

TAP

Trans Adriatic Pipeline



**Integrated ESIA Greece
Annex 8.5 - Solid Waste and Waste water study
of the compressor stations**



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1 WASTE MANAGEMENT PLAN

Hazardous waste and non-hazardous waste management plans (WMP) are developed by the waste producer and submitted to the authorities. The content of the WMP is defined by legislation and is also supported by the relevant guide that the Ministry of Environment, Energy and Climate Change has issued.

This Annex provides an overview of types and estimated amounts of waste and waste water during construction and operation of the compressor stations GCS00 and GCS01.

Separately, a detailed Waste Management Plan will be developed prior to construction as described in Section 9.

1.1 Waste Producer General Information

1. Name:

TAP AG

2. Main Activity:

Gas Transportation system

3. Facility's geographical coordinates (if possible):

The proposed location for GCS00 is approximately 1.8 km of the city of Kipoi and 1.8 km of the settlement of Peplos.

The proposed location for GCS01 is approximately 4.7 km of the city of Serres, 1.3 km of the settlement of Konstantinato and 2 km of the settlement of Krinos.



4. Number of facility's personnel:

Each compressor station will employ approximately 25 staff during operation.

5. Responsible person:

Name: Stathis Theodoropoulos, Senior Country Consultant

Telephone number: +30 210 7454613 Fax: +30 210 7454300

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1.2 Construction Data

6. Construction period:

From April 2016 until March 2018 including civil works, mechanical construction and electrical installations.

The present Annex is submitted prior to construction as part of the ESIA for the project development. Therefore the waste quantities presented are estimations based on the current design and knowledge of the project.

Workforce at the construction site is estimated to be 600 workers.

7. Products

The waste products during construction are the following:



- Excavation materials
- Packaging materials
- Absorbent materials
- Paper and cardboard
- Food
- Adhesives
- Fire fighting foam
- Oily wastes associated with vehicle maintenance
- Batteries
- Paints and solvents
- Waste chemicals
- Materials excavated from contaminated land (if any)
- Electric/ Electronic devices

8. Water consumption:

The water consumption at compressor stations during construction period is estimated at 3.75 m³/h and is planned to be partly supplied by the municipal network.

9. Type of fuel – consumption.

Diesel will be used for the diesel generator during construction. Heavy equipment and motor engine driven equipment used during the construction phase will be fuelled with diesel. Diesel fuel will be delivered via approved fuel road tankers to the construction sites

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1.3 Operational Data

10. Operation period:

Operation period will be from beginning 2019 onwards.

A detailed Waste management plan is submitted prior to operation, as part of the ESIA for the proposed development. Therefore this Annex presents waste quantity estimations based on the current design and knowledge for the project.

11. Products (bcm/year)

The compressor stations are no production facilities, but installations for transporting gas through operation of gas compressors. Actual gas composition is yet to be finalised.



In addition, the system shall be capable to transport gas from only one of the three potential sources and the compressor configuration shall be such that flexibility is achieved to technically and commercially acceptable values, without compromising the operating efficiency. The initial design capacity has been selected to be 10 standard bcm/year.

12. Raw and auxiliary materials

Natural Gas is the main material that is entering, compressed and delivered further to the pipeline system by the compressor stations with quantities as mentioned above.

Auxiliary materials:

- Paper
- Glass
- Batteries
- Electrical/ electronic comps
- Diesel fuel & oil
- Plastic
- Steel
- Packaging materials
- Food wastes
- Light bulbs
- Adhesives
- General chemical
- Cables / copper

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13. Water consumption (m³/h):

Water consumption of the compressor stations is estimated to be 13 m³/h and is planned to be partly supplied by the municipal network

14. Type of fuel – Consumption:

The main energy source used in the facility will be electricity. Demand is calculated at 2MW.

Diesel will be used for the back-up diesel generator. Thus, a diesel quantity of about 24 m³ will be stored at GCS00 site for the first phase of 10 bcm/year, while 2 x 24 m³ diesel tanks will be used for the next phase of 20 bcm/year; and a diesel tank of 40 m³ at GCS01 site. No consumption is envisaged in routine operation.

