



Traceca Corridor

Traffic and Feasibility Studies - TNREG 9803

Module E :

Transport of crude oil and oil products on the Caspian Sea

Technical report : Evaluation of existing facilities (task E2)

January 2001

Report Cover Page

Project Title : Traceca Corridor - Traffic and Feasibility Studies
Module E Title : Transport of crude oil and oil products on the Caspian Sea
Project Number : TNREG 9803
Module E Countries : Azerbaijan, Kazakhstan and Turkmenistan

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1. Project synopsis for module E

(Revised version, updated in January 2001)

Project Title	: Traceca Corridor - Traffic and Feasibility Studies
Module E Title	: Transport of crude oil and oil products on the Caspian Sea
Project Number	: TNREG 9803
Module E Countries	: Azerbaijan, Kazakhstan and Turkmenistan

Wider objective: To promote adequate and safe transport of crude oil and oil products on the Caspian Sea

Specific Objectives: A traffic forecast for oil and oil products
The condition of existing infrastructure for oil transport
The feasibility of investments in Dubendi oil terminal

Planned outputs: A detailed traffic forecast
A detailed evaluation of the transport infrastructure (terminals and vessels)
An overall feasibility study for rehabilitation of Dubendi oil terminal

Project activities: Preparation of supply demand analysis for crude oil and oil products
Preparation of traffic forecasts for crude oil and oil products
Evaluation of terminals in Aktau, Dubendi and Turkmenbashi
Evaluation of tanker fleet
Feasibility study for rehabilitation of Dubendi oil terminal

Target group(s): Ministries of Transport, Oil terminal operators, Tanker operators

Project start date: 15 March 2000 (Module E)

Expected completion date: March-April 2001 (Module E)

2. Evaluation of port terminals

2.1 Dubendi

In the Soviet times the Baku area was a major centre for oil processing. Baku refineries had a capacity of up to 25 million tonnes of crude oil per year. They were processing not only oil extracted in the area but also significant volumes brought from other parts of the Soviet Union, particularly Kazakhstan and Turkmenistan. On the other hand large volumes of petroleum products were exported in direction of those two countries with destinations as far as Siberia or even Kamchatka.

The terminal facilities of the Baku port were at one time handling inflows and outflows, particularly at pier n°20. However, to cope with increasing flows, at the beginning of the sixties it was decided to build a dedicated oil terminal on the Absheron Peninsula in a site called Dubendi that is naturally well protected by the Pirallachy island from the east and from the south (the island is connected to the mainland by an artificial dike). Dubendi is at a distance of 47 km from Baku by land and 92 nautical miles by sea. Construction of the port started in 1965.

Two kinds of flows are presently transiting by Dubendi:

- Crude oil extracted in the region of the Absheron Peninsula, which reaches Dubendi by underwater pipelines. It is shipped by rail to the SOCAR storage facilities in Sangachal, 60 km south of Baku, before being forwarded by the AIOC pipeline to the Supsa port, on the Black Sea.
- Crude oil imported by tanker either (the bulk of it) from Aktau, Kazakhstan, from where it is mainly shipped by Tengizchevroil, or from Okarem or Cheleken, Turkmenistan, where it is produced by Mobil and Total. This oil is sent to Batumi port on the Black Sea by the Caspian TransCo Company.

Dubendi oil terminal mainly consists of a navigation channel, four piers sheltered by a breakwater as well as onshore facilities: tank-farms, a rail-tank-car loading station, a water treatment facility, oil pipe networks, pump stations, power stations, electricity and water networks, administrative buildings.

All infrastructures are owned by BISP whereas most unloading facilities, pipe systems and tank-farms belong to SOCAR.

There is no bunkering station in Dubendi. Tankers refuel in other ports of call.

2.1.1 Navigation channel

The navigation channel starts from the 10 m hydrographic contour line, and was initially dredged down to 10 m below the Caspian Sea chart datum. It is 100 m wide on the sea bed and stretches along 2.5 nautical miles. Due to northern wave action the channel is subject to continuous siltation. Frequent dredging works have been required to maintain water depths, however insufficient since a shoal currently reduces the depth to 6.5 m in the vicinity of the breakwater head. The port basin was also initially dredged to 10 m, but siltation has resulted in restricted depths: 9 m in the turning area, 8.5 m to 7.5 m along the berths.

The channel is marked with six port and six starboard buoys, which are highly corroded and partly not working. In addition, two leading lines are marked by onshore beacons. The beacons in the first section are in poor condition but still working, whilst beacons in the second section are out of operation.

A specific project has been undertaken to upgrade navigation aids in Baku and Dubendi ports, to be implemented in 2001 under the Traceca programme. This project includes supply of radar equipment, Global Maritime Distress Safety System, radio communication equipment, renewal of buoys, beacons, leading lights and lighthouses.

2.1.2 Breakwater

The breakwater is of rubble mound type. Its total length is 1,035 m, consisting of a 250 m long root, a 540 m long trunk section and a 245 m head. The elevation of the top is 3 m above the Caspian chart datum.

The root section is protected with quarry stones, the trunk stretch is covered with 4.6 tonne concrete cubes and the head part is protected with 10 to 15 tonne concrete cubes. The end of the breakwater head is bordered by a sheet pile wall, to reduce its width.

Due to the increase in the Caspian Sea level incoming waves are currently stronger than those which were taken into account during the design phase, and this is probably the reason why several parts of the structures failed, including the head section, as shown on the attached photos. There is almost a breach between connection with pier n°2 and connection with pier n°5.

The inner part of the breakwater is bordered with reinforced concrete piles supporting pipelines which are generally severely damaged, except between the root and pier n°1. Diver inspections revealed that piles are damaged underwater too.

Floodlighting system along the breakwater is destroyed, as well as all water and electricity networks.

2.1.3 Piers

Four piers were constructed from 1972 to 1975, to allow berthing of tankers: pier n°1, pier n°2, pier n°3 and pier n°5. Pier n°4 was initially foreseen but not built. Piers n°2 and n°5 were never used for oil traffic, they only accommodated tug boats, dredgers and other port vessels.

Each pier has two symmetrical berths, design capacity of each berth being 2.5 Mt per annum.

Pier n°1 and pier n°3 are operated by Caspian TransCo for unloading crude oil shipped from Aktau, Okarem and Cheleken. Previously pier n°3 was dedicated to refined oil products, in both directions, but traffic of refined products came to end last summer - pier n°3 is still obstructed by lots of equipment pieces dedicated to refined oil products, owned by the Azerneftiyag refinery -

These piers are made of reinforced concrete piled structures consisting of berthing sections connected with trestle bridges. They are equipped with fenders, bollards, oil unloading arms, oil pipelines, water pipes, valves and lightening masts.

All concrete structures are highly deteriorated, cracked and show corroded steel bars, above sea water and below water level as well.

Almost all fenders are simple rubber tyres which are not adequate.

Oil arms and pipes are in need of maintenance, although in working conditions.

Fire-fighting system is not suitable since it is only based on water, except a small foam equipment recently installed on pier n°3 (water is not adequate to fight hydrocarbon fires). Moreover, there is no automated system to give the alarm.

Other steel equipment (stairs, handrails, etc.) are very corroded and generally out of shape.

Electricity networks are such in poor condition that they are indeed dangerous.

Condition of pedestrian traffic on piers is very bad and somehow risky.

Lastly, access to pier n°3, via a 220 m long rubble mound structure protected with 300 kg quarry stones, has been damaged by wave action.

2.1.4 Tank farms

Two main tank farms are available. The first one borders the port basin and is used to store crude oil (16 tanks, total capacity 170,000 m³ - available current capacity is only 130,000 m³ because some tank bottoms are obstructed with viscous products -), whereas the second one is on top of the hill (52 tanks, total capacity 260,000 m³); the latter was dedicated to refined products but it is no longer used.

Current availability storage capacity for crude oil (130,000 m³) is a bit low, on the 2000 traffic basis of 3.5 Mt it only allowed an average "oil idle time" of 13 days. According to usual ratios 20 days would be a better rate, it would require a storage capacity of 190,000 m³ for 3.5 Mt per year, and a capacity of 540,000 m³ for 10 Mt per year.

Thus, to cope with crude oil traffic increase it should be planned to undertake upgrading works aiming at making use of the upper tank farm for crude oil, and also to build some new tanks (approximately 100,000 m³, in case the 10 Mt threshold is reached). Priority actions are to clean obstructed tank bottoms and to fix tank floating roofs.

2.1.5 Rail-tank-car loading station

Two pipelines allow transfer of crude oil from the lower tank farm to the RTC station, located a few kilometres away, on top of the plateau. The station includes two blocks, each one being designed for 21 RTC at a time. It is equipped with a complete and modern foam fire-fighting station.

The RTC loading station is recent and runs under satisfactory safety conditions.

2.1.6 Water treatment facility

The port has a Waste Water Treatment Plant (WWTP), built in 1970 for treating sanitary water, bilge water from the tankers, and waste water from the land-based crude oil storage tanks. The original design capacity of the WWTP was 1,500 to 2,000 tonnes of waste water per day. The WWTP has been operated by the 28 of May Company (the same company that operates the port reception and oil transport facilities) since 1991.

The WWTP staff and quality control laboratory are at the site. The laboratory is not capable of testing for regulated parameters in the WWTP discharge. For complete analyses samples must be sent offsite. Analysis of the sea water for phenols and other contaminants is according to Gost standards.

The WWTP features the following processes:

- 3 to 4 hours of settling in crude oil tanks (containing crude oil delivered from Aktau and Turkmenbashi, as well as from Pirallachy Island, which now totals about 78.000 tonnes daily).
- Draw off of water/oil emulsion (about 80 to 100 tonnes daily, depending on tanker traffic).
- Two 5,000 tonne tanks for oil/water separation (about 17 to 20 tonnes of oil is returned to the crude oil tanks).
- Discharge of treated waste water to sea.

The WWTP does not seem to be well maintained and operated, and significant bypassing may occur. Further study for treatment needs and the ability of this plant to meet those needs is required.

2.1.7 Oil pipe networks

Except the rare lines which are still being used, all other pipelines are worn-out. Moreover, pipeline supports which are standing along the breakwater are severely damaged.

2.1.8 Pump stations

There are three pump stations on the terminal: pump stations n°27 and n°62, serving the upper tank farm*, and Caspian TransCo's pump station, serving the RTC loading facility. The latter is the only new and sound one. The two others are operating but they are in need of overhaul.

