conducted to avoid unnecessary waste generation, prevent escape, classify and quantify the waste;
- Ensuring the paperwork which accompanies waste properly reflects the wastes dispatched including quantities, classification and record keeping;
- Providing waste records data in accordance with the defined requirements.

2.3. KAVALA OIL – ONSHORE FACILITIES

Although the onshore facilities (Sigma plant) are outside the scope of ESIA, a reference is taken place here, because Kavala Oil is responsible for the management of waste produced by the current offshore installation and for the Prinos Offshore Development Project. Waste shall be managed by Kavala Oil in compliance with legislation and good practice and in accordance with the Approved Environmental Terms of Kavala Oil plant.

Kavala Oil – Onshore Facilities shall appoint a competent person or persons responsible for waste management and implementation of the WMP. Their responsibilities shall include but not be limited to:

- Ensuring all appropriate precautions are taken in waste management;
- Ensuring all containers, their storage, treatment and transfers are suitable and practices are conducted to avoid unnecessary waste generation, prevent escape, classify and quantify the waste;
- Wastes are transferred to authorized persons;
- Ensuring the paperwork which accompanies waste properly reflects the wastes dispatched including quantities, classification and record keeping.

2.4. OTHER CONTRACTORS

Other contractors producing waste during Prinos Development Project process shall manage waste in accordance with their specific WMP and in accordance with the WMP. All contractors shall submit waste records data in accordance with the requirements detailed in Section 5.4 of the WMP.

3 WASTE MANAGEMENT

3.1. GENERAL PRINCIPLES

ENERGEAN is committed to reducing the amount of waste generated by its activities and contractors will minimise waste at source where possible. All parties shall minimise and manage waste generation through the implementation of the waste hierarchy, presented in the figure below.

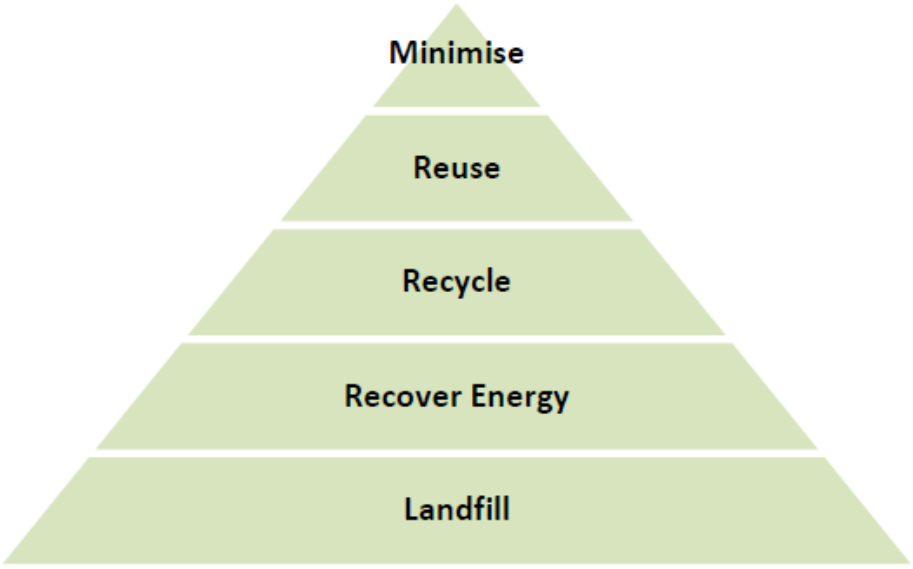


Figure 2: Waste Hierarchy

Where recycling is not deemed practical, opportunities for using the waste as a source of energy should be considered. Waste will be compacted prior to disposal dependent upon waste type and compacting facilities.

The ENERGEAN operations conducted in Prinos Development Project will produce a range of waste streams including hazardous and non-hazardous waste; an indicative list of potential waste streams is presented in Appendix A. The EWC Codes are presented for each waste stream.

In the event of waste being generated which is not detailed in Appendix A, such wastes will be classified in accordance with the EU List of Wastes prescribed within EU Decision 2000/532/EC. ENERGEAN will review any unusual waste streams or disposal requirements arising prior to onward transport, treatment or disposal commencing.

3.2. LEGISLATION

ENERGEAN and contractors will have regard to all applicable legislation in relation to the management of waste. There are no specific Prinos Development Project waste management regulations pertinent to the management of drilling wastes and consequently ENERGEAN and their contractors will follow the general requirements in Prinos Development Project and principles set out in the following:

- EU Decision 2000/532/EC which presents a harmonized list of wastes including the associated six digit code for the waste as transposed into the EWC.
- EU Directive 2008/98/EC on waste.
- International Maritime Dangerous Goods Code.
- EU Regulation (EC) No. 308/2009 on Shipments of Waste.
- MARPOL 73/78, Annex IV (sewage) and Annex V (garbage).
- Law 4042/2012 Environmental protection under the criminal law – Harmonisation with Directive 2008/99/EC - Waste generation and management framework - Harmonisation with Directive 2008/98/EC - Regulation of matters falling under the jurisdiction of the Ministry of the Environment, Energy and Climate Change' (Government Gazette, Series I, No 24).
- Presidential Decree 148/2009 (G.G. A /190) – Harmonisation with the Directive 2004/35/EC, on Environmental liability with regard to the prevention and remedying of environmental damage, based on the polluter pays principle to prevent and remedy environmental damage.
- Prefectural Decision 6924/87 (G.G. B /475), for the definition of the receptors and discharge limits for treated wastewaters in Kavala Prefecture

4 WASTE MANAGEMENT PROCEDURES

4.1. NON-HAZARDOUS WASTE

A range of non-hazardous waste streams are anticipated to arise during the drilling activities. The generation of non-hazardous waste shall be minimised through the implementation of the waste hierarchy at each stage of the drilling activities. Waste streams shall be segregated and compacted (where suitable facilities exist).