Natural gas transported through the pipeline system will be used as fuel for the turbo-compressors.

1.4 Waste Data per Category: Hazardous Waste (HW) and Non-Hazardous Waste

The following information is requested separately for the produced waste.



15. Type- characteristics of the waste (i.e. main polluting parameters)

Compressor stations operation results in the generation of small quantities of waste of various types including batteries, municipal-type wastes (garbage), waste from maintenance such as metal scrap, plastic, absorbing materials, paint and solvent residues, lab waste, as well as packaging materials.

16. Waste sources (production line points)

The main waste sources in the compressor stations during the construction phase are the following:

- Excavations
- Maintenance of construction machines /vehicles
- Workshop waste

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- Workforce related domestic wastes (Mixed municipal waste)

The main waste sources in the compressor stations during the operation phase are the following:

- Maintenance of pumps, engines, etc.
- General maintenance of the facilities
- Waste water treatment plant
- Administration building

17. Sampling and analysis:

Sampling schedule is obligatory for the waste water treatment plant.

Table 1-1 Sampling Point

| Sampling point | Frequency (i.e. monthly) |
|--|---------------------------------|
| In chosen points of the production line | 1 |
| At the inlet of the waste water treatment plant | 1 |
| At the outlet of the waste water treatment plant | 1 |

The waste water will be analysed in compliance with Greek laws and regulations for waste water sampling and analysis.

- The standards methods used shall be mentioned.
- Relevant analyses shall be attached: (the more recent)

18. Waste categorization according to European Waste Catalogue (HGG 1909 / B / 22-12-2003) for the construction and the operation phase.(The amounts are referred to each Compressor Station)



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Table 1-2 Construction Phase (Waste Categorization)

| <i>EWC Code</i> | <i>Waste type</i> | <i>Quantity</i> | <i>Management</i> |
|-----------------|--|-------------------------|--|
| 17 05 06 | Dredging spoil other than those mentioned in 17 05 05 | 120,000 m ³ | Authorized Borrow pit |
| | Building rubble | | Sanitary landfill |
| 17 01 01 | Concrete | 1.0 t | Sanitary landfill |
| 17 01 02 | Bricks | 1.5 t | Recycling |
| 17 02 02 | Glass | | Recycling |
| 17 02 03 | Plastic | | Recycling |
| 15 01 06 | Mixed packaging | 1 t | Recycling |
| 20 03 01 | Mixed municipal wastes | 440 t | *Collection by the competent Authority |
| 13 02 06* | Synthetic engine, gear and lubricating oils | 10 m ³ /year | Disposed off by licenced companies |
| 16 05 06* | Laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals | 5 m ³ /year | Disposed off by licenced companies |
| 20 01 28 | Paint, inks, adhesives and resins other than those mentioned in 20 01 27 | 2 t | Disposed off by licenced companies |
| 05 07 99 | Wastes not otherwise specified | 1.5 t | Disposed off by licenced companies |
| 16 06 01* | Lead batteries | 1 t | Recycling |
| 20 01 01* | Paper and cardboard | 0.5 t | Recycling |
| 17 04 05 | Iron and Steel | 0.5 t | Recycling |

*Note *:The mixed municipal wastes will be collected by the relative authorities. According to the relative correspondence, Municipality of Alexandroupoli will be responsible to collect them at the GCS00 site; and in addition, ESANS (:Solid Wastes Management Company of Serres Prefecture) is the competent authority for the collection of the mixed municipal wastes at GCS01 site.*