** Crude oil is delivered to the lower tank farm by the use of vessel pumps. It may be underlined that unloading operations are frequently delayed because of failures on vessel pumps.*

2.1.9 Power stations and electricity networks

The terminal is fed by two main transformers delivering 6 kV power to seven sub-transformers producing 0.4 kV power. All transformers and sub-transformers are in need of overhaul.

Besides, the whole electricity supply network is in advanced stage of deterioration and therefore dangerous with regard to risk of fire:

- cable ways are not covered;
- many connection boxes are no longer protected from dust and rain, and several cable connections are not insulated;
- earthing devices don't look efficient;
- most supporting poles are corroded and about to fall down.

2.1.10 Administrative buildings

Though main building structures look sound, terminal administrative buildings do not offer decent working conditions. They need to be refurbished, they also need some modern office equipment and adequate improvements allowing to centralise port operation control.

2.1.11 Miscellaneous deficiencies

Traffic of vehicles and pedestrians is not controlled according to international safety standards for oil terminals. All dangerous areas ought to be clearly marked and prohibited to non-authorized vehicles and persons.

The general fire-fighting system is not adequate, especially because it does not include enough foam systems (only pier n°3 has a small foam tank). Furthermore, the fire water network is not maintained and outlets are difficult to find. Other components fire control (sand pit, etc.) are inadequate.

There was no confirmation of the presence of oil spill prevention equipment, although special boom guards for localising emergency oil spills in the process of unloading tankers at the berths were said to be available. The "oil refuse collector" ship carries out mechanical collection of oil and waste floating on the surface. The fire boat is also supposed to be equipped with operational boom guards for localising oil spills in the berth areas. The port evidently expects help to come from the Port of Baku in the case of critical oil spills. There was no indication that an Emergency Response Plan has been developed. The port has requested booms of the "Anakonda" type as part of the rehabilitation project.

It may be added that Azerbaijan, as a member of the IMO (as well as all other riparian states of the Caspian), has accepted the various requirements of the IMO concerning oil pollution preparedness, response and co-operation. These include reporting procedures for vessels, emergency response plans, and international co-operation.

Port crude oil and petroleum product offloading and onloading facilities, which fall under the IMO directives on preparedness, are in the process of improving facilities, developing Emergency Oil Spill Response Plans, and upgrading equipment required to meet the terms of the plans. In general these ports should be prepared to handle US EPA Tier 1 and Tier 2 spills. The minimum requirements for Tier 1 (up to 10 tonnes) and Tier 2 (from 10 to 100 tonnes) spills are as follows:

1. *Oil spill response vessel*
2. *Rapid deployment boom system*
3. *Permanently-moored boom*
4. *Rope skimmer oil mop*
5. *Portable power supply*
6. *Sorbents*
7. *Harbour compensators*
8. *Harbour skimming system*
9. *Individual response pits*
10. *Capacity for installation & commissioning of equipment*
11. *Spare parts and maintenance*

2.1.12 Suggestions for improvements

Following items should be included in a rehabilitation programme, provided that they prove to be financially or economically viable, as it should be evaluated in the forthcoming feasibility study.

Item	Rough cost estimate (in thousand USD)	Comments
Dredging of navigation channel	800	to allow sailing of 12,000 dwt tankers
Dredging of port basin	1,000	to allow berthing of 12,000 dwt tankers
Rehabilitation of breakwater	6,000 to 10,000	to protect piers n°1, n°2 and n°3
Rehabilitation of pier n°1	1,800	to increase its capacity up to 5Mt/year
Rehabilitation of pier n°3	1,200	to increase its capacity up to 5Mt/year
Rehabilitation of pier n°2	2,000	to enable it to transit 5 Mt/year
Rehabilitation of port vessel berths	1,000	
Rehabilitation of lower tank-farm	1,400	16 tanks, total capacity 170,000 m3
Rehabilitation of upper tank-farm	5,300	52 tanks, total capacity 260,000 m3
Upgrading of water treatment plant	300	
Construction of oil pipe supports	750	
Piping works in upper tank-farm area	1,100	
Piping works in lower tank-farm area	3,000	
Electrical networks in upper area	1,500	
Electrical networks in lower area	1,500	
Refurbishment of upper buildings	540	
Refurbishment of lower buildings	480	
Supply of environmental protection equip.	500	
Supply and installation of safety equipment	1,900	
Reconstruction of the upper boiler	250	
Internal road works	250	breakwater head, tank farms areas and others
Quarry stone revetment inside the port	300	from breakwater root to pier n°3 access way
TOTAL (including 15% contingencies)	38 to 42 million USD	

2.2 Aktau

2.2.3 General

ACSP has four oil berths which are shown on the attached layout: berths n°4 and 5, on each side of the secondary breakwater, and berths n° 9 and 10 at the main breakwater head. From these berths oil is being shipped across the Caspian Sea towards three ports:

- Dubendi, Azerbaijan, for further shipment across the Caucasus up to the Black Sea port of Batumi, within the frame of the Caspian TransCo integrated system (1.83 Mt in 1999).

- Makhachkala, Russia, for further shipment by pipeline to Novorossiysk (0.5 Mt in 1999).
- Neka, Iran, to feed the Tehran refinery (0.5 Mt in 1999).

Most of crude oil reaching ACSP is transported by train from Tengiz up to a station located some 2 km away from the port, belonging to the State Oil Pumping Company Uzhnefteprovod. The station includes an unloading trestle, pumping equipment, storage tanks and an internal pipeline system connecting tanks to the port loading terminal. Storage tanks have a capacity of 150,000 m³: 22 tanks of 4,750 m³ each and 2 tanks of 22,000 m³ each. Capacity of the unloading trestle is 2 million tonnes/year.

Texaco, which operates Buzachi north field, also ships oil across the Caspian Sea, using the Caspian TransCo integrated system. Texaco sends oil to Aktau by pipeline, straight to the port tank-farm.

2.2.3 Port facilities

The Aktau port is protected from wave action by a long breakwater which is in critical condition: its slopes are damaged and its crest is frequently overtopped by waves. This breakwater is crucial for the survival of the port.

The oil berth infrastructures are own by ACSP whereas KazTransOil, the Kazakh national oil transportation company, owns oil related superstructures (pipelines, port storage facilities, loading arms, etc.). Only three berths are currently operational, able to accommodate oil tankers at a maximum draught of 6.5 m (7,400 dwt tankers, fully loaded, or 12,300 dwt tankers loaded up to 8,500 tonnes):

- Berth n°5 is dedicated to Buzachi crude oil, sent by Texaco. Loading rate is 1000 t/h (*adjoining berth n°4 is out of service since the outer side of the secondary breakwater has no fender and no oil arm left*).
- Berths n°9 and n°10 are for loading Tengiz crude oil, sent by TengizChevroil. Loading rate is 1,100 t/h on each berth (*berths n°9 and n°10 are along a single piled structure where two vessels can be loaded simultaneously; total length of the berths is 320 m; there are five oil arms currently in use*).

Berths n°4 and n°5 are standing along a massive structure supported by steel sheet piles which are deeply corroded. Holes can be seen in the bulkhead, above sea level, and earth fill leaks through the sheet piles. Pavement is also very damaged. The pier fire-fighting equipment has reached an advanced stage of deterioration; floodlighting masts as well.

Besides, the access causeway has suffered from wave damages: pavement is out of shape and cracked.

There is seasonal presence of wildfowl, especially in the winter, in coastal lagoons in the vicinity of the port. There are various bird species inhabiting these coastal wetlands. Seals are frequently seen in and around the port. Commercial fishing activities do not occur near the port. There are various recreational beaches just west of the city of Aktau.

Tank waste water from oil tankers is returned to the oil fields via Kaztransoil. Oil and water are separated, and the water is injected into injection wells. The tankers do not have equipment for cleaning out the vessels themselves. Ballast and bilge water are not unloaded at the port, as there is no treatment facility. Port sanitary waste water is treated at the Aktau municipal waste water treatment plant.

An Oil Spill Contingency Plan (OSCP) has been developed for the port, and exercises are held once per year. The plan includes provision for the following:

- Notification of spill
- Isolating the source of oil
- Evaluation of the spill
- Required actions contingent on the type and extent of the spill
- Capture of oil
- Protection of public beaches and recreation areas
- Protection of wildlife and resources
- Warning of a possible national emergency in the case of an unmanageable spill
- Oil recovery, storage and clean-up.

A loan was signed with EBRD in 1999 related to Provision of Oil Spill Control Equipment for the Aktau Commercial Sea Port. A tender has been issued.

2.2.3 Suggestions for improvements

Below is a complete list of items that might be included in a rehabilitation programme, provided that they appear to be financially or economically viable.

Item	Rough cost estimate (in thousand USD)	Comments
Dredging of navigation channel down to 9 m below CD	2,000 to 4,000	to allow sailing of 12,000 dwt tankers (existing water depths are around 7.5 m)
Deepening of oil piers n°9 and n°10	2,500	to allow berthing of 12,000 dwt tankers (existing draught is approximately 7.5 m)
Rehabilitation of main breakwater	8,000 to 14,000	would benefit to the whole port
Rehabilitation of pier n°5	1,200	
Rehabilitation of pier n°4	1,800	
Upgrading the access causeway to piers 4 & 5	500	
Supply and installation of safety equipment	800	for fire-fighting purposes
Supply of environmental protection equipment	p.m.	covered by the EBRD tender
TOTAL (including 15% contingencies)	19 to 28 million USD	

Note: Improvement of ACSP navigation aids is covered by an on-going Traceca project which is to be implemented in 2001. It includes supply of radar equipment, Global Maritime Distress Safety System and radio communication equipment.

2.3 Turkmenbashi, Cheleken and Okarem

The ports of Cheleken and Okarem export crude oil that is shipped towards Turkmenbashi (Ufra oil terminal), Dubendi and Neka, Iran. The share which is sent to Ufra is processed in Turkmenbashi refinery. Part of this refined oil is for domestic use, the rest being exported onboard tankers or in rail-tank-cars onboard ferries.

