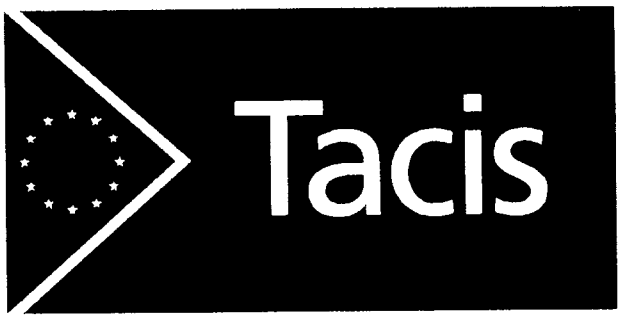

Azerbaijan Railways Restructuring

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RESTRUCTURING OF AZERBAIJAN RAILWAYS - AZERBAIJAN DOVLET DEMIR YOLU (ADDY)

TECHNICAL SPECIFICATIONS

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1. TECHNICAL SPECIFICATION FOR MANUFACTURE AND SUPPLY OF R 65 FLAT-BOTTOM RAIL

RESTRUCTURING OF AZERBAIJAN RAILWAYS - AZERBAIJAN DOVLET DEMIR YOLU (ADDY)

TRACKWORK RENEWAL

TECHNICAL SPECIFICATION FOR MANUFACTURE AND SUPPLY OF R 65 FLAT-BOTTOM RAIL

C O N T E N T S

TECHNICAL SPECIFICATION FOR MANUFACTURE AND SUPPLY OF R 65 FLAT-BOTTOM RAIL

1. General Requirements (CEN Specification - Note)

The CEN Specification has been prepared under the direction of the CEN Technical Committee 256 Working Group 4 and covers the provision of flat bottom symmetrical railway rails of 46 kg/m and greater linear mass, for general and high speed railway track usage.

The CEN Specification is mainly performance based and is drafted in terms of Qualifying and Acceptance testing.

Rails for this project shall be provided in accordance with the requirements of the CEN Specification and those particular requirements detailed in section 2 below.

2. Particular Technical Specification

2.1 General

Wherever reference is made in the Technical Specifications to specific standards and codes to be met by the goods and materials to be furnished or tested, the provisions of the latest current edition or revision of the relevant standards or codes in effect shall apply, unless otherwise expressly stated in the specifications. Where such standards and codes are national or related to a particular country or region, other authoritative standards that ensure substantial equivalence to the standards and codes specified will be acceptable subject to the agreement of Azerbaijan Railways (ADDY).

2.2 Scope of Supply (CEN clause 1)

- This specification is for the supply of a total of 7540 tonnes of R65 Flat-bottom rail, quality 350 HT made from carbon steel.

Plain line rails for use in operational lines shall be new, having a nominal weight of 65 kg/m (theoretical weight of 64.86 kg/m).

Rails shall be heat treated to obtain the specified hardness and higher strength throughout the whole cross-section of the rail.

2.3 Quality Assurance and Inspections (CEN clause 4)

The Supplier shall operate an independently approved and audited quality assurance system, conforming to the requirements of EN ISO 9002 or equivalent to be approved by Azerbaijan Railways (ADDY).

The representatives of Azerbaijan Railways (ADDY) shall have access at all reasonable times to observe and inspect the method of manufacture and shall be entitled to be present at all tests relating to the production of rails for the contract.

The representative shall also be allowed to examine the results from such tests.

The supervision shall be conducted in such a way that it does not interfere with the normal manufacturing operations unless there are acceptable reasons for doing so.

The manufacturer shall be bound to advise Azerbaijan Railways (ADDY) at least 15 days in advance of the date anticipated for the beginning of the rolling schedule.

2.4 **Manufacture** (CEN clause 5)

Rails shall be manufactured from continuous casting blooms. The choice of steel manufacturing process has been left to the manufacturer and shall be in accordance with clause 5.1 of the CEN Specification.

2.5 **Information to be Supplied by the Purchaser** (CEN clause 6)

2.5.1 Rail Profile (CEN clause 6.1)

The rail profile shall be R65, with theoretical mass of 64.86 kg/m.

2.5.2 Steel Grade (CEN clause 6.2)

The steel grade shall be 350 HT In accordance with Table 1 of the CEN Specification. Chemical composition and mechanical properties shall be in accordance with Table 2 of the CEN Specification.

2.5.3 Profile Class and Tolerances (CEN clause 6.3)

Rail shall be produced which conforms with the tolerances relating to Profile Class Y in accordance with Table 4 of the CEN Specification.

2.5.4 Straightness Class (CEN clause 6.4)

Rail straightness shall be in accordance with Class B of CEN Specification Table 5. Crown profile shall be in accordance with Table 4 of the CEN Specification.

2.5.5 Rail Length (CEN clause 6.5)

Rails shall be provided in 25 metre lengths subject to the tolerances quoted in Table 6 of the CEN Specification.

2.5.6 Rail Drilling (CEN clause 6.6)

Rails shall be delivered undrilled or as specified by the Railways.

2.5.7 Rail Identification Paint Code (CEN clause 6.9)

The steel grade shall be identified at both rail ends using a paint code to be agreed between the manufacturer and Azerbaijan Railways (ADDY).

2.6 **Identification** (CEN clause 8)

2.6.1 Branding (CEN clause 8.1)

The brand marks shown in relief on the rail web shall be as follows :-

" ROLLING MILL = — 99 R65", or as specified by the Railways.

or as specified by the Purchaser.

Delivery of the rails shall be such that 50% of the rails shall be grouped with the brand marks in relief appearing on one side of the rail web and 50% shall be grouped with brand marks on the opposite side.

2.7 **Qualifying Tests** (CEN clause 9)

The results of the following qualifying tests, performed by an independent laboratory, shall be included in the offer :-

-	Fracture toughness (K_{IC})	(CEN clause 9.2)
-	Fatigue crack growth rate	(CEN clause 9.3)
-	Fatigue test	(CEN clause 9.4)
-	Residual stress in rail foot	(CEN clause 9.5)
-	Variation of centre line running surface hardness or heat treated rails	(CEN clause 9.6)
-	Tensile strength and elongation	(CEN clause 9.7)
-	Interior condition	(CEN clause 9.8)

A complete set of results for the acceptance tests described in clause 10.1 of this specification shall be provided by the Supplier.

2.8 **Acceptance Tests** (CEN clause 10)

2.8.1 General

Each lot shall be inspected by the Purchaser or its representative in the roller mill. The samples shall be taken in accordance with Table 3 of the CEN Specification.

2.8.2 Laboratory Tests (CEN clause 10.1)

Laboratory tests shall be carried out at the frequencies shown in Table 3 of the CEN Specification. Retest procedures shall be in accordance with clause 10.1.8 of the CEN Specification.

2.8.3 Chemical Composition (CEN clause 10.1.1)

Chemical analysis shall be carried out on solid samples for which the chemical composition shall be as follows :-

-	Carbon	0.70 to 0.82%
-	Silicon	0.13 to 0.60%
-	Manganese	0.65 to 1.25%
-	Phosphorus	maximum 0.025%
-	Sulphur	0.008 to 0.03%
-	Aluminium	maximum 0.004%
-	Nitrogen	maximum 0.01%
-	Chromium	residual elements
-	Vanadium	residual elements
-	Molybdenum	residual elements
-	Nickel	residual elements
-	Copper	residual elements
-	Tin	residual elements
-	Antimony	residual elements
-	Titanium	residual elements
-	Niobium	residual elements

2.8.4 Hydrogen (CEN clause 10.1.1.1)

The amount of liquid hydrogen shall be a maximum of 2.0 parts per million.

2.8.5 Determination of total oxygen content (CEN clause 10.1.1.2)

The total oxygen content shall be a maximum of 20 parts per million.

2.8.6 Microstructure (CEN clause 10.1.2)

Testing frequency for microstructure determination shall be in accordance with Table 3 of the CEN Specification.

2.8.7 Decarburisation (CEN clause 10.1.3)

Decarburisation limits are shown in Figures 7 and 8 of the CEN Specification.

2.8.8 Oxide cleanness (CEN clause 10.1.4)

The location for the testing of oxide cleanness shall be in accordance with Figure 9 of the CEN Specification.

2.8.9 Sulphur prints (CEN clause 10.1.5)

Sulphur prints shall comply with annex 3 of the CEN Specification.

2.8.10 Hardness (CEN clause 10.1.6)

The hardness on the centre-line of the head crown shall not vary by more than 30 HBW of any individual rail. The hardness shall be between 350 and 390 HBW.

2.8.11 Tensile tests (CEN clauses 10.1.7 and 10.1.7.2)

The tensile strength shall not be less than 1175 N/mm^2. Elongation shall be a minimum of 9%.

2.9 **Dimension tolerances** (CEN clause 10.2)

2.9.1 Gauges

The master rail profile and all the gauges required for checking the manufacture shall be provided by the Supplier, at his own expense, and shall be submitted for approval to the Purchaser.

Before manufacture the Supplier shall submit two sets of male and female gauges conforming to the theoretical outline of the rail section to be manufactured, together with two sets of plus and minus limit gauges in accordance with the stipulated maximum tolerances. These gauges shall be stamped after approval by the representative of the Purchaser. One set of all gauges shall remain in the possession of the Purchaser during the period of acceptance.

Only gauges bearing the stamp of the Purchaser shall be valid for checking purposes.

When a master rail profile or a theoretical gauge has been approved by a customer or by an external controlling body it shall be used for other customers on every possible occasion.

2.9.2 Sample rail tests

The representative of the Purchaser at the commencement of the manufacturing process shall select one 25 metre long 60 E1 section rail from the manufactured lots. This rail shall be the sample rail and shall remain on the Supplier's premises until the completion of the full delivery and shall be sent to the Purchaser with the final shipment.

The sample rail must be horizontally positioned on the support located every two metres. Supporting the rail at one metre centres is not permitted. The sample rail shall be subjected to the following measurement and tests :-

- Measurement of the rail length and marking of dimensional deviations
- Measurement of geometrical dimensions of the rail cross-section, symmetry, rail end straightness (vertical and horizontal planes) and corrugation
- Measurement of upsweep and downsweep (offset from level)
- Ultrasonic tests for determination of internal defects covering a minimum of 80% of the rail cross-section
- Checking of surface defects

The results of the above measurements and tests shall be recorded in the report prepared and signed by the representatives of the Purchaser and Supplier.

2.9.3 Profile (CEN clause 10.2.1)

Profile tolerances shall be in accordance with Table 4 of the CEN Specification.

2.9.4 Straightness, surface flatness and twist (CEN clause 10.2.2)

Straightness, surface flatness and twist shall be in accordance with Table 5 of the CEN Specification.

2.9.5 Cutting and drilling (CEN clause 10.2.3)

Rails shall be delivered undrilled. Rail length and end squareness shall be in accordance with Table 6 of the CEN Specification except that the rail length shall be 25 metres ±4 mm.

2.9.6 Inspection requirements/tolerances for internal quality and surface quality (CEN clause 10.4)

2.9.7 Internal quality (CEN clause 10.4.1)

The Supplier shall provide details in his offer of the exact areas of the rail cross-section inspected by the ultrasonic control.

2.9.8 Surface quality (CEN clause 10.4.2)

The surfaces of the rails shall be free from any detrimental defects such as skin holes, shells, hot tears, outflows, welding, dressings and the traces of any hot or cold protective treatments for defect rectification.

Where defects appear on the rolling surface of the rail head or bottom surface of the rail foot, Eddy current testing should be carried out to determine the depth and position of such defects.

2.9.9 Hot marks and seams (CEN clause 10.4.2.2)

The maximum defect depth shall be as follows :-

- Rail running surface - 0.3 mm
- Rest of rail - 0.4 mm

Rails with continuous longitudinal guide marks shall be rejected.