These non-hazardous waste are mainly generated from the personnel of 'Energean Force'. For the purposes of the ESIA it is assumed that 116 persons (all shifts) will be present for 365 days in 'Energean Force', thus an estimated amount of 4,2340 kg/yr of domestic wastes will be generated. Most of them will be biodegradable waste from the kitchen (a percentage of 60% is used for the calculations). The estimated amounts of non-hazardous wastes are:

- Paper and cardboard (20 01 01) : 8,460.80 kg/yr
- Biodegradable kitchen & canteen waste (20 01 08) : 25,404.00 kg/yr
- Plastic (20 01 39) : 2,115.20 kg/yr
- Metals (20 01 40) : 2,115.20 kg/yr
- Mixed municipal wastes (20 03 01) : 4,234.00 kg/yr

Non-hazardous waste must be packaged in suitable containers and securely stored prior to transfer to Kavala Oil Onshore Facilities. The burning or incineration of non-hazardous waste is prohibited on platforms.

Non-hazardous waste generated by shall be transferred to Kavala Oil Onshore Facilities and then to the local municipality for disposal. All transfers of non-hazardous waste must be accompanied by the required documentation as detailed in Section 5.0 of the WMP.

The domestic waste produced in existing platforms will follow the same methods applied, as in so far.

4.2. HAZARDOUS WASTE

4.2.1. Expected hazardous wastes from offshore operations

From the drillings taken place in Alpha and Beta oil-containing drilling muds and waste (01 05

05*) are produced and will be produced in the same flow in the future.

Hazardous wastes from the current facilities are produced in Delta platform. These are wastes generated during maintenance, which lasts 15 days every 30 months. These hazardous wastes are produced from cleaning of collection vessels V-101 A/B, V-107 και V-102 and consists of oily sludges (mixtures of heavy hydrocarbons containing mainly asphaltenes), oily rags, absorbents etc.

The same type of hazardous wastes will be generated from the maintenance of Lamda and Omicron, though is smaller scale due to the fact that no process activities will take place there.

- 1235+

All waste oil and water contaminated with oil will be collected to the specific tanks of the 'Energean Force' and when the capacity will reach the 75% of the total capacity of the dedicated tanks, then the liquids must be transferred. Limin Prinos barge can receive the liquid waste, in the same way as receives them from Delta platform, and transported to Kavala Oil Onshore Facilities for disposal as per Facilities Approved Environmental Terms.

Hazardous waste generated offshore are transferred to Kavala Oil Onshore Facilities by a barge.

In addition to the generic flowcharts for the management of waste presented in Appendix C and D, the following procedures for the management of specialist (hazardous) waste streams will be followed by all parties.

4.2.2. Drill Cuttings

Another type of hazardous waste are the drill cuttings. Drill cuttings will be treated to remove solids from the re-circulating mud stream. Any solids that are not contaminated with toxic substances will be discharged to sea. Any cuttings contaminated by hydrocarbons from the geological formation or due to the oil based mud will be separated at the drilling unit. These cuttings will be monitored, handled and treated to ensure no uncontrolled discharge to sea.

Cuttings from the planned wells are removed in the mud package forming part of the 'Energean Force' drilling rig. Wet cuttings are transferred to a rented solids management system that can be located on the ENERGEAN FORCE barge (Prinos drilling) or on the top deck of the satellite (Lamda and Omicron). Cuttings are centrifuged to remove the majority of mud and then dried. Dried cuttings are placed in skips and then transferred onshore for further treatment and disposal via a certified waste management contractor. No cuttings are disposed of at sea.

After the on board treatment the contaminated drill cuttings will be contained and transported to Kavala Oil Onshore Facilities for disposal at an appropriate company.

In a typical Epsilon well approximately 1,448 tonnes of cuttings will be generated, hence in the P50, seven (7) well programme approximately 9,000 tonnes of solid waste will be generated. The waste generated from drilling operations on Omicron will be less, as the fields in this area are shallower. Drilling operations at Prinos generate small volumes of cuttings, as all currently planned wells are small diameter sidetracks.

Table 1: SW from cuttings

Estimated Cuttings Volumes - Epsilon 8-1/2" TD							
Vertical							
Interval	**Start mdrkb (m)**	**End mdrkb (m)**	**Length (m)**	**O/H size (")**	**O/H vol (bbls)**	**Cuttings Volume m3**	**Cuttings Weight MT (2.7 SG)**
36"	30	200	170	36	**702**	111,6	301,4
17 1/2"	200	1.900	1.700	17,50	**1.659**	263,8	712,3
12 1/4"	1.900	3.000	1.100	12,25	**526**	83,6	225,8
8 1/2"	3.000	3.300	300	8,50	**69**	11,0	29,7
Total							**968**
30 deg from 12-1/4"						30 deg	0,87
Interval	Start mdrkb (m)	End mdrkb (m)	Length (m)	O/H size (")	O/H vol (bbls)	Cuttings Volume m3	Cuttings Weight MT (2.7 SG)
36"	30	200	170	36	**702**	111,6	301,4
17 1/2"	200	1.900	1.700	17,50	**1.659**	263,8	712,3
12 1/4"	1.900	3.464	1.564	12,25	**748**	118,9	321,1
8 1/2"	3.464	3.811	346	8,50	**80**	12,7	34,2
Total							**1068**
45 deg from 12-1/4"						45 deg	0,71
Interval	**Start mdrkb (m)**	**End mdrkb (m)**	**Length (m)**	**O/H size (")**	**O/H vol (bbls)**	**Cuttings Volume m3**	**Cuttings Weight MT (2.7 SG)**
36"	30	200	170	36	**702**	111,6	301,4
17 1/2"	200	1.900	1.700	17,50	**1.659**	263,8	712,3