2.3.1 Cheleken

Cheleken terminal receives crude oil from Azizbekovo and Koturtepe nearby fields. Oil is stored in the vicinity of the bay at the Karagel tank-farm, then pumped to a double-sided pier able to accommodate tankers up to 5,000 dwt (the so-called Aladja wharf). The pier is also equipped with portal cranes and receives dry-cargo vessels. For the time being the pump and pipe system doesn't allow to load two tankers simultaneously. Capacity of the terminal is reportedly 3.5 Mt per year. The pier is fitted with a modern fire-fighting system. There is a plan for improvement of Cheleken facilities, mainly focussing on renovation of the pier and equipping it to allow simultaneous loading of two tankers. Cheleken navigation aids were upgraded in 2000; it is now possible to operate the terminal day and night.

2.3.2 Okarem

Okarem terminal mainly consists of a 20,000 m³ tank-farm and a 1967-built pier able to receive 5,000 dwt tankers. Capacity is estimated at 2.5 Mt per year. Due to lack of lighting facilities it is impossible to operate the terminal during night time.

Condition of the pier is so poor that it should be completely reconstructed. Moreover, no fire-fighting equipment is available.

2.3.3 Turkmenbashi-Ufra

Ufra oil terminal is located 4 nautical miles east of Turkmenbashi city port. It consists of two piers able to accommodate four vessels at a time (biggest tankers calling at Ufra are CSC Absheron units, 7,400 dwt). Pier n°1 is used for unloading crude oil and loading refined oil, whilst pier n°2 is dedicated to refined products. Both piers are equipped with suitable fire-fighting equipment. Vessel slop waters are collected by a specific vessel based in Turkmenbashi port.

The terminal seems to be operating in a satisfactory way, although piers are deteriorated (concrete is cracked, fenders are worn out, etc.).

The long access channel suffers from poor navigation aids and from siltation (the on-going Traceca project has a specific module dealing with improvement of Turkmenbashi channel; furthermore, Traceca already decided to finance supply of navigation aid equipment in Turkmenbashi).

Most of the Turkmenbashi bay is part of the Khazar Nature Reserve (covering 262,037 hectares, 90 % of which is covered by water), which is frequented by over 80 % of the migrating birds in the Caspian and other species, as well as permanent fauna and flora. The reserve extends to the south and east of the dredged

navigation channel for the Port of Turkmenbashi and the Ufra Oil Terminal. No commercial fishing takes place in the Gulf of Krasnovodsk, largely because it is enclosed by the reserve.

The bottom of the bay, characterised by sandy silts, have concentrations of phenols and oily substances slightly above the regulatory standards. Sources of these substances are likely to be the oil terminal, offshore oil production in the vicinity of the Cheleken Peninsula, or tankers carrying crude oil or petroleum products.

Very little information was available regarding the oil terminal. Oil spill prevention equipment is present but insufficient and aging. Ufra has some facilities for oil/water separation. Bilge and ballast water are not, however, unloaded from oil tankers. Furthermore the treatment plant for ballast water is no longer operating. Ballast water is now discharged directly into the sea. An oil spill plan exists, although it was not made available to the consultant.

2.3.4 Suggestions for improvements

The following table proposes a list of improvement works that may appear to be justified.

Item	Rough cost estimate (in thousand USD)	Comments
Widening of Turkmenbashi and Ufra navigation channels	p.m.	to be incorporated in the on-going Traceca Module D
Rehabilitation of Ufra pier n°1	1,400	
Rehabilitation of Ufra pier n°2	1,200	
Supply Ufra terminal with environmental protection equipment	300	to avoid adverse consequences of an oil spill
Improvement of Cheleken wharf	700	to allow simultaneous loading of two tankers
Supply Cheleken terminal with environmental protection equipment	200	to avoid adverse consequences of an oil spill
Reconstruction of Okarem wharf	2,500	
Supply Okarem terminal with environmental protection equipment	200	to avoid adverse consequences of an oil spill
TOTAL (including 15% contingencies)	7.5 million USD	

3. Evaluation of oil tanker fleet

In the Caspian Sea tanker vessels carry oil and oil products on the major following routes:

- from Aktau to Dubendi (almost 2 Mt in 1999);
- from Aktau to Makhachkala, Russia (0.5 Mt in 1999);
- from Aktau to Neka (0.5 Mt in 1999);
- from Cheleken to Dubendi (0.15 Mt in 1999);
- from Cheleken to Turkmenbashi, Ufra terminal (0.2 Mt in 1999);
- from Okarem to Dubendi (0.40 Mt in 1999);
- from Okarem to Turkmenbashi, Ufra terminal (0.01 Mt in 1999).

Marine transport resources include tanker vessels operated by:

- the Caspian Shipping Company (Azeri state-owned company);
- the Turkmen Maritime Lines (Turkmen state-owned company);
- Kazmortransflot (Kazakh state-owned company).

Since the break-down of the Soviet Union the status of the Caspian Sea with regard to international maritime laws has not yet been clearly established, despite regular initiatives backed by Russia and Iran to push for further negotiations, and although all riparian States are members of the IMO (Russia since 1958, Kazakhstan since 1994, Turkmenistan since 1993, Iran since 1958 and Azerbaijan since 1995). As such these countries should comply with the Marpol 73/78 specifications regarding oil tankers (even Azerbaijan and Turkmenistan, who didn't sign the Marpol Convention), notably to ensure that their oil tankers are fitted with dedicated tanks for slops and for tank washing waters*.

It may also be mentioned that a draft maritime code was proposed in the Traceca "Legal and Regulatory Framework", issued in February 1998, but so far the code was not enforced.

For the time being the Caspian Sea can be only be considered as an inland water, not as an international water.

** According to Annex I of Marpol 73/78, only new oil tankers of 20,000 dwt and above need segregated ballast tanks, dedicated clean ballast tanks and crude oil washing systems. In order to prevent oil pollution in the event of collision or stranding, oil tankers of greater than 600 dwt must be constructed with wing tanks or spaces and double bottom tanks or spaces. Tankers of greater than 150 tons gross must be provided with slop oil tanks for dirty ballast and tank washing water, and must be fitted with oil discharge monitoring and control systems.*

3.1 Caspian Shipping Company tankers

The Caspian Shipping Company (CSC) is the largest ship-owner in the region. The CSC tanker fleet operating in the Caspian Sea consists of 33 tankers:

- | | | |
|---|------------|---------------------------|
| ▪ 3 type "Kafur Mamedov" tankers: | 12,300 dwt | Mean load draught: 8.00 m |
| ▪ 9 type "Absheron" tankers: | 7,400 dwt | Mean load draught: 5.3 m |
| ▪ 21 type "G ^{al} Shikhlinskiy" tankers: | 5,500 dwt | Mean load draught: 4.15 m |

Besides, CSC owns an additional tanker which currently operates outside the Caspian Sea.

The three largest tankers were recently purchased with the objective of reducing transportation costs. However this acquisition didn't provide the expected benefit so far, since water depths in Aktau and Dubendi are not yet sufficient to accommodate fully loaded 12,300 dwt tankers.

According to the inspections performed by Uniconsult experts in Spring 2000, CSC tankers are in poor condition regarding aspects of ship operation and navigation, as well as safety and environmental protection equipment. Furthermore, the experts found that vessels often sail without complete sets of necessary

certificates and permits, and that they obviously don't comply with the regulations of the International Maritime Organisation.

Overhaul of CSC tankers is therefore urgently required.

3.2 Other tankers

For the time being the Turkmen Maritime Lines don't operate any oil carrier, Turkmen oil is shipped onboard CSC tankers. However, this year TML will receive a brand new tanker built in Turkey: 7,500 dwt, 4.5 m draught, designed according to IMO standards and ready to be classified by the Lloyd's Register. TML also owns two dry cargo vessels.

Kazmortransflot is a recent company, launched in 2000; it doesn't own any vessel yet. It just started to operate Russian-chartered oil tankers.

4. Comparison of the existing infrastructure to the demand

As far as the demand is concerned, the following comparison is mainly based on the outcomes of the Task E1 Report, "Forecasts of Oil Flows", issued by Bceom in August 2000.

4.1 Ports

For the needs of the analysis it is assumed that oil traffic through Caspian Sea ports should tend to grow according to the following rounded figures:

Port	Year 1999 (in Mt)	Year 2005 (in Mt)	Year 2010 (in Mt)
Aktau (export)	3	5	8
Okarem & Cheleken (export)	2.75	4	7
Turkmenbashi (Ufra, import & export)	2.75	3.5	3.7
Dubendi (import)	2.5 (3.5 in 2000)	5.5	9

To cope with such traffic levels the ports should progressively be improved:

- Aktau would need at least three or four adequate oil berths by 2010. Moreover, rehabilitation of the breakwater is a considerable burden that cannot be avoided. However, the benefit of deepening the channel and the berths is still to be proved.
- Okarem and Chelekem would require implementation of the rehabilitation above-mentioned programme. Otherwise a better pipeline system connecting the nearby oil fields to Turkmenbashi should be implemented.

- If Okarem and Cheleken are rehabilitated Ufra simply requires upgrading of existing piers 1 and 2, together with supply of environmental protection equipment. Construction of an additional pier, as contemplated by TML, doesn't look justified.
- Dubendi will need two fully operational berths in 2005 and four ones in 2010. This requires upgrading of pier n°1 as well as pier n°2 or pier n°3, and rehabilitation of ancillary facilities. Deepening of the sea bottom down to 12 m doesn't seem compulsory but urgent rehabilitation of the breakwater is to be undertaken.

4.2 Tanker vessels

Following routes and oil flow projections have been considered, in compliance with the conclusions of the Task E1 Report, "Forecasts of Oil Flows":

Route	Year 1999 (in Mt)	Year 2005 (in Mt)	Year 2010 (in Mt)
Aktau - Dubendi	2	4	6
Aktau - Makhachkala	0.5	0.5	0.5
Aktau - Iran	0.5	0.5	1.5
Okarem & Cheleken - Dubendi	0.5	1.5	3

On the Aktau - Dubendi route a medium CSC tanker can perform an average 100 round trips per year (ref. Module E Inception Report, Annex 1) and, assuming an oil load of 6,000 tonnes per trip, a medium vessel should be able to transfer 0.6 Mt of oil per annum from Aktau to Dubendi. Therefore 7 to 8 fully operational vessels should manage to cope with the 2005 demand, and 10 to 12 units in 2010.