2.9.10 Cold marks (CEN clause 10.4.2.3)

The maximum defect depth shall be as follows :-

- Rail running surface - 0.3 mm
- Underside of foot - 0.3 mm
- Rest of rail - 0.4 mm

3. Delivery and Acceptance

3.1 The Supplier shall arrange and take the whole responsibility for loading, transportation and unloading of rails at the location specified by the Purchaser. The Supplier shall also take responsibility for all necessary custom clearance formalities.

3.2 The costs associated with rail delivery, but excluding the customs duties and other taxes payable in the Purchaser's country, shall be met by the Supplier.

4. Warranty and Liability

4.1 The warranty period would remain valid for 10 (ten) years after the rails have been delivered to or accepted at the final destination, indicated in the Contract, against any defects attributed to manufacture and undetected at the time of the acceptance.

4.2 If during the warranty period one or more rails have to be removed from the track, due to a fracture or other such defects, then the Supplier shall replace the rails free of charge.

4.3 All costs associated with replacement/renewal of the defective rail, including transport, but excluding the customs duties and other taxes payable in the Purchaser's country, shall be met by the Supplier.

4.4 The defective rails shall remain the property of the Purchaser.

5. Schedule of Requirements

5.1 Supply and deliver: -

- **7540 tonnes of R 65 Flat-bottom rail, 350 HT quality from carbon steel. The rail shall be supplied in 25 m length.**

- The rail shall be supplied undrilled, unless instructed otherwise by the Railways.

2. TECHNICAL SPECIFICATION FOR MANUFACTURE AND SUPPLY OF CONCRETE SLEEPERS AND ELASTIC RAIL FASTENINGS

RESTRUCTURING OF AZERBAIJAN RAILWAYS - AZERBAIJAN DOVLET DEMIR YOLU (ADDY)

TRACKWORK RENEWAL

TECHNICAL SPECIFICATION FOR MANUFACTURE AND SUPPLY OF CONCRETE SLEEPERS AND ELASTIC RAIL FASTENINGS

C O N T E N T S

TECHNICAL SPECIFICATION FOR MANUFACTURE AND SUPPLY OF CONCRETE SLEEPERS AND ELASTIC RAIL FASTENINGS

1. CONCRETE SLEEPERS

1.1 General

The Supplier and manufacturer shall possess, operate and show evidence of an ISO certificated quality system in accordance with the requirements of Euronorm EN ISO 9002 for the approval of Azerbaijan Railways (ADDY).

Wherever reference is made in this Specification to specific standards and codes to be met by the goods and materials to be furnished or tested the provisions of the latest current edition or revision of the relevant standards or codes in effect shall apply, unless otherwise expressly stated in this Specification.

Where such standards and codes are national or related to a particular country or region, other authoritative standards that ensure substantial equivalence to the norms, standards and codes specified will be acceptable subject to the approval of Azerbaijan Railways (ADDY).

1.2 Design Requirements

Monoblock pre-stressed concrete sleepers shall be designed to allow for the following track parameters:

•	Rail Section	-	R65 Flat-bottom rail
•	Track Gauge	-	1520 mm
•	Rail Centres	-	1593 mm
•	Rail Seat Inclination	-	1:20
•	Axle Load	-	30 tonnes
	Traffic speed	-	120 km/h (main line passenger)
		-	80 km/h (main line freight)
•	Sleeper Spacing	-	543 mm (1840 sleepers/km) maximum
	(between centres)	-	500 mm (2000 sleepers/km) minimum
•	Dynamic Impact Factor	-	2 x static load
•	Depth of Ballast below sleeper	-	300 mm minimum (main line)
•	Minimum Horizontal Curvature	-	350 metres (main line)
•	Maximum Cant	-	150 mm (main line)

Sleepers shall be dimensioned so that the tensile stress in the concrete does not exceed 3 N/mm^2 and the compressive stress does not exceed 20 N/mm^2.

Sleepers shall be designed to withstand extreme onerous conditions (weather, oil contaminants, etc.) and shall be able to withstand extreme frost for up to six months continuously and a temperature range, in service, of - 37°C to + 55°C.

Sleepers shall be designed to accommodate an elastic fastening system in accordance with Section 2 of this Specification. The manufacturer shall submit sleeper and fastening system drawings and designs for the approval of Azerbaijan Railways (ADDY). The design life of concrete sleepers shall be 40 years.

1.3 Dimensions and Tolerances

Sleeper dimensions shall be as follows:

- Length - 2700 mm ± 10 mm
- Width - Minimum 235 mm, Maximum 300 mm at base ±5 mm
  Minimum 150 mm, Maximum 180 mm at top ±5 mm
- Depth - Minimum 185 mm at centre and ends +10, -3 mm
  Minimum 220 mm at centre of rail foot +10, -3 mm

The rail seat inclination shall not be less than 1:18 and not more than 1:22 towards the centre of the track gauge.

Relative rail seat inclination twist shall not be more than 0.5 degrees (1:115).

The rail seat inclination of the concrete shall be correct to a tolerance of ± 0.5 mm.

1.4 Materials

1.4.1 General

All materials shall comply with this standard or other alternative standard as agreed with Azerbaijan Railways (ADDY). Materials other than those specified below shall only be used with the approval of Azerbaijan Railways (ADDY).

Great care shall be exercised in the selection of materials to ensure the long term durability of the concrete. Consideration shall be given to the requirements for freeze-thaw resistance, porosity and abrasion resistance.

1.4.2 Concrete

Concrete shall generally comply with ENV 206 Procedures together with the following requirements :-

Concrete shall consist of cement, coarse aggregate, fine aggregate, water and admixture, as necessary, and shall be mixed at the sleeper factory by an appropriate mixing plant.
The concrete from which concrete sleepers are to be made shall meet the following criteria:

- The compressive strength shall be a minimum of 55 N/mm^2 at 7 days or 60 N/mm^2 at 28 days.
- The compressive strength at transfer shall be a minimum of 30 N/mm^2.
- The bending tensile strength shall be a minimum of 5 N/mm^2 at 7 days and 6.2 N/mm^2 at 28 days.
- Subject to verification and acceptance by all parties the micro cracking index shall be a maximum of 1.5 (based on zero for concrete with few or no micro cracks and 3 for concrete with numerous micro cracks).
- No recrystallite ettringite shall be allowed.
- The frost resistance value shall be in accordance with Azerbaijan Railways (ADDY) agreement/practices.
- The water / cement ratio shall be less than 0.45.
- The minimum cement content shall be 300 kg/m^3.
- Compaction of the concrete shall be sufficient to minimise water penetration.

The workability of the concrete mixture shall be such as to allow it to be easily worked into the extreme corners of the moulds and around pre-stressing wires and fastening inserts, without allowing materials to segregate or free water to collect on the surface.

The manufacturer shall submit design data and test reports of the proposed mixture to be used for the approval of Azerbaijan Railways (ADDY). Production of sleepers shall not commence without the approval of Azerbaijan Railways (ADDY).

1.4.3 Cement

Cement shall be Ordinary Portland Cement provided in accordance with British Standard BS12 : Part 2 or equivalent.

1.4.4 Coarse Aggregate

Coarse aggregate shall be composed of washed well graded crushed stone or gravel which shall be clean, hard and durable. If necessary, dirt and other deleterious coatings shall be removed by washing.

The maximum size of coarse aggregate shall be 20 mm; aggregate shall be well graded in accordance with Table No. 1.

Sieve size (mm)	20	13	10	5
% passing by weight	100	95-100	40-70	0-15

Table No.1 - Coarse Aggregate Grading

Not more than 5% shall pass a BS No. 7 sieve.

The amount of deleterious material shall not exceed the following limits:

- Clay Lumps - 0.25% by weight
- Material finer than No. 200 sieve - 1.0% by weight

The percentage of wear resulting from the Los Angeles abrasion test shall not exceed 30%.

Alternative sieve sizes may be used to determine the particle size distribution shown in Table No.1. The Supplier shall provide details of the standard test sieves he proposes to use for the approval of Azerbaijan Railways (ADDY).

1.4.5 Fine Aggregate

Fine aggregate shall be composed of clear, hard, durable, natural or manufactured sand or a combination of natural and manufactured sand, and shall be cuboid or spherical in shape.

Grading of fine aggregate shall be in accordance with Table No.2.

Sieve size (mm)	10	5	No.7	No.14	No.25	No.52	No.100
% passing by weight	100	95-100	80-100	45-80	25-60	10-30	2-10

Table No.2 - Fine Aggregate Grading

Alternative sieve sizes may be used to determine the particle size distribution shown in Table No.2. The Supplier shall provide details of the standard test sieves he proposes to use for the approval of Azerbaijan Railways (ADDY).

Deleterious material such as clay lumps shall not be greater than 1.0% by weight.

The selection of aggregates shall be such as to prevent deterioration of the concrete from Alkali Aggregate Reaction (AAR) with the cement.

1.4.6 Water

Water shall be clean and shall be free from alkalis, acids, oils, organic material and any other deleterious material.

1.4.7 Admixtures

To achieve high strength concrete, admixtures shall be used which shall be of a non-harmful non-chloride type.

The concrete sleeper manufacturer shall provide details of the admixture to be used for the approval of Azerbaijan Railways (ADDY).

1.4.8 Pre-Stressing Steel

Pre-stressing steel shall be manufactured from hot rolled steel, used for wire drawing.

Three wires of the same diameter shall be spun together to form a helical 3 wire stand.

The lay length or pitch shall be 14 to 22 times the nominal strand diameter.

Pre-stressing steel shall be manufactured generally in accordance with Euronorm EN 10138 or equivalent.

The manufacturer shall provide details of the standards he proposes to use for the approval of Azerbaijan Railways (ADDY).

Other standards may be acceptable, at the discretion of Azerbaijan Railways (ADDY) provided that their quality and performance criteria are not less than those of the above mentioned standard.

The three wire strand shall consist of 3 x 3.15 mm wires of quality standard 1860 and shall have the following minimum properties:

- Mass - 183 g/m
- Tensile Strength Rm - 1860 N/mm^2
- Diameter - 6.8 mm
- Cross-sectional area - 23.4 mm^2 ±2%
- Characteristic Breaking Load - 43.5 kN
- Maximum Breaking Load - 49.8 kN

- Characteristic 0.1% Proof Load - 37.4 kN
- Nominal modulus of elasticity - 195 kN/mm^2
- Maximum relaxation after 1000 hrs of initial load - 2.5%
- Minimum elongation at maximum load- 3.5%

The chemical composition of the steel from which the wire is made shall be in accordance with Table No 3.

	C	Si	Mn	P	S
% min	0.77	0.15	0.60	-	-
% max	0.82	0.35	0.80	0.025	0.020

Table No 3 - Chemical Composition of Steel

The manufacturer shall provide a detailed description of the steel he proposes to use for the approval of Azerbaijan Railways (ADDY).

1.5 Concrete Sleeper Manufacture

1.5.1 General

The manufacturer shall provide Azerbaijan Railways (ADDY) with a complete set of drawings of the pre-stressed concrete sleeper proposed and shall include a complete description of the manufacturing process including materials, labour, plant and other necessary equipment.

Prior to commencement of concrete sleeper production the manufacturer shall complete a production file for manufacturing data which shall be submitted to Azerbaijan Railways (ADDY) and which shall include:

- A description of the constituent materials including origin, composition, shape and size;
- The mix design;
- A full description of the production process for the concrete including cold weather working and the storage and measurement of materials;
- A technical report on the alkali content, abrasion resistance, freeze-thaw resistance and water absorption;
- A technical report on the design tests carried out;

- Water/cement ratio and tolerance;
- Weight of each component of concrete and tolerance;
- Sieve curves for each component of concrete and tolerance;
- Minimum compressive and tensile strength on concrete samples after 7 days and 28 days;
- Minimum concrete compressive strength before releasing prestressing tendons;
- Maximum relaxation for prestressing tendons after 1,000 hours;
- Description of the prestressing system including prestressing force and tolerance on each tendon;
- Method of concrete vibration;
- Curing time and temperature cycle;
- Method used for releasing prestressing force;
- Stocking and stacking rules after manufacture;
- Minimum concrete compressive strength before releasing prestressing tendons.
- Concrete sleepers shall be manufactured using the "Long Line" or alternative system in a factory of sufficient capacity to meet the requirements of Azerbaijan Railways (ADDY).