12 1/4"	1.900	4.243	2.343	12,25	**1.120**	178,1	481,0
8 1/2"	4.243	4.667	424	8,50	**98**	15,5	41,9
Total							**1235**
55 deg from 12-1/4"						55 deg	0,57
Interval	**Start mdrkb (m)**	**End mdrkb (m)**	**Length (m)**	**O/H size (")**	**O/H vol (bbls)**	**Cuttings Volume m3**	**Cuttings Weight MT (2.7 SG)**
36"	30	200	170	36	**702**	111,6	301,4
17 1/2"	200	1.900	1.700	17,50	**1.659**	263,8	712,3
12 1/4"	1.900	5.230	3.330	12,25	**1.593**	253,2	683,8
8 1/2"	5.230	5.753	523	8,50	**120**	19,1	51,7
Total							**1448**

4.2.3. Naturally Occurring Radioactive Material

Naturally Occurring Radioactive Material (NORM) is not anticipated to be outside of the normal ranges for Prinos formations.

4.3. LIQUID WASTE

The liquid waste produced by the offshore facilities are the following:

- Produced water removed from the crude oil on Delta;
- Produced water removed from condensate on Lamda and Omicron;
- Washing liquids of decks and rain;
- Washing liquids of wells, vessels and piping;
- Human wastewater.

The flows of liquid waste are described below.

4.3.1. Produced water removed from the crude oil on Delta

Wastewater from Delta, following cleaning, are transported to the skim pile of the platform and, subsequently, they end up in the subsea settlement tank TK-664.

The treated water drained from the decks, as well as the treated water produced are classified as wastewater. The operational principle and the advantages of a skim pile type

separator have already been referred to in the paragraph describing the equipment of Kappa"
The skim pile separator is equipped with an air pump and oil level switches, in order for the separated oil to be transported to the oily water collection vessel V-133.
The skim pile separator is a cylindrical, vertical vessel, with its larger part submerged, at a depth almost reaching the seabed (at 30 m). It has a diameter of 1.2 m and a length of 35.8 m, with 28 m there of being submerged.
The exit of the skim pile separator is connected to the subsea settlement tank, which is also equipped with level switches and pneumatic pumps, which send any oil formation to the oily water collection vessel V-133 above.
The subsea settlement tank TK-164 is attached to the seabed. It is a cylindrical, vertical vessel with a diameter of 7 m and a height of 8,3 m, with an open base, with two exit nozzles in the lower lateral side and with a small, circular bell at the upper part (1.53 m diameter x 0,835 m height). The tank has a capacity of 290 m^3, and its volume is considered sufficient in order to provide time for discovering and correcting any malfunction, which could result in any amount of oil leaking to the wastewater system of the platform.
There is a tracking (oil level gauge) and recovery (pump) system of any amount of oil accumulated at the upper part of the subsea tank.
It must be noted that the subsea tank system TK-164 was installed at the seabed, below the platform in 1986 in order to enhance the facilities safety level with regard to the prevention of marine pollution from oil, when the production of crude oil was still at high levels (exceeding 20,000 barrels per day). Given the current low daily production of 2,000 barrels and the equally low future production, which is not expected to exceed 10,000 barrels during the next decade, it is clear that the safety level of the facilities with regard to the prevention of marine pollution by oil will remain high, provided that the existing systems will be maintained in good order.

4.3.2. Produced water removed from condensate on Lamda and Omicron

No wastewater (WW) is generated on the proposed satellite platforms (Lamda and Omicron).
All water produced from the planned new wells is passed to Prinos Delta where it is separated and treated in existing systems and then discharged to sea. Expected annual produced water volumes for Lamda and Omicron are indicated below.

Table 2: Produced water forecasts (m3/annum)

Row levels	Average of avg. water (Lamda)	Average of avg. water (Omicron)
2016	2,169,1	0,0
2017	4,321,7	468,2
2018	1,308,9	2,243,9
2019	2,607,1	2,957,7
2020	4,357,7	2,271,4
2021	5,167,0	2,399,1
2022	6,026,4	2,542,9
2023	6,922,3	2,752,0
2024	7,675,9	2,895,5
2025	8,241,5	2,988,9
2026	8,816,9	3,022,6
2027	9,341,6	3,056,6
2028	9,794,0	3,167,0
2029	10,224,5	3,208,4
2030	10,579,2	3,267,4
2031	10,895,0	3,369,3
2032	11,192,7	3,461,4
2033	11,502,4	3,498,5
2034	11,759,6	3,570,3

The above quantities will be added to the existing flows currently operating in Delta and will not increase further the design capacities.

The only liquid “waste” stream generated on the new satellites is the result of rainwater entering the closed drain system via bunded areas with the potential to contain hydrocarbon substances. To minimise such volumes the size of bunds has been minimised and shelter to prevent blown rain provided where possible.

4.3.3. Washing liquids of decks and rain

Each deck of Delta is equipped with drainage for deck cleaning water and rainwater, which is transported to separator V-167 at the lower deck of the platform.

The water from the exit of separator V-167 is transported to the skim pile M-164, while any trapped hydrocarbons (oil) are retained and separated at V-167, they overflow to the vessel

V-168 and from there they are transported, by means of an air pump, to the oil collector V-133.

Oil from V-133, by means of pumps P-133 A/B, is returned to the entry of separators V-101 A/B.

At the water exit from separator V-167 to M-164 (skim pile), an inline analyzer is located, which measures and records the hydrocarbon concentration in the water. If the concentration exceeds 10 ppm, valve AV-167 closes automatically and water supply to M-164 (skim pile) ceases. If necessary, due to continuous flow to the separator V-167, wastewater from V-167 can be transported by pumps P-133 A/B to the entry of separators V-101 A/B and from there the produced water system. In this manner oily water with high oil content (oil in water) is prevented from entering M-164 (skim pile).