Similar arguments lead the following figures along the other routes:

- 125 round trips per year and per tanker, thus one fully operational vessel till 2010 on the Aktau - Makhachkala route.
- 55 round trips per year and per tanker, therefore two vessels till 2005 and five vessels in 2010 on the Aktau - Iran route.
- 120 round trips per year and per tanker, two vessels till 2005, four to five vessels in 2010 on the Turkmenistan - Dubendi route.

Summed up, these figures show that 12 to 13 fully operational medium tankers would be needed to cope with the 2005 demand, and 20 to 23 tankers in 2010. Even if these totals are rough, they stand far below the number of tankers currently owned by CSC. This means that the existing fleet would easily allow to cope with traffic demand, at least till 2010, provided that CSC launches a suitable tanker overhaul programme.

* *
*

Enclosures: Annex 1 to Annex 4

Impressive pictures...



Offshore facilities are in even worse condition than onshore ones: Oily Rocks (Neft Dachlari), Azerbaijan, a huge offshore site set-up in the forties, is slowly collapsing. Out of 300 kilometres of pile-founded roads, only 40 are still standing, whilst the 300 workers are accommodated in completely outdated blocks.

Source: Le Nouvel Economiste, July 2000

Annex 1

Abbreviations & Acronyms, References and Staff List

Abbreviations and Acronyms

• ACSP	Aktau Commercial Sea Port
• AIOC	Azerbaijan International Oil Corporation
• BISP	Baku International Sea Port
• BSL	Baltic Sea Level
• CPC	Caspian Pipeline Consortium (western Kazakhstan - Novorossiysk)
• CSC	Caspian Shipping Company
• dwt	dead weight tonnage
• EA	Environmental Assessment
• EBRD	European Bank for Reconstruction and Development
• EC	European Commission
• EIA	Environmental Impact Assessment
• EU	European Union
• IMDG	International Maritime Dangerous Goods Code
• IMO	International Maritime Organisation
• Inogate	Interstate Oil and Gas Transmission to Europe (a European Commission programme)
• km	kilometre
• kV	kilo Volts
• m	metre
• MARPOL	International Convention for Prevention of Marine Pollution
• MEP	Main Export Pipeline (from Baku to Ceyhan)
• Mt	Million tonnes
• RTC	Rail Tank Car
• SOCAR	State Oil Company of Azerbaijan Republic
• TEN	Trans-European Transport Network
• TML	Turkmen Maritime Lines
• Traceca	Transport Corridor Europe-Caucasus-Asia
• USD	United States dollar

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8. The Caspian Sea: legal status and international security (Umirserik Kasenov)
9. L'exploitation des hydrocarbures de la mer Caspienne (Pétrole et Techniques, February 2000)
10. EIA Caspian Sea Region Report (Energy Information Administration, December 1998)
11. Caucase, le grand jeu pétrolier (Courrier International, October 1999)
12. Seminar: Les enjeux régionaux de la mer Caspienne (Centre Français du Commerce Extérieur, September 1999)
13. Caucase, les grandes manœuvres russes (L'Express, November 1999)

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Annex 2

Photographs of Dubendi Oil Terminal (23)



1. General view of Dubendi Oil Terminal, seen from the upper tank-farm area



2. The breakwater, from its root, and pier n°1



3. On the breakwater. Connection with pier n°5



4. Along the inner part of the breakwater (oil pipe supports)



5. The most damaged part of the breakwater, between pier n°2 and pier n°5



6. Same area as photo n°5, towards the shore



7. Head section of the breakwater (notice sheet piles)



8. On pier n°1



9. Pipe nets on pier n°1



10. Underneath pier n°1 (damaged reinforced concrete)



11. A pedestrian bridge on pier n°1



12. Pier n°2



13. Pier n°5



14. Access causeway to pier n°3



15. Same as photo n°14, towards the shore



16. Head section of pier n°3



17. Pier n°3. Unused arms for refined oil



18. Pier n°3. Brand new arms for unloading crude oil



19. Pier n°3. New foam tank



20. Port-vessel berth



21. Caspian TransCo pump station



22. Caspian TransCo RTC loading station



23. Lower tank-farm (northern part)

Annex 3

Photographs of Aktau Oil Berths (6)



1. Access way to berths n°4 and n°5



**2. Tanker berthed alongside berth n°5
(notice poor piping system)**



**3. Berth n°5. Details of capping beam, bollards,
mooring ropes and fenders**



**4. Same area as photo n°3,
from the front part of the vessel**



5. Fire-fighting tower between berths n°4 and n°5



6. Berths n°9 and n°10 (notice low-crested breakwater)

Annex 4

Maps and Drawings (9)