1.5.2 Sleeper Moulds

Moulds shall be of rigid high quality steel and shall be designed so that the sleepers are cast up-side down.

Prior to casting of concrete the moulds shall be covered in oil on the inside; care should be taken not to deposit oil on pre-stressing strands or fastening anchors.

The moulds shall be designed to ensure that there is no leakage of grout during casting.

1.5.3 Concrete Mixing and Production

Concrete shall be thoroughly mixed by means of concrete batching in a pan mixer machine. Alternative methods of mixing may be proposed by the Supplier for the approval of Azerbaijan Railways (ADDY).

Provision shall be made for mixing the aggregates, cement and water in the correct quantities, to produce the required high strength concrete.

The production of concrete sleepers shall be by the "Long Line" or alternative method; the Supplier shall provide details of the method proposed for the production of concrete sleepers, including methods for preventing concrete leakage, and compaction details for the approval of Azerbaijan Railways (ADDY).

Fresh concrete shall be protected during curing with a plastic sheet within 30 minutes of casting until stress transfer has occurred.

At the time of casting the maximum temperature of the concrete shall not be greater than 30°C.

The difference in temperature between different parts of the sleeper shall not exceed 20°C during the three days after casting. If the outdoor temperature is less than 5°C the sleepers shall be stored indoors for at least two days after casting; warm sleepers shall be protected against sudden temperature variations when being transferred to an outdoor storage site.

The underside of sleepers shall be rough to provide increased lateral resistance. The maximum deviation in bottom surface evenness shall be ±3mm, provided that a minimum 30mm concrete cover to prestressing strands is obtained.

1.5.4 Concrete Curing

The manufacturer shall provide details of the curing method proposed for the approval of Azerbaijan Railways (ADDY).

The curing temperature and period shall be monitored and controlled with the temperature of concrete being taken and logged at the pre-production stage and at least four times per day.

After curing has been completed the compressive strength of the concrete at transfer of prestress shall be obtained.

Sleeper production shall not commence unless the sleepers have attained a minimum compressive strength of 35 N/mm^2.

1.5.5 Marking

Concrete sleepers shall be indelibly marked as follows:-

- Top surface of sleeper
  - ADDY – R65 - in "four-foot"
  - Name of the sleeper plant - "
  - Year of manufacture - sleeper end
  - Sleeper mould number - "
- Side of sleeper
  - Day and month of manufacture + standard used

1.6 Tests on Concrete Sleepers

1.6.1 General

The following tests shall be carried out on concrete sleepers:-

- Frost Salt Test
- Crack Tests
- Concrete Cube Compression and Bending Tests
- Sleeper Dynamic Loading Tests
- Sleeper Static Loading Tests
- Anchor Pulling Test

1.6.2 Frost Salt Test

The Frost Salt Test shall be carried out in accordance with Azerbaijan Railways recommendations.

1.6.3 Crack Test

The manufacturer shall provide details of his proposed Crack Test procedures for the approval of Azerbaijan Railways (ADDY).

1.6.4 Concrete Cube Tests

Compression and bending tests on concrete cubes shall be carried out in accordance with currently valid general construction standards.

The manufacture shall provide details of the proposed test procedures for the approval of Azerbaijan Railways (ADDY).

1.6.5 Sleeper Dynamic Loading Test (Sleeper End)

A load shall be applied simultaneously to both rail bearing surfaces with the bottom surface of the sleeper symmetrically supported.

A minimum load of 40 kN and a maximum of 185 kN per rail seat shall be applied at a frequency of 10 Hz during two million load cycles.

No permanent cracks greater than 0.05 mm shall be accepted.

1.6.6 Sleeper Dynamic Loading Test (Sleeper Centre)

The sleeper shall be supported up-side down at the rail seat positions with the bottom surface of the sleeper loaded symmetrically.

The total upper load limit shall be 110 kN divided equally with a lower total load limit of 25 kN. These shall be applied at a frequency of 10 Hz during two million load cycles.

No permanent cracks greater than 0.05 mm shall be accepted.

1.6.7 Sleeper Static Loading Test (Sleeper End)

The sleeper shall be set up in accordance with section 1.6.5 of this Specification.

During the static test the load shall be increased at a rate of 10 kN/min up to 80 kN and after that in steps of 5 kN.

The load should be increased in steps until breaking occurs.

the following details shall be recorded:-

- Largest crack width
- Load value for first appearing crack
- Load value for crack length greater than 15 mm
- Load value for crack width greater than 0.1 mm
- Load value for permanent crack width greater than 0.05 mm
- Crack details for a load of 270 kN.

The following loads shall be the minimum allowed under test procedures:-

- First Crack - 150 kN minimum
- Permanent Crack - 240 kN minimum
- Breaking - 300 kN minimum

1.6.8 Sleeper Static Loading Test (Sleeper Centre)

The sleeper shall be set up in accordance with section 1.6.6 of this Specification.

During the static tests the load shall be increased at a rate of 10 kN/min up to 40 kN and after that in steps of 5 kN.

The load shall be increased in steps until breaking occurs.

The following details shall be recorded:-

- Longest crack width
- Load value for first appearing crack
- Load value for crack length greater than 15 mm
- Load value for crack width greater than 0.1 mm
- Load value for permanent crack width greater than 0.05 mm
- Crack details for a load of 145 kN.

The following loads shall be the minimum accepted under test procedures:-

- First Crack - 80 kN minimum
- Permanent Crack - 128 kN minimum
- Breaking - 160 kN minimum

1.6.9 Anchor Pulling Test

Pulling tests shall be carried out on screw or clip fastening anchors as necessary. The manufacturer shall provide details of the proposed tests to be carried out for the approval of Azerbaijan Railways (ADDY).

1.7 Inspection and Acceptance

1.7.1 General

The representatives of Azerbaijan Railways (ADDY) shall be entitled, at any time during working hours, to access the concrete sleeper factory in order to inspect all aspects of the manufacturing process and materials and plant involved.

Azerbaijan Railways (ADDY) shall be allowed to supervise tests and measurements and carry out inspections as required.

The Supplier shall provide details of all tests and materials relating to the concrete sleepers to be provided.

1.7.2 Dimensional Verification

The Supplier shall provide two sets of gauges for checking dimensions, one of which shall remain the property of Azerbaijan Railways (ADDY).

Visual inspection of the finished concrete sleepers shall be undertaken to ensure that concrete sleepers are free from surface defects including hair cracks.

2. ELASTIC RAIL FASTENING SYSTEM

2.1 General

The rail fastening system shall consist of rail pads, spring clips, clip or screw inserts, insulators, screws and washers as required. The Supplier shall provide details of the proposed fastening system to be provided for the approval of Azerbaijan Railways (ADDY).

The tenderer shall provide Azerbaijan Railways (ADDY) with details of the respective quality system for each fastening component for approval. The quality systems shall be ISO certified to ISO 9000 or equivalent.

The rail fastening shall be of an elastic type capable of withstanding forces resultant from 30 tonne axle load vehicles coupled with speeds and track parameters detailed in accordance with section 1.2 of this Specification.

The rail fastening shall be of a type which will satisfactorily achieve the desired clamping force.

The manufacturer shall be permitted to submit alternative designs for fastening systems which will be supplied attached to the concrete sleeper.

The design of the rail fastening shall be such that it can be installed and removed by non-specialist labour using simple tools with the minimum of supervision. The rail fastening shall also be suitable for installation and removal by mechanical equipment.

Wherever reference is made in this Specification to specific standards and codes to be met by the goods and materials to be furnished or tested the provisions of the latest current edition or revision of the relevant standards or codes in effect shall apply, unless otherwise expressly stated in this Specification.

Where such standards and codes are national or related to a particular country or region, other authoritative standards that ensure substantial equivalence to the standards and codes specified will be acceptable subject to the approval of Azerbaijan Railways (ADDY).

2.2 Rail Pads

2.2.1 General

Rail pads shall be provided for locations between the foot of the rail and the top surface of the concrete sleeper.

Rail pads shall be provided in accordance with the Suppliers product specification and shall be of elastomeric material with a maximum stiffness of 70 kN/mm. Pads of the same type shall have been used successfully in track with axle loads of 30 tonnes and for a minimum lifetime traffic flow of 500 million gross tonnes (MGT).

2.2.2 Marking

Each pad shall be marked in legible and indelible characters with the following details:-

- Suppliers Mark
- The date of the year of manufacture

2.2.3 Dimensional Tolerances

The following tolerances shall apply to the pad dimensions:

- Length - ±1.5 mm
- Width - ±1.5 mm
- Thickness - ±0.5 mm
- Squareness of Cut - ±0.5 mm

Pads shall have a flatness which complies with the specified tolerances and shall be free from moulding defects.

2.2.4 Tests

The following tests shall be carried out:

- Hardness Test in accordance with ISO Standard R868
- Ultimate Tensile Test in accordance with BS 903 Part A2 or equivalent
- Percentage Elongation Test in accordance with BS 903 Part A2 or equivalent
- Compression Set Test in accordance with BS 903 Part A2 or equivalent
- Electrical Resistance Test in accordance with Appendix 1 of UIC Code 864-5 or ASTM D257 or equivalent.

2.2.5 Packing

The Supplier shall provide details of the packaging proposed for the approval of Azerbaijan Railways (ADDY).

Each package shall bear the following information:

- The name or mark of the Supplier
- The order number
- The number and total weight of the parts.

Packing used for despatch shall not have been used previously for any purpose which may cause it to damage the material.

2.2.6 Guarantee

The Supplier shall guarantee his supplies against all defects attributable to manufacture and materials for a period of 5 (five) years following the date of manufacture of the pads.

Test results shall be in accordance with Table No 4.

Hardness 71 ± 3 ± 5 Change		SHORE A (Acceptance) SHORE A (after 7 days at -40°C)
Ultimate Tensile Strength		17 Mpa (minimum)
Elongation		300 % of unstrained gauge length
Compression Set	Test 1	30 % Duration of Test : 22 hours Temperature :70°C Strain Constant : 25 % 30 minute recovery period at 23°C
	Test 2	20 % Duration of Test : 70 hours Temperature :23°C Strain Constant : 25 % 30 minute recovery period at 23°
Electrical Resistance		≥ 100 megohms
Density		930 -952 Kg/m^3

Table 4 - Rail Pad Test Results

2.2.7 Alternative Designs

The Supplier may offer alternative pad designs for the approval of Azerbaijan Railways (ADDY) together with test procedures and criteria proposed. These details shall take into account the track design criteria detailed in Section 1.2 of this Specification and the requirement to withstand extreme onerous conditions (weather, oil contaminants etc) at a temperature range of -35°C to +53°C.

2.3 Elastic Rail Clips

2.3.1 General

Elastic rail clip fastening shall be employed for fixing R65 flat-bottom rail section onto pre-stressed concrete sleepers.

The design shall be simple and shall allow for easy installation and maintenance.

2.3.2 Rail Clamping Force

The clamping force shall be ensured for a minimum traffic flow of 500 MGT.

The average clamping force shall be between 8 kN and 12.5 kN giving a deflection in the range 10-15 mm.

The resistance to longitudinal creep with the rail resting on an elastomeric pad shall be between 14 kN and 20 kN.

2.3.3 Electrical Insulation

The elastic fastening for fixing rail to concrete sleepers shall ensure electrical insulation between the rail and the sleeper.