Photo 4: 1Separator V-167

Photo 5: Inline analyzer

Every year the Kavala Central Port Authority inspects the condition of the equipment and the proper operation of the system, which renews the oil pollution prevention certificate.

Rainwater and cleaning water of the decks of platforms Lamda and Omicron (future) are transported through the drain lines, to the skim pile of each platform, where any trapped hydrocarbons (oil) are separated. Oil from the skim piles of platforms Lamda and Omicron is automatically transported, by means of level monitoring and pumps, to separator M-165 at platform “Delta” and, subsequently, to the oily water collection vessel of Delta, V-133.

4.3.4. Washing liquids of wells, vessels and piping

Liquid waste produced during cleaning and maintenance activities of the drillings and the cleaning of various containers and piping on the platforms are transported, through a piping system, to the "LIMIN PRINOS" barge, which is equipped with fifteen tanks. These waste products are transported to shore for treatment and disposal.

Liquid waste is transported from the platforms to the land facilities by the barge for treatment at the existing plant approximately 12-15 times per year (in total 5,000 to 8,000 m^3 per year).

4.3.5. Human wastewater

Domestic type wastewater from the complex platforms are transported and stored in special tanks, which are located, on each platform. Tanks are periodically emptied in the barge or in the support vessel's tank. The content of the tank is transported to the biological treatment of the land facilities by the barge.

Table 3: Wastewater discharge

Source of wastewater	Average flow (m^3/d)	Maximum flow (m^3/hr)	Consumption	
			Maximum flow (m^3/h)	Discharge duration
Produced water from Delta platform	1,600	100	-	-
Deck cleaning and rainwater	0.8	0.05	-	-
Process cleaning liquids	4.1	0.2	-	-
Domestic type wastewater	0.15	0.0125	-	-

4.4. WASTEWATER RECEPTOR

The receptor of wastewater off shore facilities is the marine area under the proposed platforms, as it is defined in the Prefectural Decision 6924/87 (Gov.Gaz. 475/B/87), for the definition of the receptors and discharge limits for treated wastewaters in Kavala Prefecture.

4.5. CHEMICALS

The use and chemicals are described in the Chemical Use Plan, which is part of the ESIA.

5 MONITORING, REPORTING AND AUDITING

5.1. ANNUAL WASTE REPORT (HAZARDOUS OR NOT)

The complex of platforms will maintain a Hazardous and non-Hazardous annual waste report, according to article 11 of Joint Ministerial Decision (JMD) 13588/725/06.

5.2. WASTE TRANSFER DOCUMENTATION

All transfers of waste will be accompanied by waste transfer documentation, a copy of which will be retained by the waste producer. All parties shall utilise the ENERGEAN Waste Transfer Note and this document shall accompany every transfer of waste. ENERGEAN Waste Transfer Notes will be provided to all parties and an example of the note is presented in Appendix E.

5.3. REPORTING

Details of the quantity of waste generated by all parties are required to be recorded and submitted to ENERGEAN HSE Department.

5.4. INSPECTION AND AUDITING

All parties will maintain routine checks and inspections as part of their day-to-day operations to ensure all equipment and containers are in good repair and procedures are being followed. ENERGEAN or third party shall undertake one or more audits of the WMP during the drilling project including, but not limited to:

- Practical application of the WMP;
- Application of procedures;
- Hazardous and no hazardous Annual Waste report
- Waste transfer documentation; and

Findings or non-conformances will be provided to the responsible party who will develop a preventative or corrective action to address these items.

5.5. MONITORING OF QUALITY OF LIQUID WASTE

5.5.1. Sampling

It will be taken three (3) samples over twenty-four (24) hours with a difference between two (2) successive samples, at least three (3) hours.

The sampling points are referred below:

- Exit of de-oilers (M -111, M-111B)
- Exit of skim pile M-164
- Exit of subsea settlement tank

Figure 3: Exit of de-oiler (M-111)

Figure 4: Exit of tank

5.5.2. Chemical Analysis

The nature of the process (hydrocarbons) requires the monitoring of the following parameters:

- ✓ pH
- ✓ Suspended solids
- ✓ B.O.D.5,
- ✓ C.O.D.,
- ✓ Hydrocarbons
- ✓ Fe
- ✓ Sulphide

5.5.3. Standards of Chemical Analysis

The American Public Health Association – A.P.H.A. Standards will be observed.

The following table shows the standards and the corresponding results of Chemical Laboratory were applied:

Table 4: Standards and corresponding results

Substance	Measurements	Units of Measurement
pH	-	-
Suspended solids	209D	mgr/lt
BOD5	507	mgr/lt
COD	508A	mgr/lt
Hydrocarbons	503B	mgr/lt
Fe	303A	mgr/lt
Sulphide	427C/D	mgr/lt

The Frequency of chemical analysis is weekly in the exits of de-oilers (M -111, M-111B), skim pile M-164 and subsea settlement tank and monthly in the exit of settlement tank for the control of quality of wastewater.

5.5.4. Liquid Waste Monitoring Book

There is a common liquid waste monitoring book maintained by ENERGEAN. It consists of chemical analysis sheets and remains at the disposal of the competent authorities.

Chemical Analysis Sheets are presented in Appendix F.