European Union

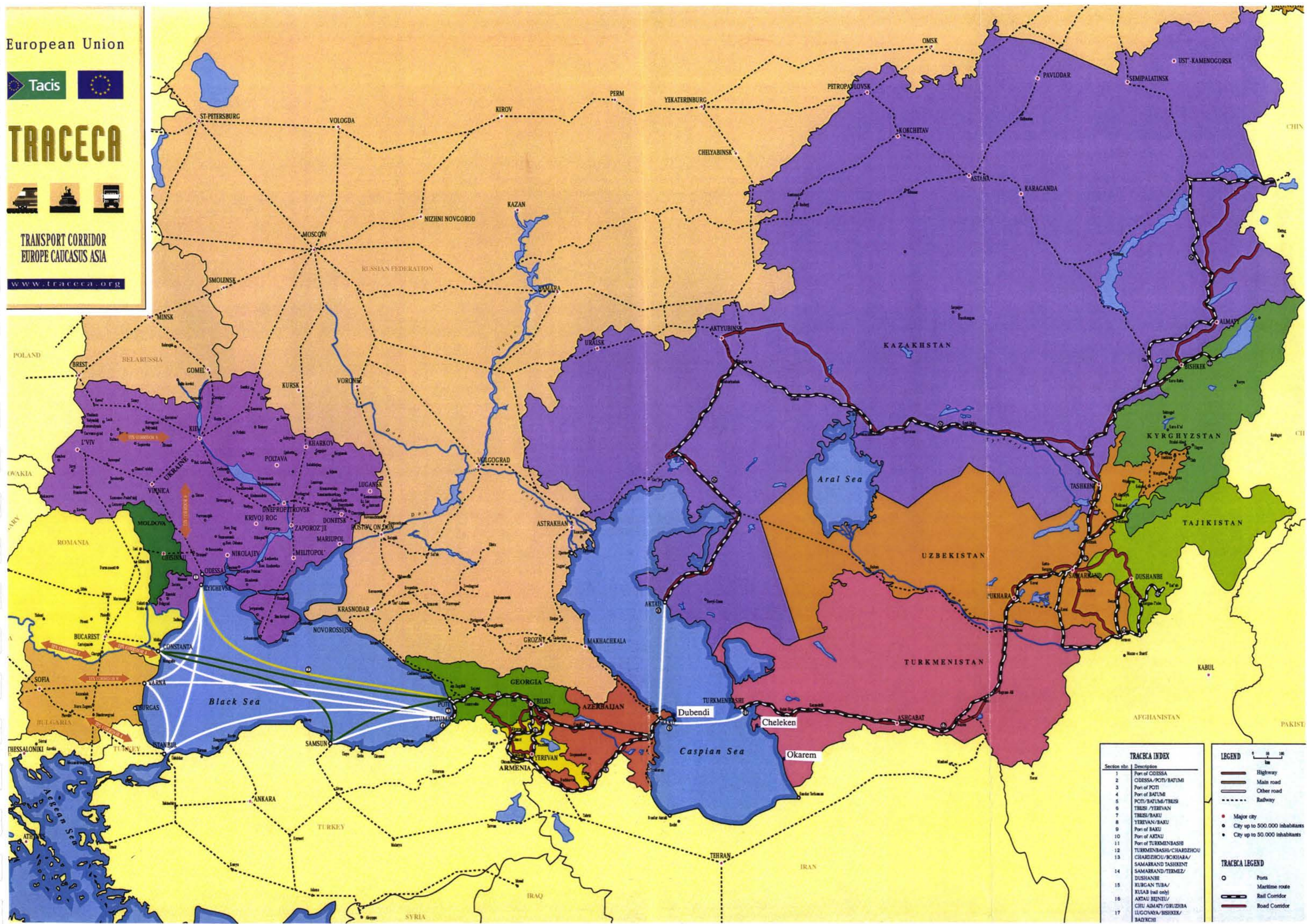


TRACECA



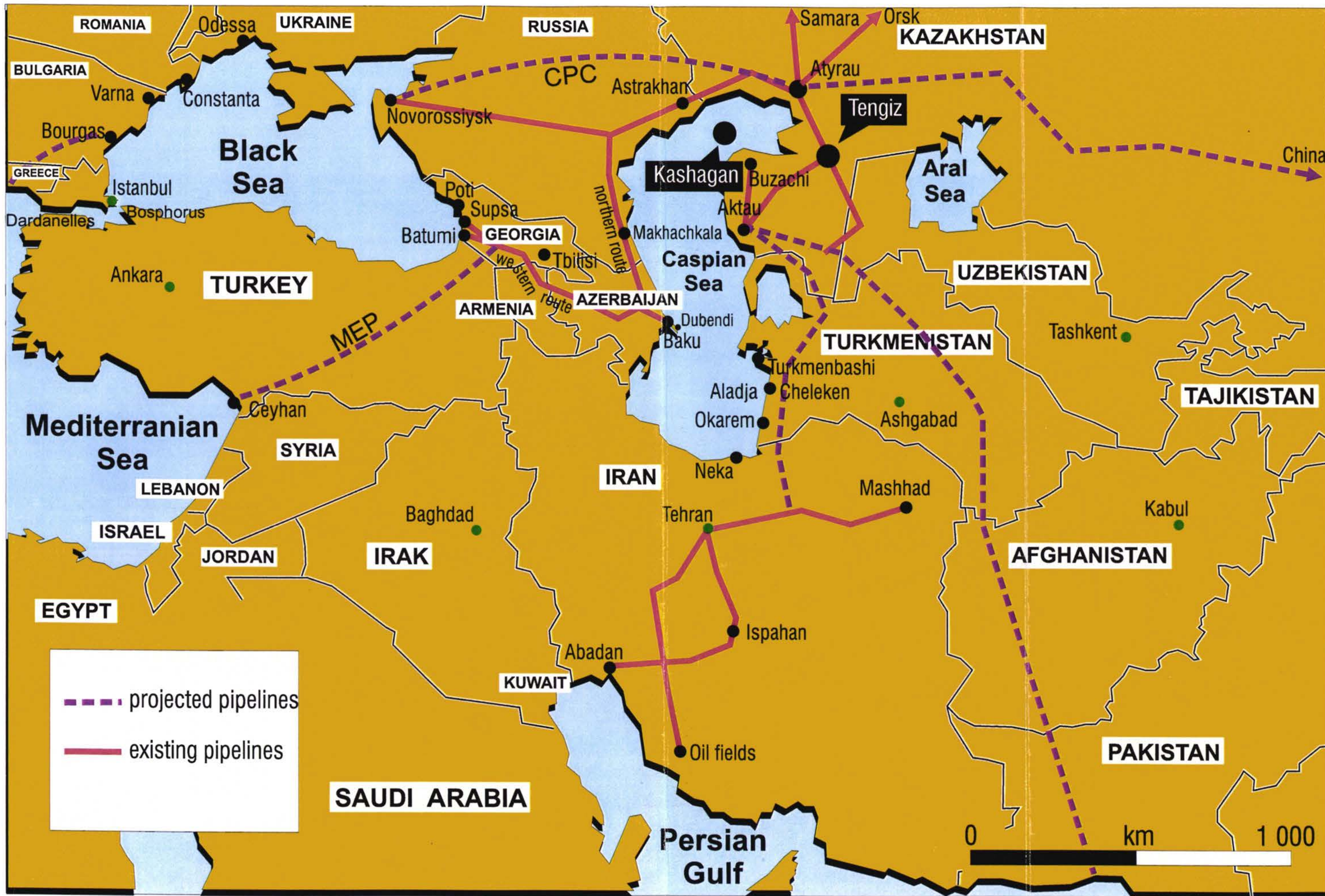
TRANSPORT CORRIDOR
EUROPE CAUCASUS ASIA

www.traceca.org

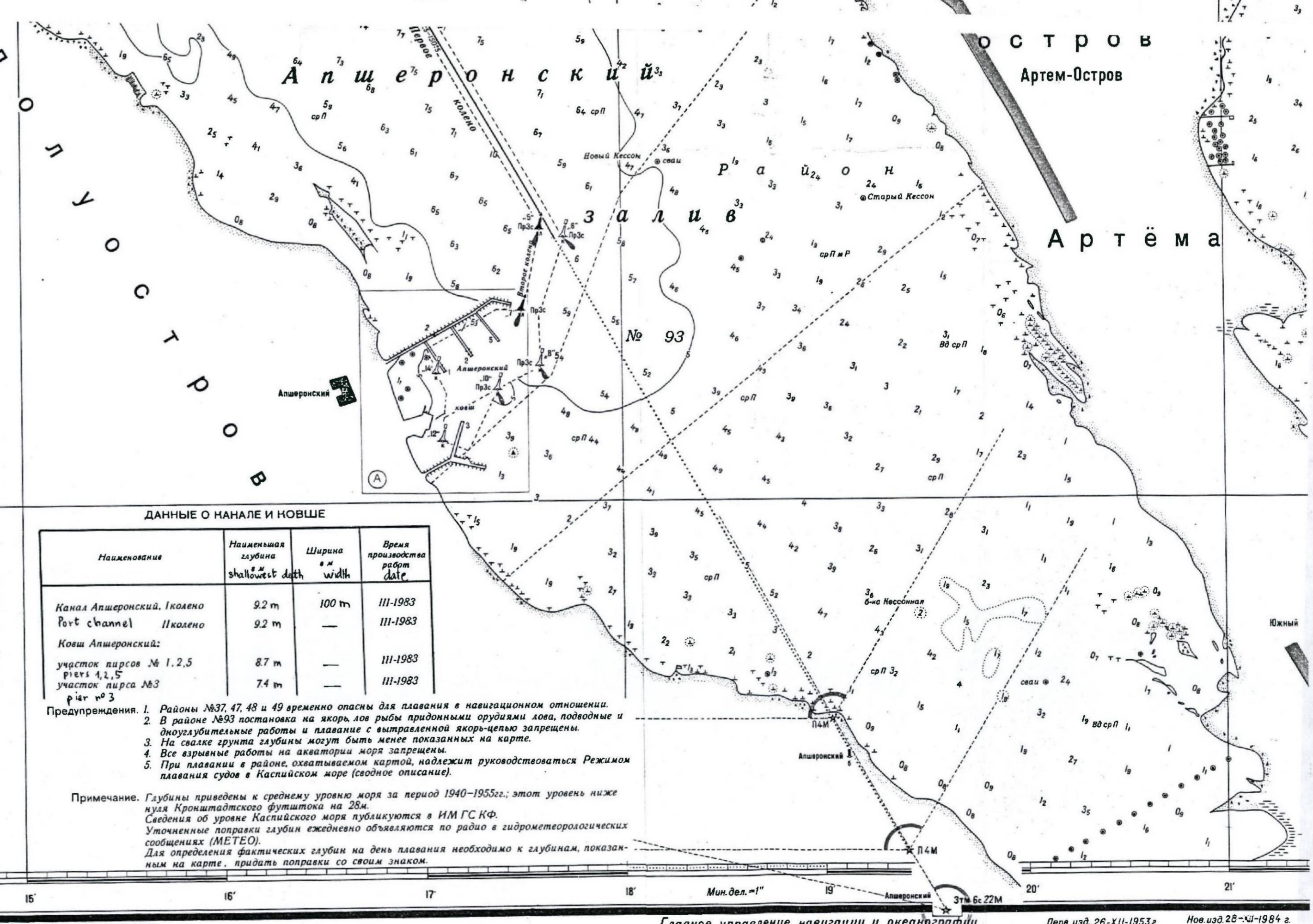
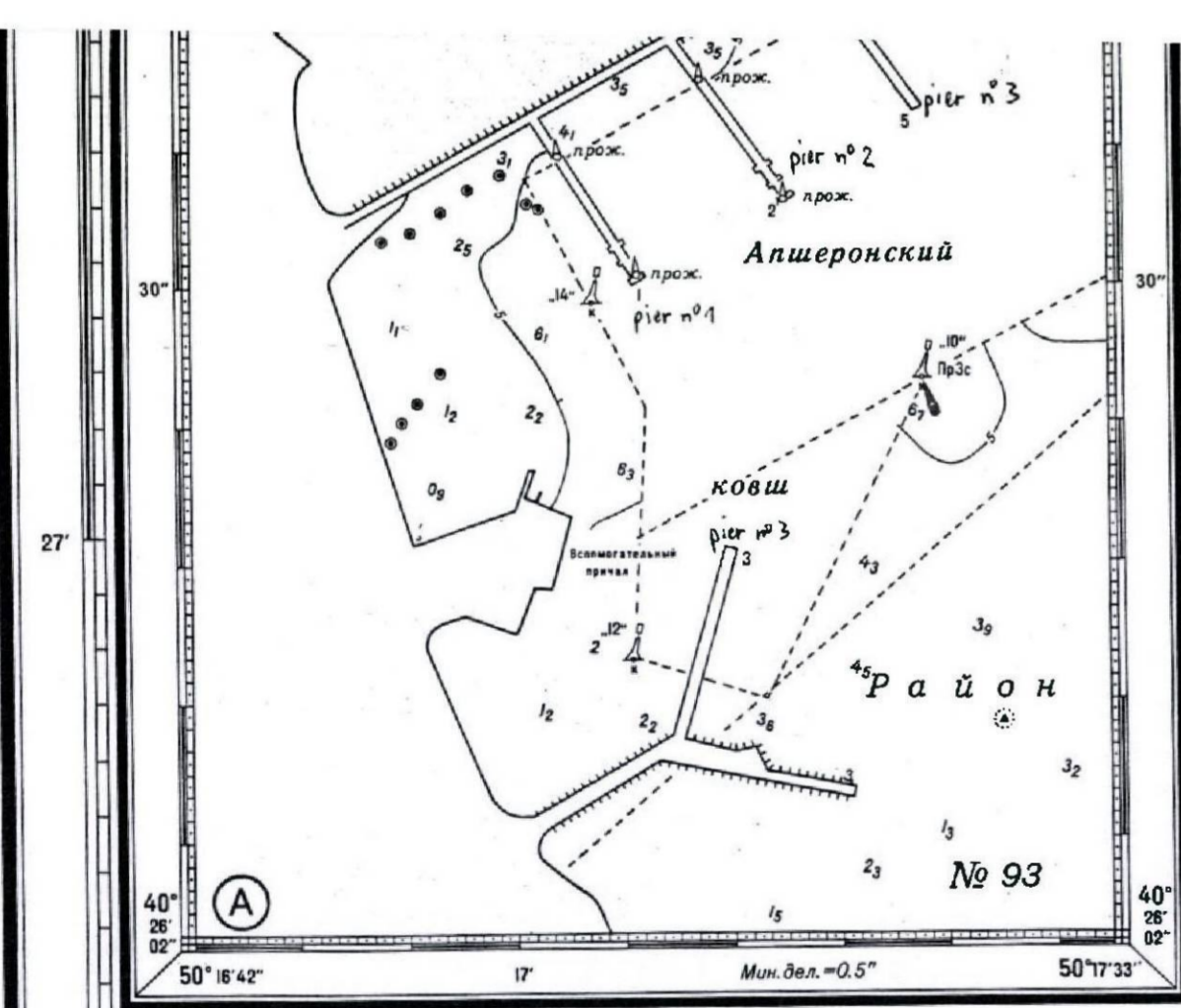
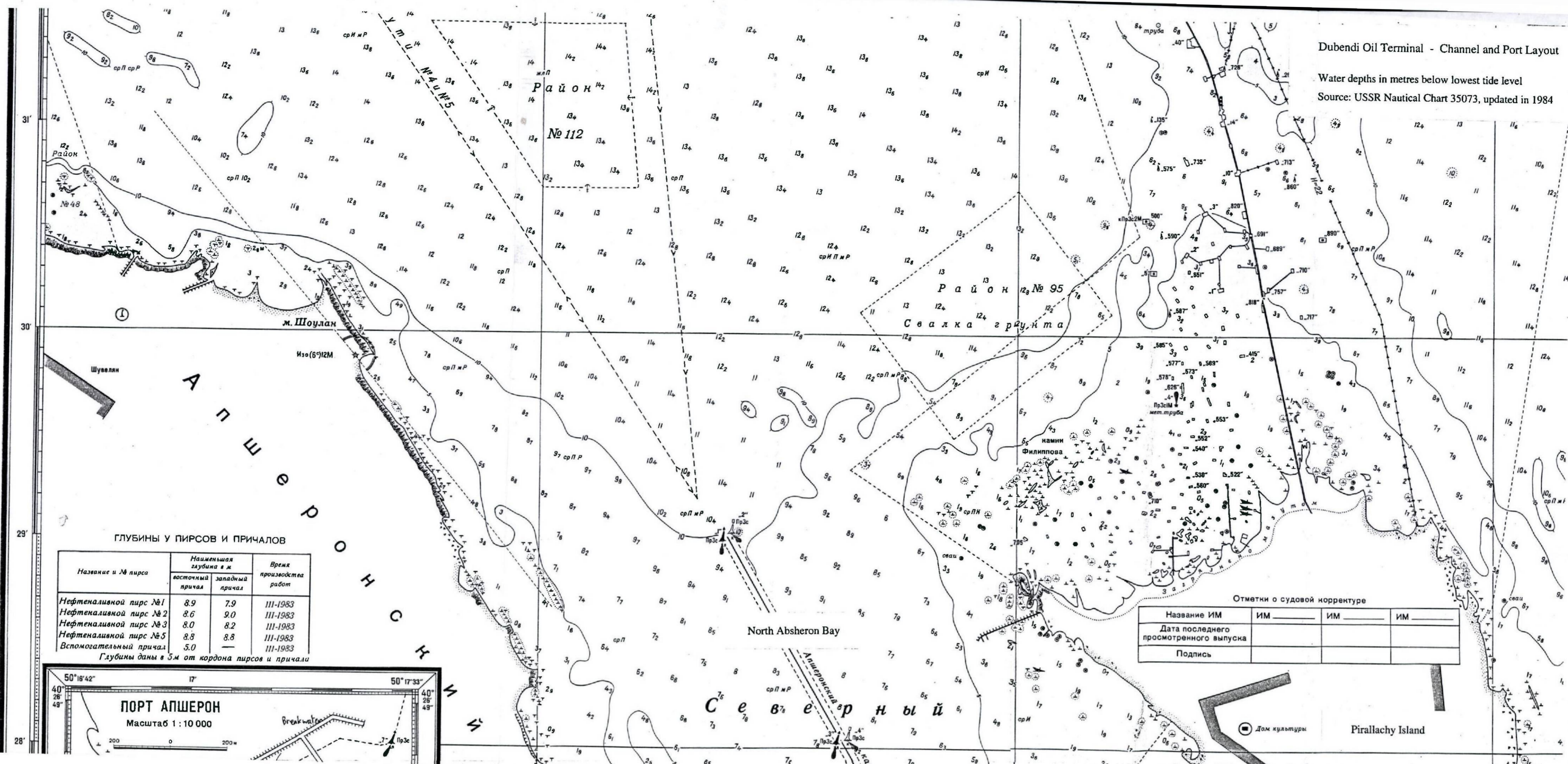