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Table 1-3 Operation Phase (Waste Categorization)

| <i>EWC Code</i> | <i>Waste type</i> | <i>Quantity, tn/a</i> | <i>Management</i> |
|-----------------|---|-----------------------|---------------------------------------|
| 16 06 01* | Lead batteries | 0.1 t | Disposed off by licenced companies |
| 17 04 05 | Iron and Steel | 2 t | Recycling |
| 15 01 06 | Mixed packaging | 0.5 t | Recycling |
| 17 02 03 | Plastic | 0.01 t | Recycling |
| 17 02 02 | Glass | 0.01 t | Recycling |
| 20 03 01 | Mixed municipal wastes | 170 t | Collection by the competent Authority |
| 13 02 08* | other engine, gear and lubricating oils | 4 m ³ | Disposed off by licenced companies |
| 20 01 28 | Paint, inks, adhesives and resins other than those mentioned in 20 01 27 | 0.1 t | Disposed off by licenced companies |
| 15 02 02* | Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances | 0.2 m ³ | Disposed off by licenced companies |
| 16 03 05 | Organic wastes containing dangerous substances | 1 t | Disposed off by licenced companies |
| 15 01 09* | Textile packaging | 6 t | Disposed off by licenced companies |
| 16 02 16 | Components removed from discarded equipment other than those mentioned in 16 02 15 | 500 items | Recycling |

19. Description of the techniques used for the prevention/ minimization of waste production (Best Available Techniques, Clean Production etc.).

The compressor stations adheres to a waste minimisation policy as part of its wider environmental management system. Waste quantities are minimised at source and further waste management is based on recycling and minimisation of waste disposal

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1.5 Data relevant to Waste Management per Category

Notes:

(a) Each disposal/recovery method that is used is described and characterized by the relevant code DorR [Decision 96/350/EC of the Council (EEL 135/6-6-1996) or Annex III of the JMD 13588/725/2006].



(b) In “storage” is also incorporated the storage in the waste producer’s facility (temporarily storage).

20. Collection- Storage:

- Waste collection:
 - Description of collection means
 - Quantity of collected waste (tonnes/ year)
- Waste storage :
 - space/ storage area
 - storage duration
 - quantity of stored waste (tonnes/ year)
- Relevant correspondence shall be attached

Only temporary storage of waste will take place at the compressor stations. With regard to waste collection, the following means will be used:

- Used oils, lubricants will be collected in tanks with secondary containment
- Oil-contaminated filters, cloths, etc., will be collected in appropriately labelled containers in sheltered area.
- Batteries and accumulators will be collected in plastic containers in closed and well-aerated area.
- Fluorescent tubes will be collected in waste bins in sheltered areas
- Packaging materials will be collected in containers
- Municipal waste will be collected in waste bins

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21. Waste transfer:

- During the construction phase:
 - Waste transfer means (i.e. trucks)
 - Waste transfer destination
 - Itinerary frequency

Waste transfer will be carried out by licensed contractors or the municipality services. The compressor stations will not be involved in waste transfer in any way. Especially for hazardous waste, documentation for final waste destination and eventual waste destruction will be maintained.

- During the operation phase:
 - Waste transfer means (i.e. trucks)
 - Waste transfer destination
 - Itinerary frequency

Waste transfer will be carried out by licensed contractors or the municipality services. The compressor stations will not be involved in waste transfer in any way. Especially for hazardous waste, documentation for final waste destination and eventual waste destruction will be maintained.



22. Recovery – Reusing – Recycling of Waste:

Recycling or recovery of waste will not take place on site but will be performed by the licensed contractors.

23. Waste processing:

There will be not waste processing on site. Wastes will be stored by type/category and recycled /disposal off by licenced companies.

- Waste processing techniques:
- Waste processing techniques in joint waste treatment with other facilities:

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24. In case of no processing of the waste, the techniques that are used for the disposal of this waste should be described.

Waste generated on-site the compressor stations will be disposed of through licensed contractors or the municipality, as described in previous sections.

25. Problems- proposals:

No problems are expected.

The abovementioned information will also be included in the Annual Waste Report which shall be submitted on a yearly basis to the relevant authorities by the waste producer, once the facility is operational.