6 APPENDICES

6.1. APPENDIX A – EXPECTED WASTE STREAMS

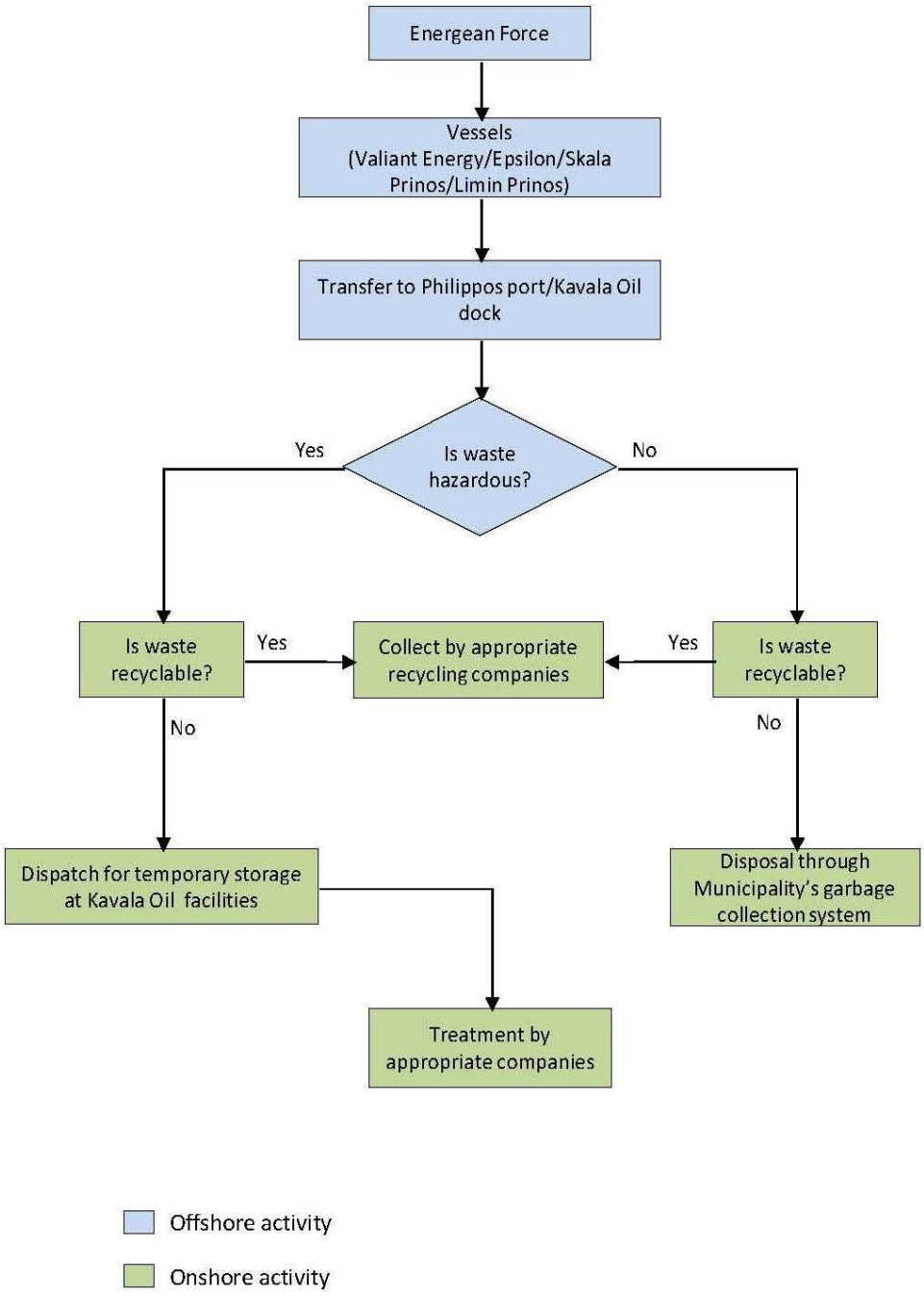
Expected Waste Stream	Description	EWC Code
Domestic Waste	Mixed municipal waste	20 03 01
Oil sludges	Oil sludges from maintenance	05 01 06*
Drilling Cuttings	Oil containing drilling muds and wastes	01 05 05*
	Wastes not otherwise specified	01 05 99
Paper	Paper and cardboard	20 01 01
Cardboard		
Plastic (not contaminated with food)	Plastics	20 01 39
Aluminum cans	Metals	20 01 40
Metal		
Batteries	Lead batteries	16 06 01*
	Ni-Cd batteries	16 06 02*
	Mercury-containing batteries	16 06 03*
	Alkaline batteries not containing mercury	16 06 04
	Other batteries and accumulators	16 06 05
Fluorescent Lamps	Fluorescent tubes and other mercury containing waste	20 01 21*
Food Waste	Biodegradable kitchen and canteen waste	20 01 08
Oily Rags	Absorbents, filter materials, wiping cloths,	15 02 02*

Expected Waste Stream	Description	EWC Code
	protective clothing contaminated by dangerous substances	
Nominally Empty Paint and Thinner Cans	Packaging containing residues of or contaminated by dangerous substances	15 01 10*
Aerosol Cans	Gases in pressure containers containing dangerous substances	16 05 04*
Glass	Glass	20 01 02
Wood	Wood that does not contain dangerous Substances	20 01 38
Oil Filters	Absorbents, filter materials, wiping cloths, protective clothing contaminated by dangerous substances	15 02 02*
Used Cooking Oil	Edible oil and fat	20 01 25
Clinical Waste	Wastes whose collection and disposal is not subject to special requirements in order to prevent infection	18 01 04
Used Lube Oil	Mineral based chlorinated engine, gear and lubricating oils	13 02 04*
	Oily water form oil-water separator	13 05 07*
	Mineral based non-chlorinated engine, gear and lubricating oils	13 02 05*
	Synthetic engine, gear and	13 02 06*