TRACECA INDEX	
Section nbr	Description
1	Port of ODESSA
2	ODESSA/POTI/BATUMI
3	Port of POTI
4	Port of BATUMI
5	POTI/BATUMI/TBILISI
6	TBILISI/YEREVAN
7	YEREVAN/BAKU
8	Port of BAKU
9	Port of AKTAU
10	Port of TURKMENBASHI
11	TURKMENBASHI/CHARDZHOU
12	CHARDZHOU/BUKHARA/SAMARKAND/TASHKENT
13	SAMARKAND/TASHKENT/DUSHANBE
14	DUSHANBE
15	KULGAN TUBA/KULAB (rail only)
16	AKTAU/BEINTEU/CHU AMANY/DRUZHBA
17	LUGOVAYA/BISHKEK/BARYKCHI

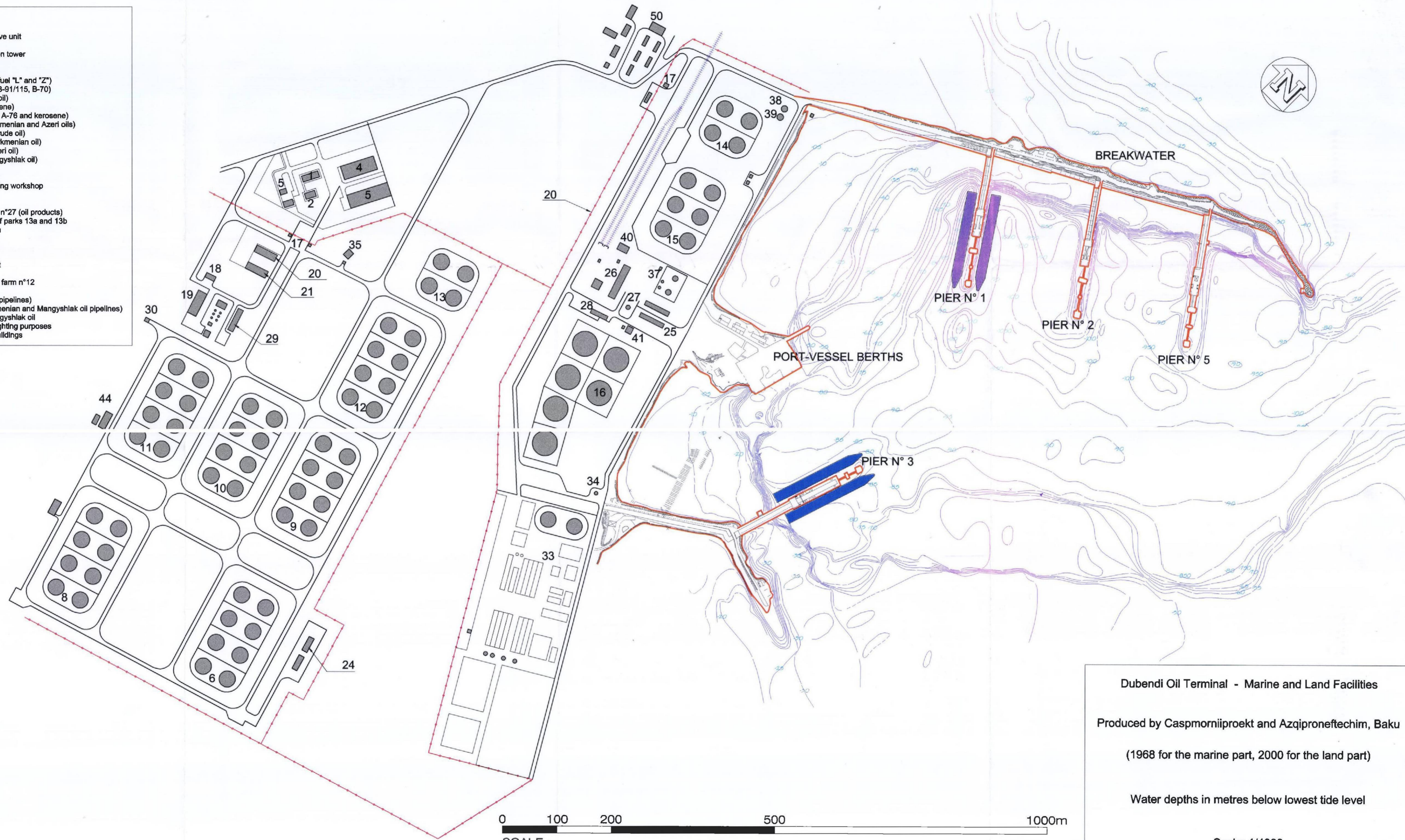
LEGEND	
	Highway
	Main road
	Other road
	Railway
	Major city
	City up to 500.000 inhabitants
	City up to 50.000 inhabitants
	Ports
	Maritime route
	Rail Corridor
	Road Corridor



Global oil map



- Key**
1. Tank-farm administrative unit
 2. BOXP barracks
 3. Fire-fighting observation tower
 4. Fire-fighting offices
 5. Garage for 5 cars
 6. Tank-farm n°4 (diesel fuel "L" and "Z")
 8. Tank-farm n°6 (petrol B-91/115, B-70)
 9. Tank-farm n°7 (diesel oil)
 10. Tank-farm n°8 (kerosene)
 11. Tank-farm n°9 (petrol A-76 and kerosene)
 12. Tank-farm n°11 (Turkmenian and Azeri oils)
 13. ITK tank-farm n°12 (crude oil)
 14. Tank-farm n°13a (Turkmenian oil)
 15. Tank-farm n°13b (Azeri oil)
 16. Tank-farm n°14 (Mangyshlak oil)
 17. Gatekeeper's booths
 18. Warehouse
 19. Mechanical and welding workshop
 20. Chemical laboratory
 21. Service department
 24. Internal pump station n°27 (oil products)
 25. Service department of parks 13a and 13b
 26. External pump station
 28. External pump station
 29. Boiler room
 - 30/7. Fire-fighting tank
 33. Water treatment plant
 34. Pump station
 35. Pump station for tank farm n°12
 37. Bunkering base
 38. Pump n°52 (Azeri oil pipelines)
 39. Pumping n°53 (Turkmenian and Mangyshlak oil pipelines)
 41. Pump station for Mangyshlak oil
 - 44/2. Foam tank for fire-fighting purposes
 50. Port administrative buildings



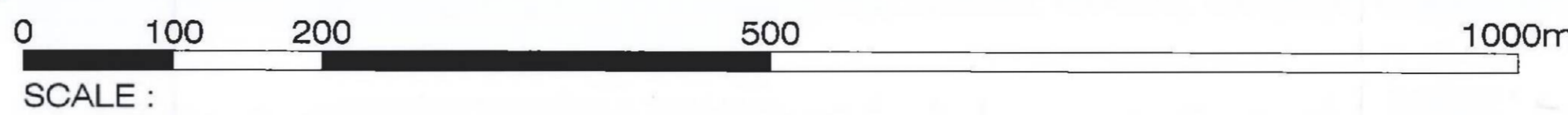
Dubendi Oil Terminal - Marine and Land Facilities

Produced by Caspmorniiproekt and Azqironeftechim, Baku

(1968 for the marine part, 2000 for the land part)