1.6 Liquid Wastes

Table 1-4 Estimated Liquid Waste during Construction Phase (Waste Categorization)

| <i>Waste Type</i> | <i>Quantity</i> | <i>Management</i> |
|--|----------------------------|---|
| "Black" and "grey" water from construction camps | 1.5 tanker per month | Waste water treatment plant |
| Rainwater runoff from surfaces and roofs | 1,170.14 m ³ /h | Natural drainage |
| Sanitary waste water during construction | 3.75 m ³ /h | Disposal to waste water treatment plant of competent land Authority |

Table 1-5 Estimated Liquid Waste during Operation Phase

| <i>Waste Type</i> | <i>Quantity</i> | <i>Management</i> |
|---------------------------------------|------------------------|---|
| Sanitary waste water during operation | 13 m ³ /h | Waste water treatment plant |
| Rainwater from protected surfaces | 24.3 m ³ /h | Oil separator-waste water treatment plant |

Detail descriptions for liquid wastes are included in *Section 4* (par. 4.8.5.6) and *Annex 3.5*. The **Fehler! Verweisquelle konnte nicht gefunden werden.** presents the flow diagram of liquid wastes.



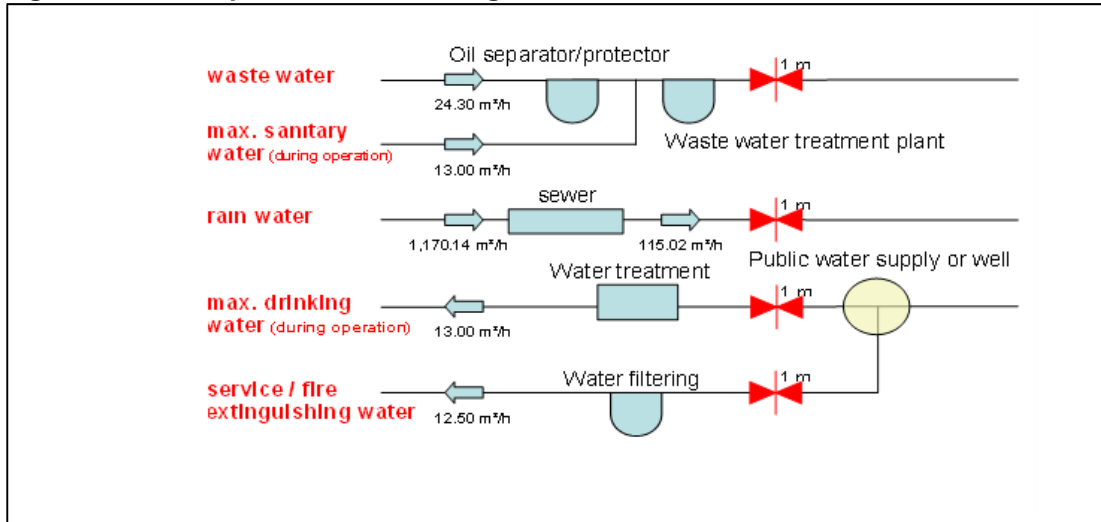
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Figure 1-1 Liquid wastes' flow diagram



Source: ENT (2013)

During operation phase two main liquid waste types are referred.

Sanitary Waste - Water during the operation phase:

Sanitary Waste - Water will arise from the sanitation facilities within the buildings and will be collected within the Waste Water System.

Waste Water will be treated on each of the Compressor Station designed in accordance with DIN EN 12566. The total volume of waste water will be treated in the treatment plant at each Compressor Station. The description of biological Waste Water Treatment Plant is referred to Section 4 (par. 4.8.5.6.2). The effluents will be discharged in accordance to IFC standards and EU and Greek legislation and requirements (i.e. HGG 354/B/08.03.2011)

Rainwater during operation

Rainwater and surface water run-off will be non-polluted water arising from the buildings, shelter roofs, roads and traffic areas and areas beside them.

Rainwater from these areas is considered to be clean water, so there will be no requiring any treatment. Based on EN 752, rain water will be collected by curb stones and gullies in sewerage system and be discharged in nearby streams according to the requirements of responsible Authorities.

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