Expected Waste Stream	Description	EWC Code
	lubricating oils	
	Readily biodegradable engine, gear and lubricating Oils	13 02 07*
	Other engine, gear and lubricating oils	13 02 08*
Paint	Paint, inks adhesives and resins containing dangerous substances	20 01 27*
	Paint, inks adhesives and resins that do not contain dangerous substances	20 01 28

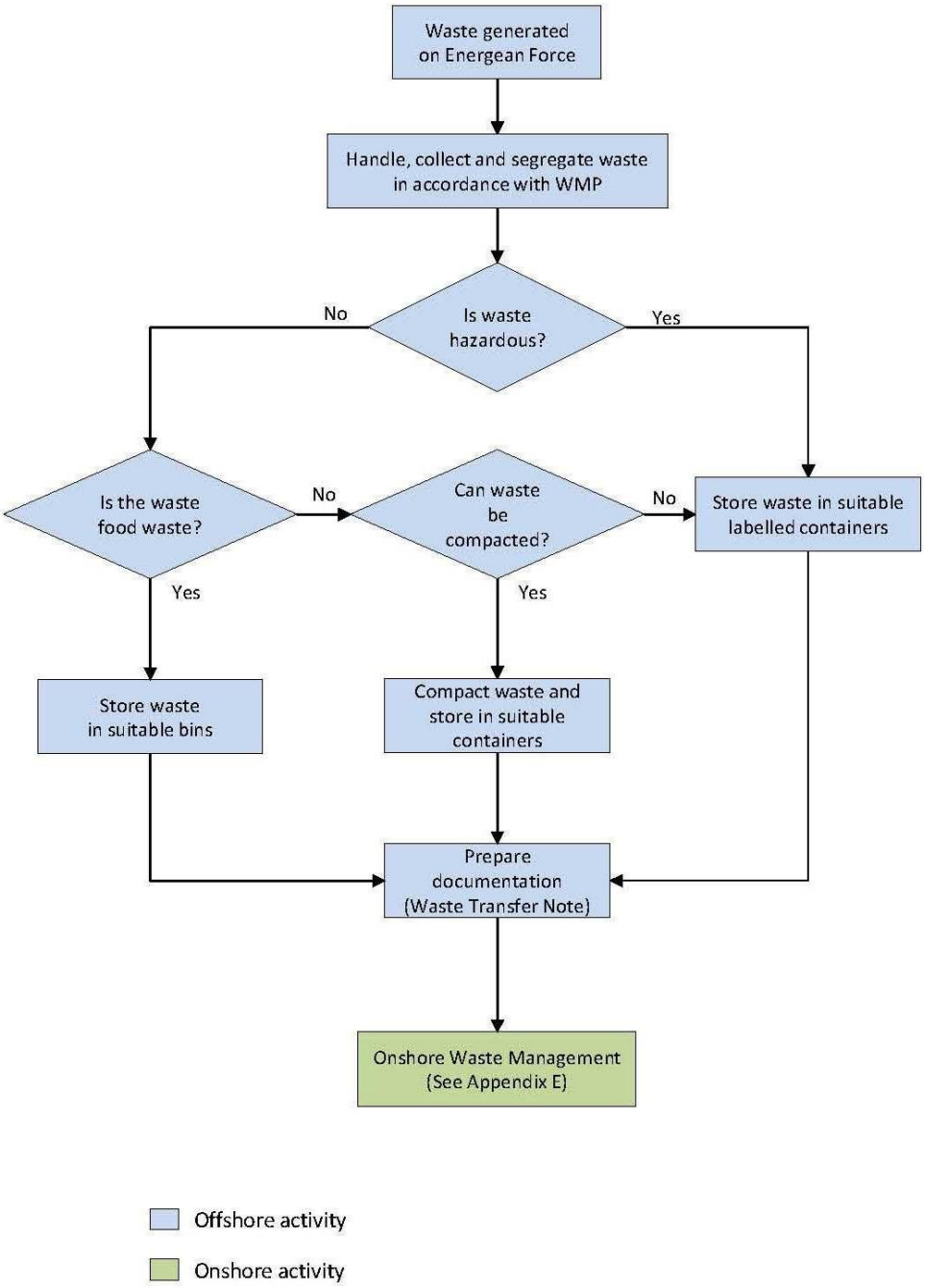
6.2. APPENDIX B

PROJECT WASTE MANAGEMENT DISPOSAL ROUTES



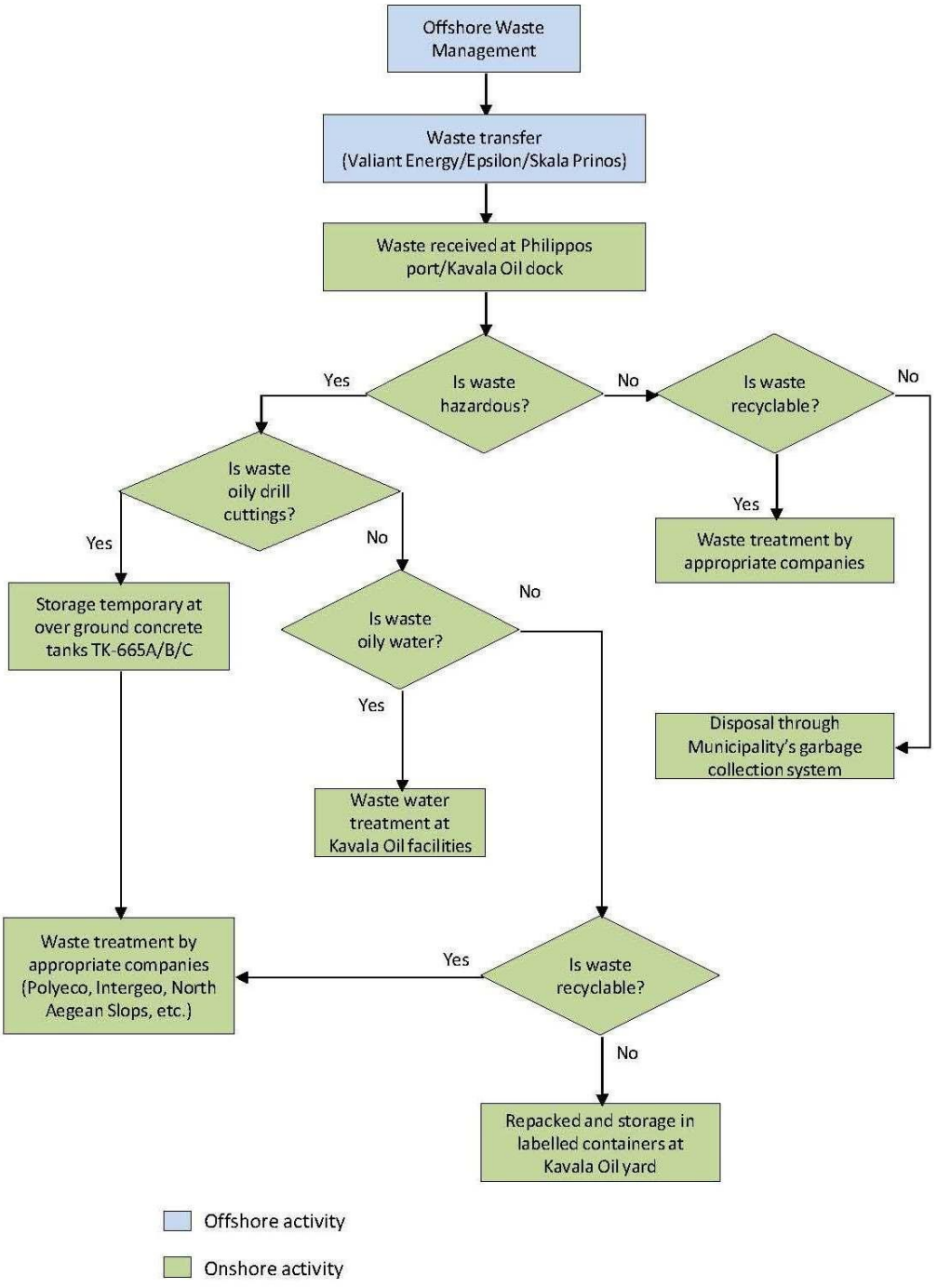
6.3. APPENDIX C

OFFSHORE WASTE MANAGEMENT



6.4. APPENDIX D

ONSHORE WASTE MANAGEMENT



6.5. APPENDIX E

WASTE TRANFER NOTE

Manifest No:.....

WASTE TRANFER NOTE

ITEM	QTY	PACKAGING	EWC CODE	DESCRIPTION OF WASTE	OWNER
Shipped by: VALLIANT ENERGY / EPSILON / SKALA PRINOS / LIMIN PRINOS (mark the appropriate)					
Comments:					

ENERGEAN FORCE
Name:
Sign:
Date:

KAVALA OIL
Name:
Sign:
Date:

DISTRIBUTION	
Energean Force Responsible	Retain a copy
Kavala Oil Responsible	Retain the original
Energean Oil & Gas HSE Dprt	Retain an electronic copy