Water depths in metres below lowest tide level

Scale: 1/4000





TARTAR CAPE

TURKMENBASHI
КРАСНОВОДСК

UFRA

NAVIGATION CHANNEL

DISPOSAL AREA
FOR DREDGED SEDIMENTS

TURKMENBASHI SPIT

BEKOVICH

CHELEKEN SPIT

CHELEKEN

APPROACHES OF TURKMENBASHI

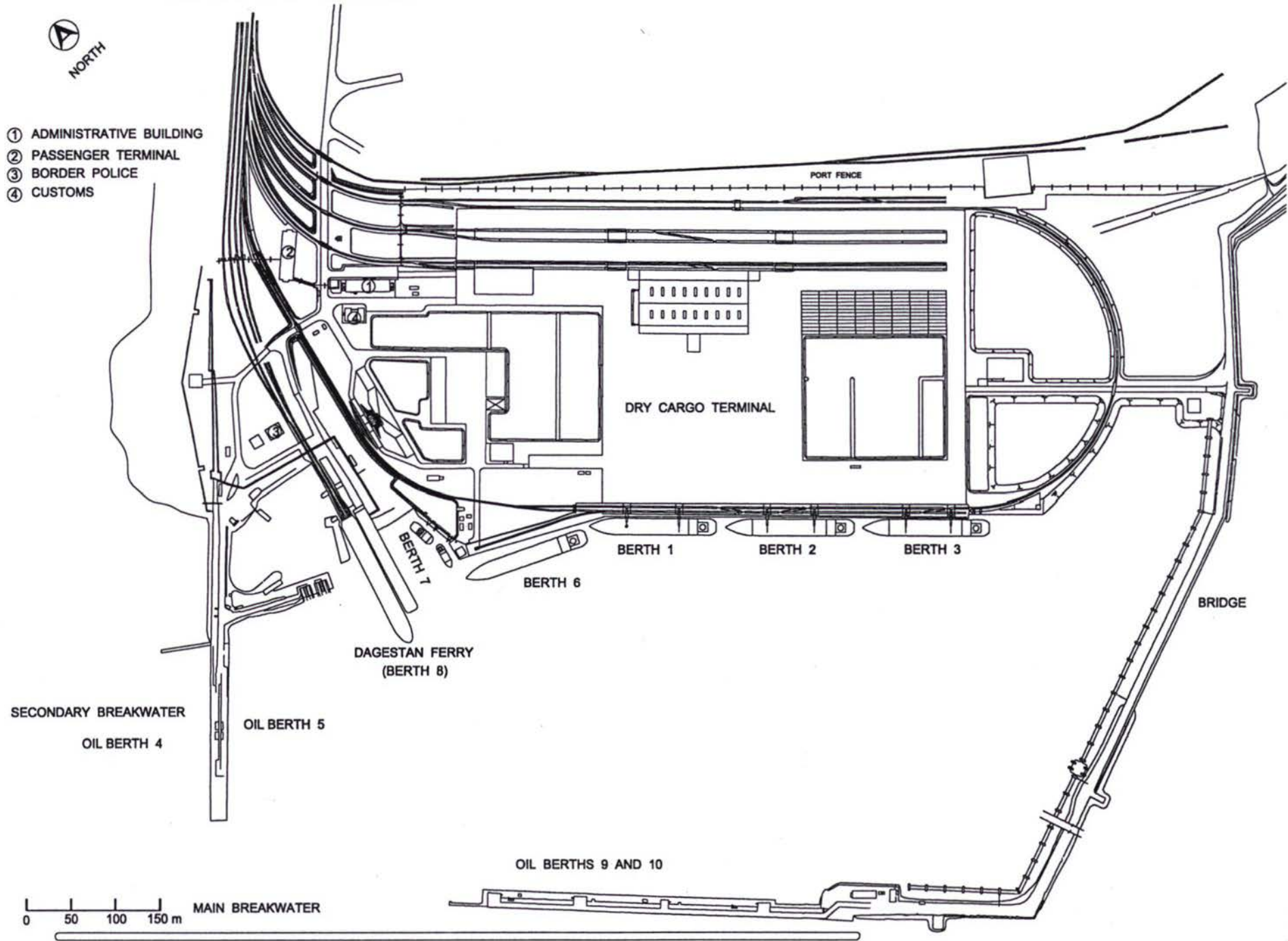
SOURCE = MARINE CHART 32015
DEPTHS IN METRES BELOW CASPIAN SEA REFERENCE

0 1 2 5 10 20km
SCALE

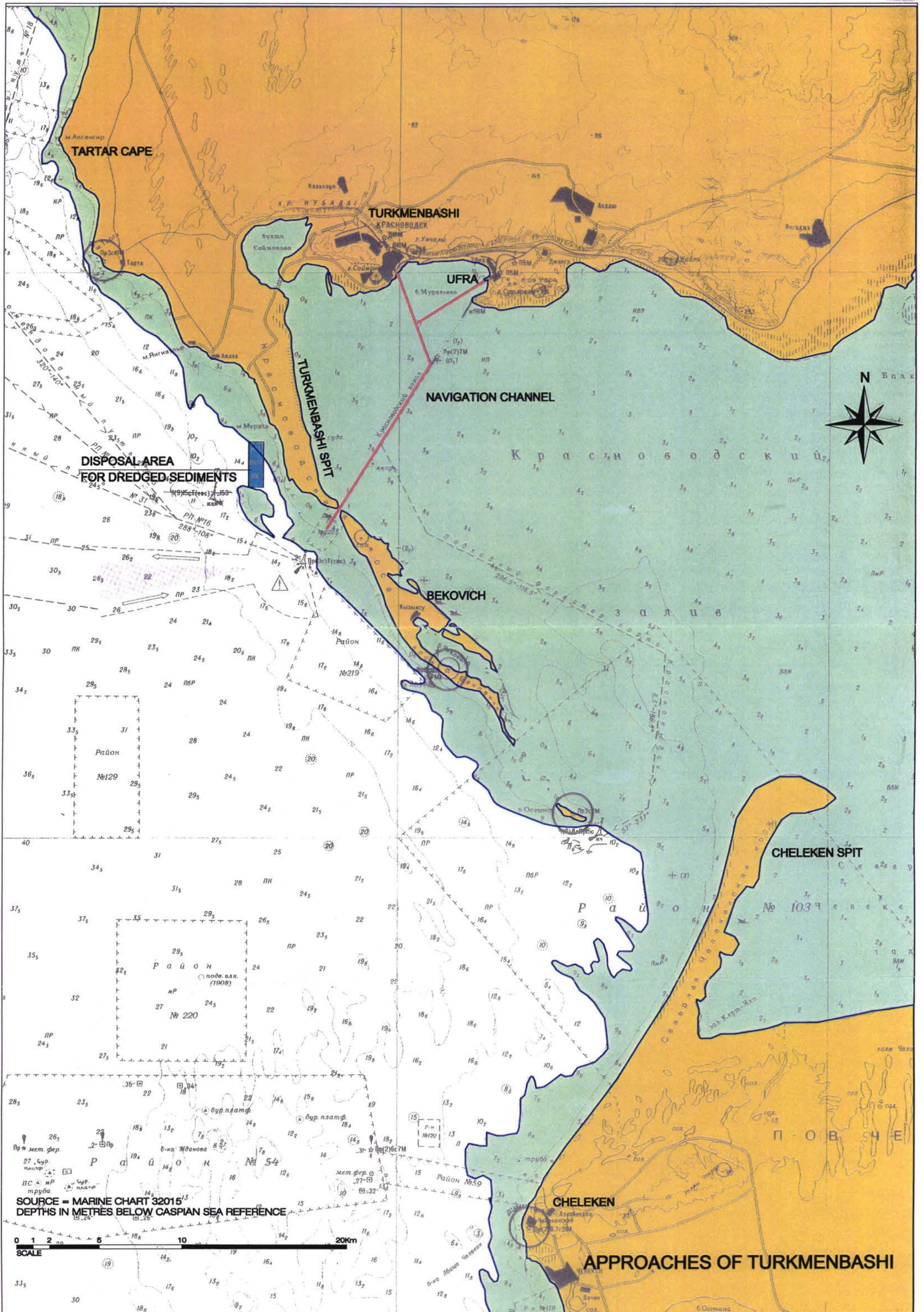
ACCESS RAILWAYS ACCESS ROAD



- ① ADMINISTRATIVE BUILDING
- ② PASSENGER TERMINAL
- ③ BORDER POLICE
- ④ CUSTOMS