The electrical resistance of the fastening shall exceed 10 kΩ and shall be determined in accordance with the procedures described in ERRI D170 Report 3.

2.3.4 Raw Material

Material for elastic rail clips shall be from alloy spring steel to BS970, Part 2: 1988 Grade 251A58 or equivalent. The Supplier shall provide details of the proposed material and chemical composition for the approval of Azerbaijan Railways (ADDY).

Steel shall be free from detrimental surface and internal defects.

Clips shall be heat treated to achieve a surface hardness of 44 to 48 Rockwell C or equivalent and shall be supplied free from burrs, which may be considered harmful when handled, or affect efficient assembly of the clip.

2.3.5 Protective Coating

Clips shall be provided with a protective coating which may include the following alternatives:-

- Bituminous Coating
- Hot dipped galvanising
- Sheradized zinc coating

The Supplier shall provide details of the proposed coating to be used for the approval of Azerbaijan Railways (ADDY).

2.3.6 Packing and Identification

Packaged clips shall be part marked in accordance with the Supplier's drawings.

The outer packaging shall identify the following information :-

- Type of clip
- Date of manufacture
- Date of packaging
- Number of clips per package
- Gross weight of package

2.3.7 Tests and Inspections

The following tests and inspections shall be carried out:-

- Chemical analysis
- Visual inspection
- Dimensional accuracy
- Hardness
- Clip toe load determination

The steel Supplier shall submit, with each batch of raw material a certificate detailing the chemical composition of the steel.

The clips shall be free from burrs at the cropped ends. Tooling marks shall be smooth and free from sharp indentations.

Hardness tests shall be carried out in accordance with BS 891 or equivalent.

Clip toe load shall be determined using a calibrated test rig or alternative system.

Details of the above - mentioned test procedures and alternative proposals shall be provided by the Supplier for the approval of Azerbaijan Railways (ADDY).

2.4 Insulators

2.4.1 General

Insulators shall be manufactured from high viscosity nylon 66 material or equivalent.

Insulators shall not contain glass fibre or other filling material with the exception that an ultra violet stabilising agent shall be added to the raw material.

The Supplier shall provide details of the proposed insulators for the approval of Azerbaijan Railways (ADDY).

Design life shall allow for a minimum traffic flow of 500 MGT.

2.4.2 Marking

Each insulation shall be marked in raised 3 mm characters with the following information:-

- Manufacturers Designation
- Year of Manufacture
- Material Code
- Pattern Number

2.4.3 Raw Material

Virgin raw material shall be unfilled nylon 66 to which an ultra violet stabilising agent has been added.

Clean reground insulator sprues, which shall be ground when still hot, may be added to the virgin raw material provided that it is not to the detriment of the specified mechanical properties of the insulator.

Properties of the raw material shall be in accordance with Table No. 5.

Density	1.3 - 1.45 g/cm^3
Melt Point	250°C to 270°C
Electrical Volume Resistivity	minimum 2 x 10^{12} Ωcm (before conditioning)

Table No. 5 - Insulator Raw Material Properties

2.4.4 Tests and Inspections

The following tests shall be carried out on insulators:

- Water Absorption Test
- Ultimate Tensile Strength
- Dimensional Accuracy
- Visual Inspection

2.4.5 Water Absorption

For the water absorption conditioning test all insulators shall be conditioned in water until they have absorbed a minimum of 1.0 to 6.0 % of their original moulded weight.

2.4.6 Ultimate Tensile Strength

A tensile load of 6 kN shall be applied to the insulator before failure occurs.

2.4.7 Dimensional Accuracy

Dimensional accuracy of the insulators shall be checked by a method approved by the system designer/Supplier.

Tolerances shall be in accordance with Table No. 6.

Dimensions up to 25 mm	$\pm$ 0.25 mm
Dimensions 25 - 50 mm	$\pm$ 0.80 mm
Dimensions over 50 mm	$\pm$ 1.50 mm
Surface against Rail Foot (convexity)	0 + 0.25 mm
Vertical surface against rail foot edge	$\pm$ 0.5 mm

Table No. 6 - Dimensional Tolerances of Insulators

2.4.8 Visual Inspection

Insulator surfaces shall be clean and free from any evidence of gassing or burning.

2.5 Concrete Sleeper Cast-in Anchor

2.5.1 General

Concrete sleeper anchors shall be provided for anchorage of screw inserts or clips as necessary. The anchor shall leave sufficient grip in the sleeper to give resistance to loosening under dynamic loads, and a high tensional resistance at the top of the anchor stem.

The Supplier shall provide details of the anchorage system proposed for the approval of Azerbaijan Railways (ADDY).

Design life of the anchorage system shall be 40 years.

2.5.2 Anchorage for Screw Inserts

The anchorage for screw inserts shall consist of a long plug or plastic dowel.

The Supplier shall provide details of the materials and tests proposed for the approval of Azerbaijan Railways (ADDY).

2.5.3 Anchorage for Rail Clips

Cast shoulder anchorages for rail clips shall be manufactured from spheroidal graphite cast iron to BS 2789 or equivalent, grade 500/7, with a hardness range of between 170 HB and 241 HB.

The Supplier shall provide details of the materials and tests proposed for the approval of Azerbaijan Railways (ADDY).

2.6 Screws

2.6.1 General

Screw fastenings shall be provided in accordance with UIC Code 864-1 as required.

2.6.2 Material

Steel shall be manufactured by the Bessemer or Siemens-Martin process, electric process or in a convertor blown with oxygen.

Steel shall be of a hardened type to give a tensile strength of between 470 and 550 N/mm^2 and a minimum elongation of 20%.

2.6.3 Manufacture

Screws shall be manufactured from a single piece without welding. The head shall be formed by hot-working from the bar-stock.

Screws shall be free from camber and the centre lines of the screw head and the thread portion shall be on the same line.

The surface of the screw shall be smooth and free from injurious wrinkles, cracks and fractures. Screws shall be galvanised by the hot zinc process. The zinc used shall not contain more than 2% of impurities, with the maximum aluminium content being 0.2%.

The coating shall be neat, smooth and free from bulges, dripping cracks or other defects.

The sleeper screws shall be free from all traces of grease, paint, etc., before the coating of zinc is applied.

2.6.4 Marking

The following marks shall be shown on the head of the screw in permanently embossed characters:

- The Suppliers mark
- The last two figures of the year of delivery
- The identification mark.

The initials "ADDY" shall be clearly marked on the top surface of the head of the screw.

2.6.5 Tolerances

Dimensional tolerances shall be in accordance with table No. 7.

Top of head	$\pm$ 0.5 mm
Collar diameter	$\pm$ 0.5 mm
Core diameter	$\pm$ 0.5 mm
Diameter over thread	$\pm$ 0.5 mm
Shank length	Length $\pm$ 4%

Table No. 7 - Dimensional Tolerances of Screws

2.6.6 Tests and Acceptance

Tests and Acceptance shall be in accordance with UIC Code 864-1.

The following tests shall be carried out:

- Material Test
- Tensile Test

- Bend Test
- Dimensional Inspection
- Galvanising Inspection

As an alternative to material tests the Supplier may supply a rolling mill certificate for each steel cast for acceptance by Azerbaijan Railways (ADDY).

Tests on dimensional quality may be dispensed with subject to the Supplier providing an acceptable quality control procedure as approved by Azerbaijan Railways (ADDY).

2.6.7 Packing

The Supplier shall provide details of the packaging proposed for the approval of Azerbaijan Railways (ADDY).

Each package shall bear the following information:

- The name or mark of the Supplier
- The order number
- The number and total weight of the parts.

Packing used for despatch shall not have been used previously for any purpose which may cause it to damage the material.

2.6.8 Guarantee

The Supplier shall guarantee his supplies against all defects attributable to manufacture and materials for a period of twelve months following the date of manufacture of the screws.

2.7 Washers

2.7.1 General

Washers shall be provided in accordance with UIC Code 864-3 as required.

2.7.2 Material

Spring washers shall be manufactured from spring steel bars, made from high carbon steel wire rod and shall conform to the chemical competition shown in Table No.8.

	C	Si	Mn	P	S
% Min.	0.59	0.15	0.30	-	-
% Max.	0.86	0.35	0.90	0.04	0.04

Table No.8 - Chemical Composition of Washers

The Supplier shall provide details of the proposed washers to be used for the approval of Azerbaijan Railways (ADDY).

After shaping the washers shall be hardened and tempered. Washers shall be manufactured to give a minimum tensile strength of 1375 N/mm^2 and a minimum elongation of 6%.

2.7.3 Marking

The following marks shall be stamped on each washer by a blunt-edged punch in sufficiently legible characters:

- The Suppliers mark
- The last two figures of the year of delivery

2.7.4 Finish

The washer surfaces shall be regular and clean, and free from superficial cracks, flaws, burrs, deficiency in metal, folds or any other defect likely to affect the use for which the part is intended.

2.7.5 Tolerances

Dimensional tolerances shall be in accordance with Table No. 9.

Internal diameter	1.2 mm
Section, long side, small side and diameter	0.4 mm
Height	1.6 mm

Table No. 9 - Dimensional Tolerances of Washers

2.7.6 Tests and Acceptance

Tests and acceptance shall be in accordance with UIC Code 864-3.

The following tests shall be carried out:

- Flattening Test
- Compression Test
- Torsion Test
- Texture Test
- Hardness Test
- Dimensional Inspection

Tests on dimensional quality may be dispensed with subject to the Supplier providing an acceptable quality control procedure as approved by Azerbaijan Railways (ADDY).

2.7.7 Packing

The Supplier shall provide details of the packaging proposed for the approval of Azerbaijan Railways (ADDY).

Each package shall bear the following information:

- The name or mark of the Supplier
- The order number
- Description of the parts
- Number and total weight of the parts.

Packaging for despatch shall not have been used previously for any purpose which may cause it to damage the material.

2.7.8 Guarantee

The Supplier shall guarantee his supplies against all defects attributable to manufacture and materials for a period of twelve months following the date of manufacture of the washers.

3. Delivery and Acceptance

3.1 The Supplier shall arrange and take whole responsibility for loading, transportation and unloading of concrete sleepers, including the rail fastening assemblies, at the location specified by the Purchaser. The Supplier shall also take responsibility for all necessary custom clearance formalities.

3.2 The costs associated with the delivery of concrete sleepers, including rail fastening assemblies, but excluding customs duties and other taxes payable in the Purchaser's country, shall be met by the Supplier.

4. Warranty and Liability

4.1 The warranty period would remain valid for 10 (ten) years after the concrete sleepers have been delivered to or accepted at the final destination, indicated in the Contract, against any defects attributed to manufacture and undetected at the time of the acceptance.

4.2 If during the warranty period the defects became apparent then the Supplier shall replace the sleepers free of any charges.

4.3 All costs associated with the replacement/renewal of defective sleepers, including rail fastening assemblies, and including transportation, but excluding customs duties and other taxes payable in the Purchaser's country, shall be met by the Supplier.

5. Schedule of Requirements

5.1 Supply and delivery of: -

- **133 000 pre-stressed concrete monoblock sleepers together with complete elastic type rail fastening assemblies.**

3. TECHNICAL SPECIFICATION FOR SUPPLY AND DELIVERY OF HIGH PERFORMANCE TAMPING MACHINE (FOR PLAIN LINE)

RESTRUCTURING OF AZERBAIJAN RAILWAYS - AZERBAIJAN DOVLET DEMIR YOLU (ADDY)

TRACKWORK RENEWAL

TECHNICAL SPECIFICATION FOR SUPPLY AND DELIVERY OF HIGH PERFORMANCE TAMPING MACHINE (FOR PLAIN LINE)

C O N T E N T S

TECHNICAL SPECIFICATION FOR SUPPLY AND DELIVERY OF HIGH PERFORMANCE TAMPING MACHINE (FOR PLAIN LINE)

1. General Requirements

The plain line track tamping, line and levelling machine shall be capable of performing the following operations: -

1.1 To determine track alignment of ballasted track on either wooden or concrete sleepers with R 65, R 60 or R 50 flat-bottom rail.