This note certifies that all the necessary actions have taken for the proper management of the received waste according to the Approved Environmental Terms of Kavala Oil Onshore Facilities

6.6. APPENDIX F

CHEMICAL DATA SHEETS

Monitoring Performance of de-oilers- Weekly Data Sheet

Χ Η Μ Ε Ι Ο

Ε Β Δ Ο Μ Α Δ Ι Α Ι Ο Δ Ε Λ Τ Ι Ο Α Ν Α Λ Υ Σ Ε Ω Ν

Π Α Ρ Α Κ Ο Λ Ο Υ Θ Η Σ Η Α Π Ο Δ Ο Σ Η Σ Α Π Α Λ Α Ι Ω Τ Ω Ν

	Περιγραφή δείγματος	Ημερομηνία / ώρα δειγματοληψίας
	Έξοδος απελαιωτών Μ-111 ή Μ-111Β	

α/α	Ο υ σ ί ε ς	Πρότυπες μέθοδοι	Μονάδες μέτρησης	Αποτελέσματα
1.	pH	-	-	
2.	Υδρογονάνθρακες	503B	mg/lt	
3.	Θειούχα	427C/D	mg/lt	
4.	Σίδηρος ολικός (Fe)	303A	mg/lt	

Παρατηρήσεις:
1. Λαμβάνονται τρία (3) δείγματα σε διάρκεια είκοσι τεσσάρων (24) ωρών με διαφορά, μεταξύ δύο (2) διαδοχικών δειγμάτων, τουλάχιστον τρεις (3) ώρες.
2. Οι εργαστηριακές εξετάσεις των υγρών αποβλήτων της εγκατάστασης ακολουθούν τα πρότυπα της American Public Health Association (A.P.H.A.) η οποία σε συνεργασία με την American Water Works Association (A.W.W.A.) και τη Water Pollution Control Federation (W.P.C.F) έχουν δημοσιεύσει το βιβλίο Standard Methods of Water and Wastewater Analysis.