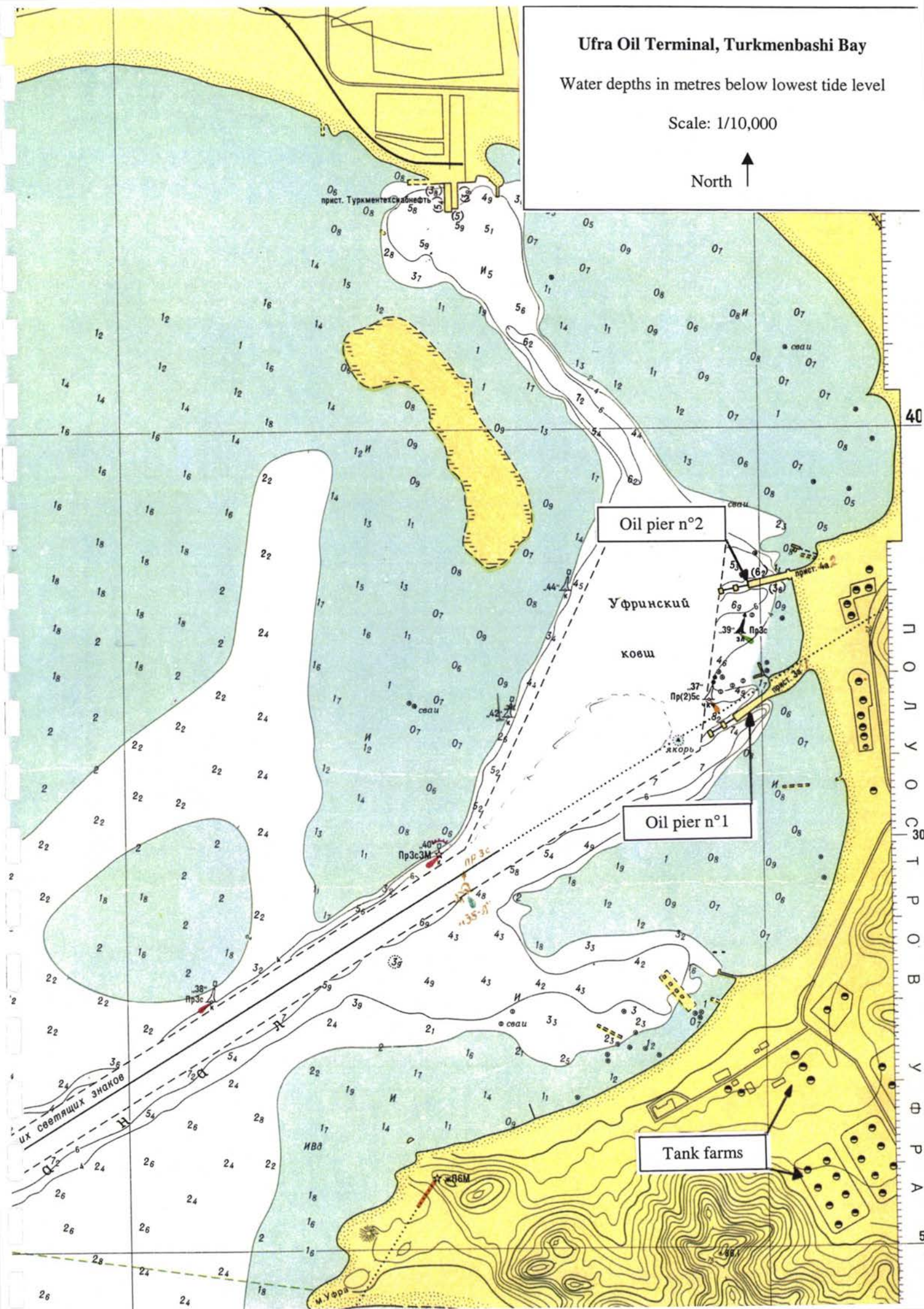
Aktau Port Layout



Ufra Oil Terminal, Turkmenbashi Bay

Water depths in metres below lowest tide level

Scale: 1/10,000



Oil pier n°2

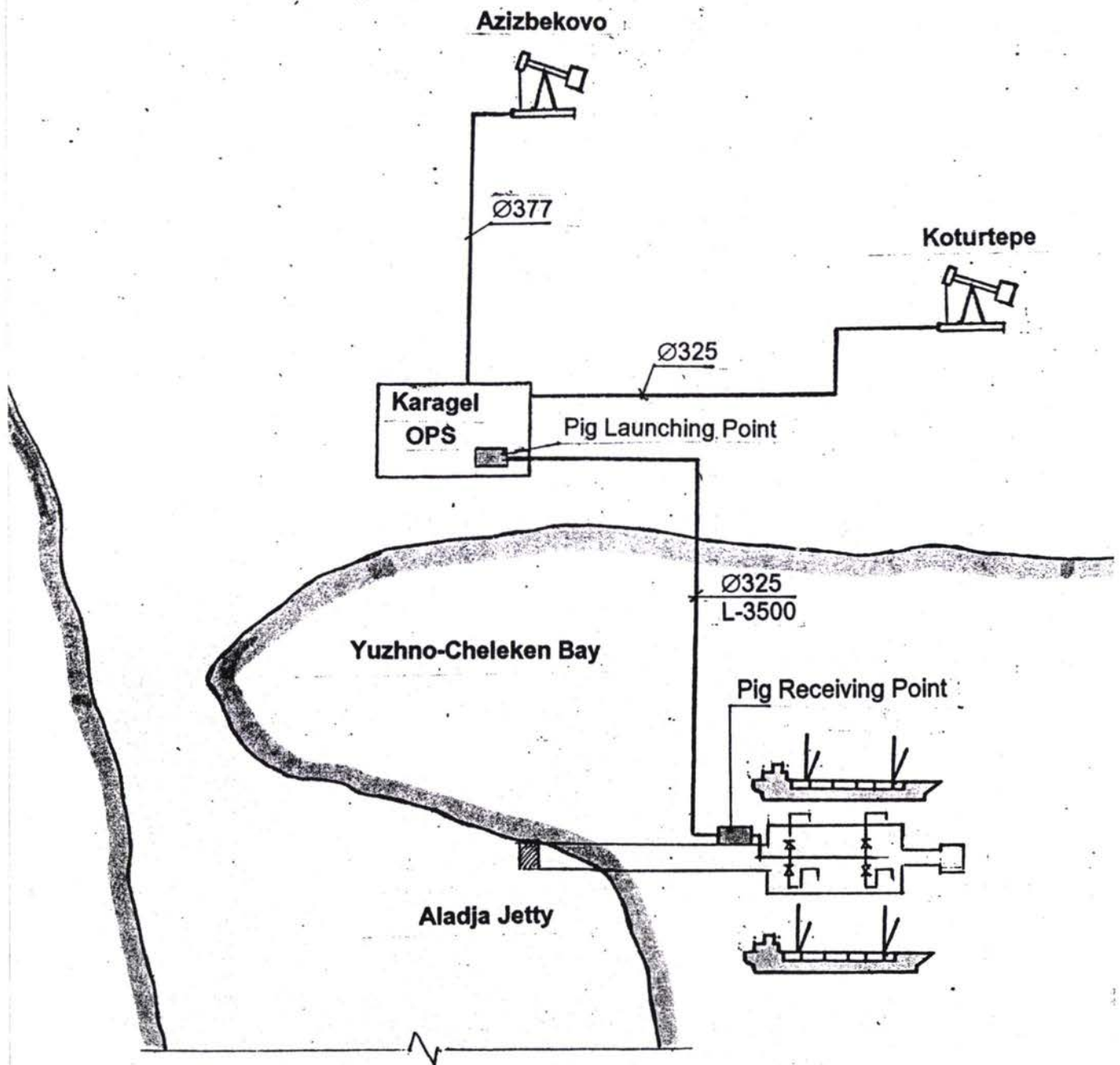
Уфринский
ковш

Oil pier n°1

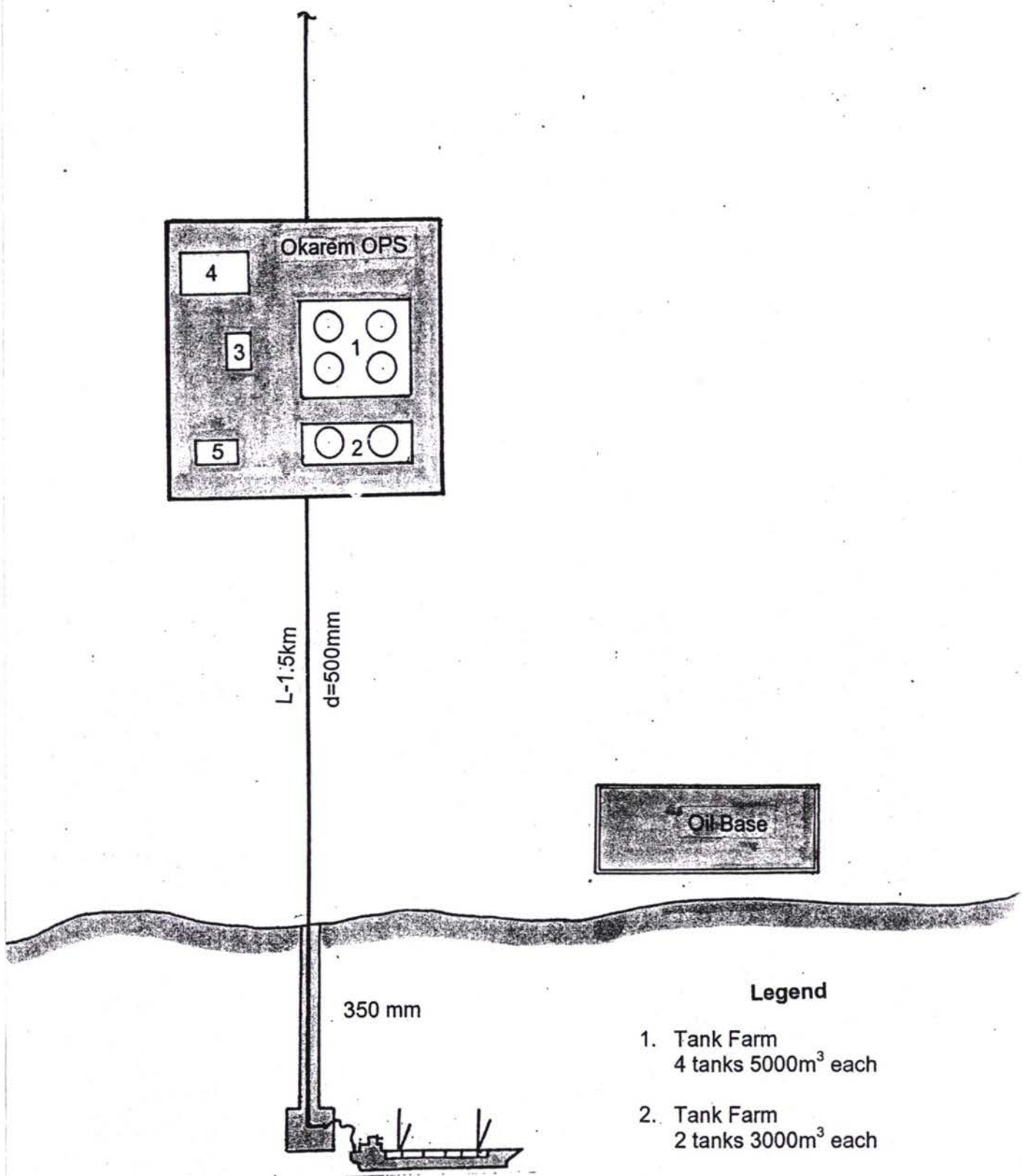
Tank farms

ПОЛУОСТРОВ УФРИН

SCHEME of oil transportation at "Karagel - Aladja" Terminal



Scheme of Okarem Terminal OPS - Pier



- Legend**
- 1. Tank Farm
4 tanks 5000m³ each
 - 2. Tank Farm
2 tanks 3000m³ each
 - 3. Pump Station
 - 4. Unit for oil handling and heating
 - 5. Office