1.2 To continuously tamp the track ballast under two sleepers.

1.3 To tamp the ballast at the sleeper ends.

2. Country's Climate

• Altitude above Sea Level	-	< 1500 m
• Ambient Temperature	-	Lowest: -20° C
	-	Highest: +40° C
• Climatic Zone	-	moderate climate
• Atmospheric Humidity	-	Lowest: 60%
	-	Highest: 100%

3. Track Geometry and Components

• Track Layout Arrangement	- Single and Double
• Track Gauge	- 1520, (-9; +28)
• Rail Section	- R65; (R60; R50)
• Rail Inclination	- 1:20 nominal towards centre of track
• Minimum Horizontal Track Curvature	- 80 m in transport mode
	- 180 m in operation mode
• Maximum Track Gradient	- 12‰
• Type of Sleepers	- Wooden; length 2750 – 2780 mm
	- Concrete monoblock - 2700 mm (nom.)
• Rail Fastening	- Spikes, coachscrews, holding down bolts or elastic rail fastenings
• Type of Rail Joints	- 4 or 6 holes fishplates
• Sleeper Spacing	- 543 mm (1840 sleepers/km) maximum
	- 500 mm (2000 sleepers/km) minimum
	- 625 – 670 mm at stations
• Type of Track Ballast	- Crushed rock grain size 40-70 mm
	- River gravel size <25 mm
	- Well compacted mixture of ballast, sand, gravel, dust and clay
• Ballast Depth	- 300 mm minimum (theoretical)
• Maximum Admissible Load Gauge	- To comply with Load and Gauge Standard GOST No. 9238 - 83

4. Machine Requirements

4.1 Working

4.1.1 The tamping machine shall operate on the principle of continuous machine movement, while the actual work unit, positioned on a separate under-frame, shall move in cycle from sleeper to sleeper.

4.1.2 The machine shall be fitted with 2 tamping units, capable to tamp simultaneously under 2 sleepers, by pressure and vibration at a frequency in the range of 35-45 Hz and a minimum amplitude of 2.5 mm in the initial situation.

4.1.3 The tamping tool depth in ballast shall be at least 500 mm from the top of the running rail to the tip of the paddle of the tamping tool.

4.1.4 The tamping tool shall be made of an abrasion resistant alloy.

4.1.5 The tamping unit shall be able to move also laterally at least 85 mm.

4.1.6 The tamping machine line and levelling system shall be capable of track slewing and/or lifting by a minimum of 100 mm.

4.1.7 The machine shall be fitted with a ballast compacting device for the sleeper ends. Such compacting devices shall be capable to reach 300 mm below the top of the rail with a ballast shoulder compaction of up to 500 mm.

4.1.8 The design of the vehicle shall enable the machine operations on the track with a maximum track gradient of 30‰.

4.1.9 The ballast tamping machine shall be able to operate also within the station platform areas. The load and structure gauge detail to be supplied by the Azerbaijan Railways.

4.1.10 The machine shall be able to tamp under sleepers that are off centre by up to 50 mm.

4.1.11 The vehicle shall be able to provide 8 hours of continuous operation.

4.1.12 The vehicle shall be designed to be operated, transported or towed at any time of the day.

4.1.13 The machine shall be able to work on either single or double track.

4.1.14 The machine tamping set up time from reaching the site to the ballast tamping operation and vice versa should be no more than 10 min.

4.1.15 The break-down time from operation position to leaving the site, in case of an incident, should be no more than 20 min.

4.2 Transfer

The machine shall be self-propelled during transfer to and from site and capable to maintain a speed of 80 km/h on an inclined track gradient of a maximum of 12‰ and a 100 km/h when it is hauled.

4.3 Braking System

4.3.1 The machine shall be equipped with pneumatically operated block brakes acting on all wheels in accordance with UIC regulations.

4.3.2 The machine shall also be equipped with a mechanically operated parking brakes.

4.3.3 The machine shall also be equipped with an indirect train brake system with KE- valve and appropriate connections.

4.3.4 All the operational units i.e. brake connections, universal joints and other such units shall be supplied with devices to prevent units from touching the track or falling outside the clearances for the vehicle.

4.4 Accommodation

4.4.1 The machine shall be equipped with fully enclosed cabins, one at each end.

4.4.2 All operations for transfer and working shall be controlled from one central driver's and operation stand in an enclosed cabin on the main frame.

4.4.3 For transfer the machine shall be equipped with a second driver's stand in the enclosed front cabin.

4.4.4 An appropriate acoustic, dust protection of the cabins, air conditioning, heating and ventilation system shall be provided.

4.4.5 The cabins shall be equipped with devices for communication between the vehicle crew members, by telephone and radio communication, including the microphones, speakers, etc.

4.4.6 All cables, conducts and electrical installations shall be protected against climatic and other elements.

4.4.7 The machine shall carry sufficient light source to allow perfect sight during dark working.

4.4.8 Th*p-1Xal situation - min. 2.5 mm

6.1.4 The machine shall be able to tamp track with varied sleeper spacing.

6.1.5 The design life of the tamping units shall be for a minimum of 400 km of tamped track.

6.1.6 The design life of the tamping tools shall be for a minimum of 200 km of tamped track.

6.2 Tamping Principle

6.2.1 Tamping operation shall be by pressure and vibration.

6.2.2 All tamping tools shall operate under the same pressure, but independent from each other. The required tamping pressure shall be easy to set. Each tamping arm shall be capable of independent movement to accommodate variations in the ballast bed.

6.2.3 The machine shall be equipped with a mechanism allowing the tamping of double sleepers.

6.2.4 The tamping depth shall be adjustable, in steps, from the operator's seat.

6.2.5 During the lifting and lining process the machine shall not be supported directly on the track ballast.

6.2.6 The machine shall be equipped with a device for removing ballast from top of the sleepers and rail fastenings.

6.3 Track Levelling, Lifting and Lining Equipment

6.3.1 The machine shall be equipped with the following: -

- A computerised unit for automatic measurement of horizontal and vertical track alignment.
- An automatic track lining and levelling system by a method of curve smoothing or by a fixed point method. The control shall be indirect.
- A laser device with a carriage and a remote control of carriage movement with an operator's monitor.
- A recording system that will record the following track parameters before, during and after track tamping operation: -
  - track versines
  - longitudinal track profile
  - track cant (superelevation)
  - track twist
- An on-board diagnostic device to be able to review quickly any malfunctions as they occur in the machine systems.

6.3.2 The track lifting and lining unit shall run along the running rails during the operation in advance of the machine.

6.3.3 The lifting and lining force must be applied on at least two points on each rail.

6.3.4 The lining process shall be carried out without previous measuring runs.

6.3.5 During the operation all the necessary adjustment values shall be continuously calculated, fed back into the system and displayed in the cabin to the operator.

6.3.6 Accuracy of the track lining shall be: -

- smoothness of the track profile over a length of 2.5 m - $\leq$1 mm
- track levelling - $\leq \pm$ 2 mm
- track lining - $\leq$ 2 mm

6.4 Miscellaneous

6.4.1 Lighting: -

- The machine shall be equipped with 8 driving lights. Four at each end fixed to the vehicle's under-frame in the buffer bar area (two on each side). Each pair shall contain one red and one white signal light, symmetrically placed relative to the vertical axis of the vehicle. The red lights shall be placed closer to the centre.
- The power of the signal lamps shall be sufficient to ensure the reliable visibility from a distance of 1500 m on a straight track section in clear visibility.
- In addition the vehicle shall be equipped with two searchlights mounted along the longitudinal axis of the vehicle. The searchlights shall ensure the clear visibility of not less than 800 m in clear weather.
- The vehicle shall be equipped with sufficient lighting for the operation of the vehicle at night.

6.4.2 Warning sound: -

- The vehicle shall be equipped with two sets of pneumatic horns with one set at the each end of the vehicle. One high volume (air horn) and one low volume (whistles).
- The air horns shall provide a sound level of 120 ±5 dB with a main tonal frequency of 360-380 Hz at a distance of 5 m in front of the horn at a pressure of 0.8 MPa.
- The vehicle shall also be equipped with electric alarms for the monitoring operations.

6.4.3 Fire extinguishers

- The vehicle shall be equipped with appropriate fire extinguishing devices. Each cabin shall contain not less than one extinguisher.

7. Construction

7.1 The frame shall be sturdy of welded construction designed to function.

7.2 The vehicle frame shall be sufficiently rigid for the lifting of the vehicle with jacks. The appropriate jacking points shall be clearly indicated on the body of the vehicle.

7.3 The service life of the vehicle shall be not less than 15 years.

7.4 The vehicle shall be equipped at both ends with an automatic coupling units to GOST No. 3475 – 81. The distance from the coupler to the top of the running rail shall be 1060 ±20 mm.

7.5 The installation of the automatic coupling units on the vehicle shall be carried by the Supplier.

7.6 The main frame of the machine shall be equipped with two-axle bogies. One axle shall be provided on a separate under-frame for working units.

7.7 The bogies and axles shall be equipped with an appropriate suspension.

7.8 The vehicle shall be equipped with the pair of wheels 710-950 mm diameter. The maximum axle load in the transport mode shall be 23.25 tonnes.

7.9 Axle and wheels shall be steel forged.

7.10 The rim surface profile of the wheel shall correspond to GOST 9036 – 88. The distance between the inner surface of the wheel rims shall be 1440 +1/-2 mm. The tolerance between the wheel diameters, for the roll of one wheel pair, shall be not more than 1.0 mm

7.11 The machine shall be equipped with a Diesel engine of well known type with at least 340 HP suitable for operation in the dusty environment at altitude of 2000 m and ambient temperature of 45°C. Under the rated conditions the power of the engine shall be sufficient and correspond to the operation mode of the vehicle. Alternating current requirements for the diesel-generator unit is 50 Hz.

7.12 A pre-heating system for the engine and the operating hydraulic system shall be provided.

7.13 Painting of the vehicle. - With the exception of the tamping units and elements the vehicle painting and the corrosion-preventive coating of the vehicles shall correspond to the technical requirements and standards of UIC 842-1, 842-2, 842-3, 842-6 842-7 and to the ISO/R1461, R2085 and R2128 standards.

7.14 All signs and identifications on the vehicle shall be in Azerbaijan (main language) and Russian.

7.15 All manuals including computer manuals, the user interface software and instructions concerning computer software shall provided in Russian and English.

8. Spare Parts

8.1 The Supplier shall provide within his tender submission a list of mandatory spare parts, amounting to approximately 5% of the total capital cost of the tamping machine. The list shall follow the requirements outlined in the Technical documentation and shall be priced by the tenderers on CIP (place of destination) basis. The cost of these spare parts would be considered for the evaluation purposes. The Purchaser reserves the right to modify the list if required.

8.2 Furthermore the Supplier shall provide within his tender price a list of consumable items that will be required for a period of 5 years machine operation. The Supplier shall itemise the list with an identification, short description and detail price breakdown.

8.3 In order to have a standard basis for comparing submitted tenders, the Purchaser will review the Supplier's lists (spare parts and consumable) and will, if required, add or delete items to these lists. This adjustment of the spare parts list for the initial 5 year period will be based on information furnished by each tenderer as well as on the past experience of the Purchaser. This list is to be used only for comparison during tender evaluation stage.

8.4 The delivery of spare parts to be within 10 (ten) working days of the written request made to the Supplier. During the warranty period all expenses associated with the supply and delivery, but excluding the costs associated with the custom duties and other taxes payable in the Purchaser's country, will be met by the Supplier.

8.5 Any machine breakdown within the warranty period, which results in downtime of 20 (twenty) working days or more shall result in an extension to the warranty by the amount of downtime period.