Χημείο

Ημερομηνία: _____

Κοιν.: Διευθυντή Εργοστασίου
Προϊστάμενο Λειτουργίας Θαλασσίων Εγκαταστάσεων
Προϊστάμενο Τεχνικών Υπηρεσιών
Τεχνικό Περιβάλλοντος

Monitoring of quality of liquid wastes (Exit of skim pile) - Weekly Data Sheet

Χ Η Μ Ε Ι Ο

Ε Β Δ Ο Μ Α Δ Ι Α Ι Ο Δ Ε Λ Τ Ι Ο Α Ν Α Λ Υ Σ Ε Ω Ν

Π Α Ρ Α Κ Ο Λ Ο Υ Θ Η Σ Η Π Ο Ι Ο Τ Η Τ Α Σ Υ Γ Ρ Ω Ν Α Π Ο Β Λ Η Τ Ω Ν

	Περιγραφή δείγματος	Ημερομηνία / ώρα δειγματοληψίας
1.	Έξοδος δεξαμενής M-164	

α/α	Ο υ σ ί ε ς	Πρότυπες μέθοδοι	Μονάδες μέτρησης	Αποτελέσματα	Ανώτατα όρια
				1.	
1.	pH	-	-		6,6 – 8,5
2.	Υδρογονάνθρακες	503B	mgr/lt		10
3.	Θειούχα	427C/D	mgr/lt		2
4.	Σίδηρος ολικός (Fe)	303A	mgr/lt		20

Παρατηρήσεις:
1. Λαμβάνονται τρία (3) δείγματα σε διάρκεια είκοσι τεσσάρων (24) ωρών με διαφορά, μεταξύ δύο (2) διαδοχικών δειγμάτων, τουλάχιστον τρεις (3) ώρες.
2. Οι εργαστηριακές εξετάσεις των υγρών αποβλήτων της εγκατάστασης ακολουθούν τα πρότυπα της American Public Health Association (A.P.H.A.) η οποία σε συνεργασία με την American Water Works Association (A.W.W.A.) και τη Water Pollution Control Federation (W.P.C.F) έχουν δημοσιεύσει το βιβλίο Standard Methods of Water and Wastewater Analysis.

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Προϊστάμενο Τεχνικών Υπηρεσιών
Τεχνικό Περιβάλλοντος

Monitoring of quality of liquid wastes (exit of tank) - Weekly Data Sheet

Χ Η Μ Ε Ι Ο

Ε Β Δ Ο Μ Α Δ Ι Α Ι Ο Δ Ε Λ Τ Ι Ο Α Ν Α Λ Υ Σ Ε Ω Ν

Π Α Ρ Α Κ Ο Λ Ο Υ Θ Η Σ Η Π Ο Ι Ο Τ Η Τ Α Σ Υ Γ Ρ Ω Ν Α Π Ο Β Λ Η Τ Ω Ν

	Περιγραφή δείγματος	Ημερομηνία / ώρα δειγματοληψίας
	Έξοδος δεξαμενής ΤΚ-164	

α/α	Ο υ σ ί ε ς	Πρότυπες μέθοδοι	Μονάδες μέτρησης	Αποτελέσματα	Ανώτατα όρια
1.	pH	-	-		6,5 – 8,5
2.	Υδρογονάνθρακες	503B	mgr/lt		10
3.	Θειούχα	427C/D	mgr/lt		2
4.	Σίδηρος ολικός (Fe)	303A	mgr/lt		20

Παρατηρήσεις:
1. Λαμβάνονται τρία (3) δείγματα σε διάρκεια είκοσι τεσσάρων (24) ωρών με διαφορά, μεταξύ δύο (2) διαδοχικών δειγμάτων, τουλάχιστον τρεις (3) ώρες.
2. Οι εργαστηριακές εξετάσεις των υγρών αποβλήτων της εγκατάστασης ακολουθούν τα πρότυπα της American Public Health Association (A.P.H.A.) η οποία σε συνεργασία με την American Water Works Association (A.W.W.A.) και τη Water Pollution Control Federation (W.P.C.F) έχουν δημοσιεύσει το βιβλίο Standard Methods of Water and Wastewater Analysis.

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Προϊσταμένο Τεχνικών Υπηρεσιών
Τεχνικό Περιβάλλοντος

Monitoring of quality of liquid wastes (Exit of skim pile) - Monthly Data Sheet

Μ Η Ν Ι Α Ι Ο Δ Ε Λ Τ Ι Ο Α Ν Α Λ Υ Σ Ε Ω Ν

Π Α Ρ Α Κ Ο Λ Ο Υ Θ Η Σ Η Π Ο Ι Ο Τ Η Τ Α Σ Υ Γ Ρ Ω Ν Α Π Ο Β Λ Η Τ Ω Ν

	Περιγραφή δείγματος	Ημερομηνία / ώρα δειγματοληψίας
	Έξοδος δεξαμενής ΤΚ-164	

α/α	Ο υ σ ί ε ς	Πρότυπες μέθοδοι	Μονάδες μέτρησης	Αποτελέσματα	Ανώτατα όρια
1.	pH	-	-		6,6 – 8,5
2.	Αιωρούμενα στερεά	209D	mgr/lt		70
3.	B.O.D.5	507	mgr/lt		40
4.	C.O.D.	508A	mgr/lt		120
5.	Υδρογονάνθρακες	503B	mgr/lt		10
6.	Σίδηρος ολικός (Fe)	303A	mgr/lt		20
7.	Θειούχα	427C/D	mgr/lt		2

Παρατηρήσεις: 1. Λαμβάνονται τρία (3) δείγματα σε διάρκεια είκοσι τεσσάρων (24) ωρών με διαφορά, μεταξύ δύο (2) διαδοχικών δειγμάτων, τουλάχιστον τρεις (3) ώρες.

2. Οι εργαστηριακές εξετάσεις των υγρών αποβλήτων της εγκατάστασης ακολουθούν τα πρότυπα της American Public Health Association (A.P.H.A.) η οποία σε συνεργασία με την American Water Works Association (A.W.W.A.) και τη Water Pollution Control Federation (W.P.C.F) έχουν δημοσιεύσει το βιβλίο Standard Methods of Water and Wastewater Analysis.

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Τεχνικό Περιβάλλοντος