9. Acceptance and Commissioning

9.1 The initial, preliminary acceptance of the tamping machine will be carried out by the Purchaser at the manufacture's plant at approximately 90% completion. The Supplier shall arrange for the attendance at the factory of two officials from the Azerbaijan Railways and for a Russian interpreter to be present during preliminary acceptance stage. The costs of travelling, including accommodation, will be met by the Purchaser.

9.2 All the necessary technical documents for the vehicle, including the operational, maintenance and repair documents shall be available to the Purchaser at least two months before the date of the preliminary acceptance. These documents shall be in Russian and English.

9.3 The Supplier shall arrange and take responsibility for, machine packing, transportation, unloading and delivery, including all the necessary custom clearance formalities.

9.4 The costs associated with the delivery of tamping machine, but excluding the costs of customs duties and other taxes payable in the Purchaser's country, will be met by the Supplier.

9.5 The final acceptance of the tamping machine vehicle will be made upon the delivery and following the tamping machine vehicle assembly, start-up and adjustments by the Supplier.

9.6 The machine commissioning shall comprise: -

- checking completeness and intactness of the machine
- removal of transport packing
- assembling of the superstructures
- filling up lubricants, fuel, hydraulic oil, etc. and verification of filling levels
- leakage tests for air, gas and liquid systems
- functional tests of the various units
- functional test of the complete machine on the basis of a work sample
- operational trials to demonstrate that all machine performance criteria are met

9.7 In case when the final acceptance are considered unsatisfactory, the operations that are considered necessary, in order to eliminate the defects, shall be conducted by the Supplier with his own resources and at his own expense. The repeated final acceptance shall be conducted upon elimination of all defects.

9.8 On the occasion of the acceptance of the machine an acceptance certificate will be issued by the Supplier and signed and dated by both parties.

10. Training

10.1 The tenderer's proposal shall include: -

10.2 The list of the personnel required for the operation of the machine, with the indication of the number of persons, their positions, responsibilities, qualifications and other relevant data.

10.3 The list of the personnel required for the machine maintenance and repair, stating the number of required persons, professions, qualifications and other relevant data.

10.4 A training plan or schedule for each category or profession of personnel, with the corresponding indication of the theoretical and/or practical subjects stating the locations and training periods for each person.

10.5 The Supplier shall itemise the costs for both Purchaser's and Supplier's personnel, showing costs separately for both.

10.6 An itemised list of the following costs of training: -

- Supplier's costs for factory-based training
- Supplier's costs for site-based training
- Travel costs for Purchaser's personnel
- Subsistence costs for Purchaser's personnel

All costs of training are to be met by the Supplier. In particular the Supplier's price shall include all costs of travel, accommodation and all meals for the Purchaser's personnel on visit to the Supplier's factory.

10.7 For the tender evaluation purpose the Supplier shall submit price, within the tender, for the following training: -

Personnel	Factory-based Period	Site-based Period
Purchaser's personnel		
Machine Operator (tamping)	3 weeks	
Machine Operator (track geometry)	3 weeks	
Machine Maintenance Mechanic	3 weeks	
Interpreter		4 weeks
Supplier's personnel		
Engineer/Lecturer	3 weeks	4 weeks
Interpreter	3 weeks	

11. Quality Control

11.1 Quality Assurance Programme - The proposal from the Supplier shall include a description of its quality assurance programme. This description shall detail the quality control system and procedures at the manufacturing facilities of the Supplier and shall also state whether the Supplier is certified by the recognised quality assurance association.

11.2 The Purchaser reserves the right to audit the quality management system of the Supplier within the period of the proposed evaluation.

11.3 Quality Plan - Within the 30 days from the notification to commence the Supplier shall provide to the Purchaser the quality plan for the contract including manufacturing, delivery, commissioning and preliminary acceptance machine testing.

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12. Technical Documentation

12.1 The complete delivery of ballast tamping machine shall include the corresponding technical documentation: -

- three copies of all technical documents in Russian
- three copies in Azerbaijan
- one copy in English
- one copy in the language of the country of the Supplier

12.2 The Supplier shall also provides certificates for the: -

- materials and devices, subject to technical inspection and checking, such us cables, lines, compressed air tanks, etc.
- wheel sets
- braking system
- complete vehicle with the additional equipment and units

12.3 The Supplier shall provide operating manuals among other things: -

- the description of the vehicle
- the design drawings and relevant diagrams of the vehicle and the main units with main clearances and overall dimensions
- instructions for driving the vehicle in the transport mode
- instructions for the preparation of the vehicle for the transport and operation modes, for the operation and the shut-down of the vehicle
- instructions for operation of all machine functions
- instructions for servicing and adjustment
- instructions for the preventive maintenance of the vehicle and main units including the hydraulic, electrical and pneumatic systems with preventative maintenance cycles for lubrication, inspection etc.
- diagrams of the control of the hydraulic, electrical, electronic and pneumatic systems
- general safety instructions for the maintenance personnel
- instruction for the handling of the vehicles in case of track derailment or breakdown

12.4 The Supplier shall provide the diagrams of the components which are subject to fast wear and use.

12.5 The Supplier shall provide complete list of all spare parts for operation of the vehicle to the end of the vehicle design life. For each individual item the Supplier shall provide the reference number, description, design life, place of origin, unit price and delivery time from stock with separate time for transport. The Supplier shall provide an exploded diagram of the unit showing the location of each spare part.

12.6 The documentation is to include all necessary information and technical documents related to requirements and facilities for the storage of the spare parts, the method of storage and the required storage space. Any special requirements for the condition of spare parts storage, such as temperature, humidity, etc shall be clearly stated.

12.7 Supplier's recommendations for all consumables.

12.8 All information and technical documents concerning the use and application of the devices, instruments and special equipment.

12.9 All relevant information and technical documents concerning requirements and facilities for storage of devices, instruments and special equipment, the method of storage and required storage space.

12.10 All information and technical documents describing the condition of storage of the devices, instruments and special equipment, such us temperature, humidity, etc.

12.11 The instructions for the removal and assembly with the indication of the acceptable tolerances for wear and clearances.

12.12 The documents concerning the repair of the moving parts of the vehicle.

12.13 All the dimensions and clearance limits, specified in the technical documents shall correspond to the SI - International Unit System.

12.14 The Supplier shall provide the Purchaser with all above necessary documents not later than at the machine delivery date. The documents shall correspond to the design of the vehicle as delivered. All alteration to the documents resulting from the final acceptance shall be made by the Supplier within 10 days from the date of the final acceptance and at his own expense.

13. Technical Maintenance and Repair

13.1 The Supplier shall provide the complete list, in Russian and English, of the devices, instruments and special equipment necessary for the technical maintenance and the repair of the vehicle, including the devices, instruments and equipment for the following: -

- Preliminary testing before beginning a maintenance activity on a vehicle
- Tests of sub-units and sub-systems before and after performing a maintenance activity, such as preventative, corrective, standard replacement, overhaul, etc.
- Final testing before placing the vehicle back into service including required tagging and sealing of components.

13.2 The Supplier shall include in its tender the supply of devices, instruments and special equipment required to perform technical maintenance and repair of the vehicle for the complete service life of the vehicle.

13.3 This proposal shall be itemised providing a separate detailed price breakdown and shall be placed in an appendix in the tender along with a detailed description of the operation of each item proposed.

13.4 The Supplier shall also provide, with the tamping machine, a tool kit containing a complete set of tools and equipment for servicing and routine maintenance of the tamping machine.

14. Warranty and Liability

14.1 The warranty period would remain valid for a period of 36 (thirty six) months after the ballast tamping machine has been delivered to or accepted at the final destination indicated in the Contract, or 40 (forty) months after the date of shipment from the port of loading in the source country, whichever period concludes earlier.

14.2 The Supplier shall be contractually responsible to inspect and adjust and/or remedy the tamping machine after 6 (six) months of operation. Thereafter the Supplier will make a yearly check and/or adjustment during the 3 years warranty period, including an inspection at the end of warranty period. The costs associated with these inspections will be met by the Supplier.

14.3 During the warranty period the Supplier will be obliged to remedy all defects that preclude the usage of the vehicle whether resulting from faulty design, materials or poor workmanship.

14.4 The Supplier is obliged to remedy any faults, which occur during the warranty period, at his own expense by either repair or replace defective parts as quickly as possible.

14.5 If it takes more than 20 (twenty) working days to remedy the faulty vehicle then the original warranty period will be extended by the duration that vehicle is out of service.

15. Schedule of Requirements

Supply and deliver **ONE ballast tamping machine**, with continuous mode of tamping operation, together with capability of track line and levelling for plain line operation.

4. TECHNICAL SPECIFICATION FOR SUPPLY AND DELIVERY OF DEEP BALLAST CLEANING MACHINE

RESTRUCTURING OF AZERBAIJAN RAILWAYS - AZERBAIJAN DOVLET DEMIR YOLU (ADDY)

TRACKWORK RENEWAL

TECHNICAL SPECIFICATION FOR SUPPLY AND DELIVERY OF DEEP BALLAST CLEANING MACHINE

C O N T E N T S

TECHNICAL SPECIFICATION FOR SUPPLY AND DELIVERY OF DEEP BALLAST CLEANING MACHINE

1. General Requirements

1.1 Supply and deliver deep ballast cleaning machine with capability to install geotextile and/or polystyrene sheets for the Azerbaijan Railways – Azerbaijan Dovlet Demir Yolu (ADDY).

1.2 The machine shall be capable to clean ballast on broad gauge track with either wooden or concrete monoblock sleepers with R65, R60 or R50 flat-bottom rail sections.

1.3 The machine shall be suitable to clean ballast on plain line or junction work track with a minimum output of 600 m/h.

1.4 The condition of existing ballast is, at some locations, well compacted mixture of ballast, sand, gravel, dust and clay (see below).

2. Country's Climate

• Altitude above Sea Level	-	< 1500 m
• Ambient Temperature	-	Lowest: -20° C
	-	Highest: +40° C
• Climatic Zone	-	moderate climate
• Atmospheric Humidity	-	Lowest: 60%
	-	Highest: 100%

3. Track Geometry and Track Components

• Track Layout Arrangement	- Single, Double and Junction work
• Track Gauge	- 1520, (-9; +28)
• Rail Section	- R65; (R60; R50)
• Rail Inclination	- 1:20 nominal towards centre of track
• Max. Track Cant (superelevation)	- 150 mm
• Turnout Types	- 1/6, 1/9, 1/11 and 1/18
• Minimum Horizontal Track Curvature	- 80 m in transport mode
	- 180 m in operation mode
• Maximum Track Gradient	- 12‰
• Type of Sleepers	- Wooden; length 2750 – 2780 mm
	- Concrete monoblock - 2700 mm (nom.)
• Rail Fastening	- Spikes, coachscrews, holding down bolts or elastic rail fastenings
• Type of Rail Joints	- 4 or 6 holes fishplates
• Sleeper Spacing	- 543 mm (1840 sleepers/km) for R >1200 m
	- 500 mm (2000 sleepers/km) for R ≤ 1200 m
	- 625 – 670 mm at stations
• Type of Track Ballast	- Crushed rock grain size 25-70 mm
	- River gravel size <25 mm
	- Well compacted mixture of ballast, sand, gravel, dust and clay
• Ballast Depth	- 300 mm minimum (theoretical)
• Maximum Admissible Load Gauge	- To comply with Load and Gauge Standard GOST No. 9238 - 83

4. Machine Requirements

4.1 Working

4.1.1 The machine shall be able to remove and clean the track ballast within both plain line and junction work track constructions.

4.1.2 The machine shall be able to operate on single and/or double track configuration between stations and also within the station platform tracks.

4.1.3 The ballast cleaning machine shall be capable of the following: -

- To lift the track up to 150 mm without inducing excessive stresses on rails, rail fastenings and sleepers.
- To maintain the excavating device in a horizontal position even under circumstances when the machine operates within the canted track (up to 150 mm).
- To control the cross fall of the excavating chain/track formation.
- To clean the track ballast under the whole length of turnout.
- To slew the track up to 300 mm to either side.
- Maintaining the screening unit in a horizontal position even when the machine operates in canted track section.
- The screening unit sieves shall be changeable to clean the track ballast within the 25-70 mm size range.

4.1.4 The machine shall be capable to dig the ballast under bottom of sleepers between 200 and 600 mm with excavation tolerances of ±30 mm.

4.1.5 For plain line track the width of excavation shall be between 4 200 and 5 200 mm.

4.1.6 Under the junction work the excavation of the ballast shall be under the whole width of the turnout.

4.1.7 The ballast cleaning output shall not be less than 400 m^3/h with 35% spoil.

4.1.8 The minimum amount of spoil shall be at least 5%.

4.1.9 Spoil material shall be off-loaded , using conveyor belt system, up to 5 m either side of the track or, if required, load it into wagons placed either on the same or adjacent track. For the wagon loading operation it is envisage that no special wagons will be required.

4.1.10 The spoil material removal system shall have sufficient capacity to remove all of the ballast (spoil and track ballast) to accommodate different level of ballast replacement.

4.1.11 The machine shall be equipped to place a layer of either geotextile or polystyrene 4.5 m wide from a 400 mm diameter roll prior to return of cleaned ballast.

4.1.12 The machine shall be capable to return clean ballast back to the track immediately behind the excavating chain and geotextile or polystyrene sheet laying component.

4.1.13 The returned ballast shall be spread uniformly under the track sleepers to ensure track stability.

4.1.14 The screening unit, conveyor belts and chain channels shall be enclosed on both sides, as much as possible, in order to reduce amount of dust.

4.1.15 The ballast cleaning operation shall be controlled either manually or semi-automatically from a central operator's cabin.

4.1.16 The machine shall be equipped with measuring and recording instruments for, at least, depth of excavation, track lifting and track cant.

4.1.17 The machine shall be equipped with an over-stress measuring device to stop the excavation if there is an obstacle in the track ballast.

4.1.18 The design of the machine shall enable the ballast cleaning operations on the track with a maximum gradient of 35‰.

4.1.19 The operation of ballast cleaning equipment shall be hydraulic with adjustable working speed.

4.1.20 The vehicle shall be able to provide at least 8 hours of continuous operation.

4.1.21 The vehicle shall be designed to operate be transported or towed at any time of the day.

4.1.22 The machine set up time, from reaching the site to the ballast cleaning operation and vice versa, shall not be no more than 30 min.

4.1.23 The break-down time from operation position to leaving the site, in case of an incident, shall be no more than 60 min.

4.2 Transfer

During transfer to and from working site the machine shall be self-propelled and capable to maintain speed of up to 80 km/h on a maximum track gradient of 12‰. When hauled by other locomotive power the machine shall be able to travel at 100 km/h.

4.3 Braking System

4.3.1 In accordance with UIC regulation requirements the machine shall be equipped with pneumatically operated block brakes, fed through a brake line, acting on all bogie wheels.

4.3.2 The machine shall also be equipped with an indirect train brake system with KE-valve and appropriate connections.

4.3.3 For additional safety the machine shall be fitted with mechanically operated parking brakes.

4.3.4 All the operational system i.e. brake connections, universal joints and other such units shall be supplied with devices to prevent units from touching the track or falling outside the clearances for the vehicle.

4.4 Accommodation

4.4.1 The machine shall be equipped with fully enclosed cabins, fitted with safety glass windows. One cabin for driver to control movement of the vehicle with additional cabin for operator to direct ballast cleaning activity.

4.1.1 The cabins shall be equipped with air conditioning, heating and ventilating systems together with appropriate acoustic and dust protection/insulation.

4.4.3 The cabins shall be equipped with devices for communication between the vehicle crew members, by telephone and radio communication, including the microphones, speakers, etc.

4.4.4 All cables, conducts and electrical installations shall be protected against climatic and other elements.

4.4.5 The machine shall carry sufficient light source to allow perfect sight during dark working.

5. Performance

5.1 The machine shall be self-propelled when in working mode and capable of forward drive, ballast cleaning, of up to 600 m/h while, at the same time, pushing wagons for spoil material of up to 800 tonnes.

5.2 The machine shall be able to perform the following functions: -

- Remove the track ballast
- Clean the ballast
- Discharge the unwanted spoil either to the track side or into wagons
- Compact the track formation after removing the ballast and before laying geotextile.
- Install geotextile or polystyrene layer
- Place the cleaned ballast back into the track

6. Equipment

6.1 Ballast excavating chain

6.1.1 The excavating chain shall cut the ballast under the sleepers and transport it directly to the screening unit. The ballast shall be excavated in one working pass.

6.1.2 The operation of the excavating chain shall be driven by the hydraulic system.

6.1.3 The disposable drive power of the excavating chain shall not be less than 200 kW.

6.1.4 The machine shall be equipped with a measuring device for excavating depth and lateral slope of the chain.

6.2 Ballast screening unit

6.2.1 The ballast cleaning machine shall be equipped with a vibrating unit for cleaning and dividing excavated material.

6.2.2 The screening unit shall have exchangeable screens.

6.2.3 The screening unit shall work satisfactorily in either horizontal or track canted position.

6.2.4 When working on canted track, to a maximum of 150 mm, the screening unit shall be hydraulically adjustable to work horizontally.

6.3 Re-ballasting/Waste disposal

6.3.1 If required the equipment shall be able to excavate and load onto wagons all of the excavated material by means of the conveyor belts.

6.3.2 The swivelled conveyor belts shall return the cleaned ballast back into the track immediately behind the ballast excavating chain.

6.3.3 The machine shall be equipped with a device for cleaning the sleepers and rails from the ballast.

6.3.4 The ballast conveyor belt shall be tiltable with a tilting angle approx. 70° to either side of the track to unload the waste up to a distance of 5 m from the track centre.

6.3.5 No special wagons will be required for spoil/waste material.

6.3.6 The machine shall be equipped with a device for laying rolls of geotextile.

6.3.7 The machine shall be capable to excavate and clean the ballast under the junction work without a need to dismantle the switches.

6.3.8 The ballast conveyor belt shall ensure a uniform ballast distribution over the entire turnout area.

6.4 Miscellaneous

6.4.1 Lighting: -

- The machine shall be equipped with 8 driving lights. Four at each end fixed to the vehicle's under-frame in the buffer bar area (two on each side). Each pair shall contain one red and one white signal light, symmetrically placed relative to the vertical axis of the vehicle. The red lights shall be placed closer to the centre.
- The power of the signal lamps shall be sufficient to ensure the reliable visibility from a distance of 1500 m on a straight track section in clear visibility.
- In addition the vehicle shall be equipped with two searchlights mounted along the longitudinal axis of the vehicle. The searchlights shall ensure the clear visibility of not less than 800 m in clear weather.
- The vehicle shall also be equipped with sufficient lighting for the operation of the vehicle at night.

6.4.2 Warning sound: -

- The vehicle shall be equipped with two sets of pneumatic horns with one set at the each end of the vehicle. One high volume (air horn) and one low volume (whistles).
- The air horns shall provide a sound level of 120 ±5 dB with a main tonal frequency of 360-380 Hz at a distance of 5 m in front of the horn at a pressure of 0.8 MPa.
- The vehicle shall also be equipped with electric alarms for the monitoring operations.

6.4.3 Fire extinguishers

- The vehicle shall be equipped with appropriate fire extinguishing devices. Each cabin shall have at least one extinguisher.

7. Construction

7.1 The frame shall be sturdy of welded construction designed to function within the most severe track working environment.

7.2 The overall dimensions of the ballast cleaning machine shall be in compliance with the GOST 9238-83 load gauge requirements.

7.3 The height of the machine shall not exceed, in transport and operational modes, 5 300 mm.

7.4 The ballast cleaning machine may be composed of one or more vehicles.

7.5 The both ends of the machine shall be prepared for the installation of buffers and pulling gear.

7.6 The frame shall be sufficiently rigid for the lifting of the vehicle with jacks. The corresponding jacking points shall be clearly indicated on the body of the vehicle.

7.7 The service life of the vehicle shall be not less than 15 years.

7.8 The vehicle shall be equipped at both ends with an automatic coupling units to GOST No. 3475 – 81. The distance from the coupler to the top of the running rail shall be 1060 ±20 mm.

7.9 The installation of the automatic coupling units on the vehicle shall be carried by the Supplier.

7.10 The main frame of the machine shall be equipped with two two-axle bogies.

7.11 The bogies and axles shall be equipped with an appropriate suspension.

7.12 The vehicle shall be equipped with the pair of wheels 710-950 mm diameter. The maximum axle load in the transport mode shall be 23.25 tonnes. The strength of the axle shall be sufficient also for the operation mode loads.

7.13 Axle and wheels shall be steel forged.

7.14 The rim surface profile of the wheel shall correspond to GOST 9036 – 88. The distance between the inner surface of the wheel rims shall be 1440 +1/-2 mm. The tolerance between the wheel diameters, for the roll of one wheel pair, shall be not more than 1.0 mm

7.15 The machine shall be equipped with a Diesel engine of a well known type with an output not less than 340 kW and suitable for operation in the dusty environment at altitude of 2000 m and ambient temperature of 45°C. Under the rated conditions the power of the engine shall be sufficient and correspond to the operation mode of the vehicle. Alternating current requirements for the diesel-generator unit is 50 Hz.

7.16 A pre-heating system for the engine and the operating hydraulic system shall be provided.

7.17 Painting of the vehicle. - With the exception of the tamping units and elements the vehicle painting and the corrosion-preventive coating of the vehicles shall correspond to the technical requirements and standards of UIC 842-1, 842-2, 842-3, 842-6 842-7 and to the ISO/R1461, R2085 and R2128 standards.

7.18 All signs and identifications on the vehicle shall be in Azerbaijani (main language) and Russian.

7.19 All manuals including computer manuals, the user interface software and instructions concerning computer software shall provided in Russian and English.

8. Spare Parts

8.1 The Supplier shall provide within his tender submission a list of mandatory spare parts, amounting to approximately 5% of the total capital cost of the ballast cleaning machine. The list shall follow the requirements outlined in the Technical documentation and shall be priced by the Supplier on CIP (place of destination) basis and shall include unit prices. The cost of these spare parts would be considered for the evaluation purposes. The Purchaser reserves the right to modify the list if required.

8.2 Furthermore the Supplier shall provide within his tender price a list of consumable items that will be required for a period of 5 years machine operation. The Supplier shall itemise the list with an identification, short description and detail price breakdown per spare part.

8.3 In order to have a standard basis for comparing submitted tenders, the Purchaser will review the Supplier's lists (spare parts and consumable) and will, if required, add or delete items to these lists. This adjustment of the spare parts list for the initial 5 year period will be based on information furnished by each tenderer as well as on the past experience of the Purchaser. The list is to be used only for comparison during tender evaluation stage.

8.4 The delivery of spare parts to be within 10 (ten) working days of the written request made to the Supplier. During the warranty period all expenses associated with the supply and delivery, but excluding the costs associated with the custom duties and other taxes payable in the Purchaser's country, will be met by the Supplier.

8.5 Any machine breakdown within the warranty period, which results in downtime of 20 (twenty) or more working days shall result in an extension to the warranty by the amount of downtime period.

9. Acceptance and Commissioning

9.1 The initial, preliminary acceptance of the ballast cleaning machine will be carried out by the Purchaser at the manufacture's plant at approximately 90% completion. The Supplier shall arrange for the attendance at the factory of two officials from the Azerbaijan Railways and for a Russian interpreter to be present during preliminary acceptance stage. The costs of travelling, including accommodation, will be met by the Purchaser with the remainder costs being met by the Supplier.

9.2 All the necessary technical documents for the vehicle, including the operational, maintenance and repair documents shall be available to the Purchaser at least two months before the date of the preliminary acceptance. These documents shall be in Russian and English.

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9.5 The final acceptance of the ballast cleaning machine vehicle will be made upon the delivery and following the ballast cleaning machine assembly, start-up and adjustments by the Supplier.

9.6 The machine commissioning shall comprise: -

- checking completeness and intactness of the machine
- removal of transport packing
- assembling of the superstructures
- filling up lubricants, fuel, hydraulic oil, etc. and verification of filling levels
- leakage tests for air, gas and liquid systems
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- functional test of the complete machine on the basis of a work sample
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Interpreter		4 weeks
Supplier's personnel		
Engineer/Lecturer	3 weeks	4 weeks
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11. Quality Control (In compliance with ISO 8402 standards)

11.1 **Quality Assurance Programme** - The proposal from the Supplier shall include a description of its quality assurance programme. This description shall detail the quality control system and procedures at the manufacturing facilities of the Supplier and shall also state whether the Supplier is certified by the recognised quality assurance association.

11.2 The Purchaser reserves the right to audit the quality management system of the Supplier within the period of the proposed evaluation.

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- braking system
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12.3 The Supplier shall provide operating manuals among other things: -

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- instructions for driving the vehicle in the transport mode
- instructions for the preparation of the vehicle for the transport and operation modes, for the operation and the shut-down of the vehicle
- instructions for operation of all machine functions
- instructions for servicing and adjustment
- instructions for the preventive maintenance of the vehicle and main units including the hydraulic, electrical and pneumatic systems with preventative maintenance cycles for lubrication, inspection etc.
- diagrams of the control of the hydraulic, electrical, electronic and pneumatic systems
- general safety instructions for the maintenance personnel
- instruction for the handling of the vehicles in case of track derailment or breakdown

12.4 The Supplier shall provide the diagrams of the components which are subject to fast wear and use.

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12.10 All information and technical documents describing the condition of storage of the devices, instruments and special equipment, such us temperature, humidity, etc.

12.11 The instructions for the removal and assembly with the indication of the acceptable tolerances for wear and clearances.

12.12 The documents concerning the repair of the moving parts of the vehicle.

12.13 All the dimensions and clearance limits, specified in the technical documents shall correspond to the SI - International Unit System.

12.14 The Supplier shall provide the Purchaser with all above necessary documents not later than at the machine delivery date. The documents shall correspond to the design of the vehicle as delivered. All alteration to the documents resulting from the final acceptance shall be made by the Supplier within 10 days from the date of the final acceptance and at his own expense.

13. Technical Maintenance and Repair

13.1 The Supplier shall provide the complete list, in Russian and English, of the devices, instruments and special equipment necessary for the technical maintenance and the repair of the vehicle, including the devices, instruments and equipment for the following: -

- Preliminary testing before beginning a maintenance activity on a vehicle
- Tests of sub-units and sub-systems before and after performing a maintenance activity, such as preventative, corrective, standard replacement, overhaul, etc.
- Final testing before placing the vehicle back into service including required tagging and sealing of components.

13.2 The Supplier shall include in its tender the supply of devices, instruments and special equipment required to perform technical maintenance and repair of the vehicle for the complete service life of the vehicle. The total cost of the corresponding devices, instruments and special equipment shall not exceed 2% of the total cost of the ballast cleaning machine

13.3 This proposal shall be itemised providing a separate detailed price breakdown and shall be placed in an appendix in the tender along with a detailed description of the operation of each item proposed.

13.4 The Supplier shall also provide, with the machine, a tool kit containing a complete set of tools and equipment for servicing and routine maintenance of the ballast cleaning machine.

14. Warranty and Liability

14.1 The warranty period would remain valid for a period of 36 (thirty six) months after the ballast cleaning machine has been delivered to or accepted at the final destination indicated in the Contract, or 40 (forty) months after the date of shipment from the port of loading in the source country, whichever period concludes earlier.

14.2 The Supplier shall be contractually responsible to inspect and adjust and/or remedy the ballast cleaning machine after 6 (six) months of operation. Thereafter the Supplier will make a yearly check and/or adjustment during the 3 years warranty period, including an inspection at the end of warranty period. The costs associated with these inspections will be met by the Supplier.

14.3 During the warranty period the Supplier will be obliged to remedy all defects that preclude the usage of the machine whether resulting from faulty design, materials or poor workmanship.

14.4 The Supplier is obliged to remedy any faults, which occur during the warranty period, at his own expense by either repair or replace defective parts as quickly as possible.

14.5 If it takes more than 20 (twenty) working days to remedy the faulty vehicle then the original warranty period will be extended by the duration that vehicle is out of service.

15. Schedule of Requirements

Supply and deliver **ONE** **ballast cleaning machine**, with a facility to lay/install geotextile or polystyrene layer.

5. WASHING PLANT TECHNICAL SPECIFICATIONS

GIBB

LAWGIBB Group Member

RESTRUCTURING OF THE AZERBAIJAN RAILWAYS

WASHING PLANT TECHNICAL SPECIFICATIONS (FINAL DRAFT)

December 1998

CONTENTS

SECTION A EXTERIOR WASH PLANT FOR RAILWAY TANK WAGONS

3.19 Safety Arrangements

General assembling and detailed design of the equipment shall conform to all safety regulations and codes applicable in Azerbaijan, with the addition of the following:

Sufficient labelling of controls should be provided to ensure the safe operation of the equipment. All labelling must be in the Russian language, as well as in the contractor's own language if different.

3.20 Documentation

The Contractor shall provide the following "as installed" documentation, in the Russian language, delivered to site not later than one month after installation :

Operation and Maintenance Manuals	4 copies
Wiring Diagrams	4 copies

In addition the Contractor shall provide one set of Operation and Maintenance Manuals, and Wiring Diagrams, in the contractors own language if different, for use by the contractor's staff during site visits.

3.21 General Instructions

The Tenderer shall submit with his proposal detailed specifications of all the equipment to be supplied, together with all associated fixtures, fittings and connections to existing plant.

The Tenderer shall submit with his proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Tenderer shall give full details of all the requirements of the plant relating to consumption of water, steam, electricity, and chemicals and other consumables required.

The Tenderer shall offer a standard product as close as possible to the given technical requirements. The offered type of product must have been manufactured for at least one year.

The Tenderer shall provide a list of similar plants installed for the washing of railway tank wagons, including details of capacity and throughput times.

3.22 Warranty Period and Defects during Warranty Period

The Tenderer will be expected to demonstrate his faith in his product by offering a warranty period of at least three years.

The Tenderer should outline his proposals for dealing with defects during the warranty period.

The provision of remote monitoring and fault diagnosis from the Contractor's base should be considered.

The Tenderer should outline how he proposes to ensure that the plant continues to operate in optimum condition during the warranty period.

Provision of an inspection visit after 6 months operation, and then annually, should be considered.

4 Spare Parts and Special Tools

4.1 Recommended Spare Parts

The Tenderer shall submit with his bid a list of required spare parts, including consumables for a period of three years, duly completed and priced, to the value of 5% of the total ex-works price of the equipment.

The spare parts lists should include the following data elements:

- Sequence number
- Tenderer's part number
- Item description
- Figure and item number in the illustrated parts breakdown/drawing if applicable
- Quantity
- Unit price
- Total price

Price basis on the spare parts list shall be "Ex Works".

4.2 Chemicals

The Tenderer shall include in his tender for the supply of sufficient chemicals for three years operation. Phasing of delivery can be considered.

4.3 Special Tools

The Tenderer shall supply with the equipment:

1 - set of all tools required for regular servicing and maintenance.

The Tenderer shall prepare and submit to the Purchaser a priced list of any optional special tools which may be required, but not included in the delivery.

5. Bill of Quantities

Beneficiary : Azerbaijan Dovlet Demir Yolu (ADDY) - Azerbaijan State Railways

5.1 Tender

Item	Description	Unit	Qty	Total Cost
1	Tank wagon exterior wash plant capacity 24 wagons per day, complete with spare parts.	pc	1	
2	Chemical supplies for three years operation.			
Total FOB				
Freight to Balajari, Azerbaijan.				
Insurance to Balajari, Azerbaijan				
Total, CIF Balajari, Azerbaijan				
3	Erection, Commissioning, and Training	pc	1	
	TOTAL TENDER PRICE			

Delivery Period to Balajari
from date of order confirmation ..... weeks

Time for Erection and Commissioning .....weeks

5.2 List of Spare Parts included in the Tender

The Tenderer shall attach a priced list of spare parts included in the Tender, in the format outlined in Para. 4.1

5.3 List of Optional Tools not included in Tender

The Tenderer shall attach a priced list of optional tools in the following format:

Item	Description and part no.	Unit	Qty	Unit Cost	Total Cost

APPENDIX 1

Balajari Tank Wagon Washing Station

Oil Specifications

Heavy Fuel Oil

Heavy fuel oil known as **"Mazut"** to Specification M 40.

Specific Gravity : 0.930 - 0.940

Oil may occasionally be to Specification M 100.

A recent analysis is as follows :

Mazut of M-40 type, low sulphur
GOST 10585-75 with changes., N5

N	Indicator	Actual
1	Viscosity at 80, not more than, conventional, degree , corresponding to sq m/sec c (CT)	8 59
2	Ash content, not more than	0.12
3	Percentage of water % not more than	1
4	Percentage of mechanical mixtures, % not more than	0.5
5	Content of water soluble acids and alkalines	not present
6	Portion of sulphur for not more than	1
7	Flash temperature for detecting in open crucible, not less than	90
8	Freezing temperature,C not lower	25
9	Lowest combustion heat to convert to dry fuel Jl/kg/Kca//kg	3 40740*10 /9730/
10	Density at 20 C,g/sm, not more than	no standard

Recovered Oil

The boilers are required to burn a proportion of recovered oil after separation from the oil / water emulsion, known as **"Sno"** :

	Average	Range
Viscosity centistokes	24	24-35
Specific gravity.	0.923	0.900-0.940
Flash point c	140	
Water content %	7.5	3-10

May contain up to 10-12 Kg of crude oil in 60 tonnes.
There are plans for an increased reduction in water content.

Above information supplied by Balajari Wash Plant.

Recovered oil analysis from sample taken for EBRD Enviromnmental Report June 1998:

Viscosity	1.453 E which is 5.7 mm2/s
Specific gravity.	0.9007 g/cm2
Marcusson flash point	98 c
Ignition Temperature	118 c
Water content	8-10 %

APPENDIX 2

Balajari Tank Wagon Washing Station

Results

Boiler Feed Water Analysis 1998

Selective operation control of the chemical water-preparing unit of the boiler-room has been carried out. The hardness of the feed water after nitric cationic filters, of the Ist and 2nd stages, and the hardness of water in the deaerator, have been measured.

The average results obtained are as follows:

	After stage 1	After stage 2	In deaerator
Hardness mg equiv./l	0,35 - 0,60	0,01 - 0,02	0,01 - 0,03
PH	-	-	7 - 9

Chief Engineer of Balajari Wagon Washing Plant (Signed) Agaev A.A.

Head of the Labaratoty - Balajari Wagon Washing Plant (Signed) Makhmudov C.N.

Water analysis from samples taken for EBRD Environmental Report June 1998:

	Conductivity MicroSiemens / cm	Hardness CaO mg / l
Raw water	925	179
Boiler feed water	1060	4.4

MAIN INDICATORS OF THE PERFORMANCE OF EFFLUENT TREATMENT FACILITIES

N	Name of process	Concentration of contaminations (mg/l)							
		Suspended substances		Oil products		pH		BPK complete	
		Before construction	After construction	Before construction	After construction	Before construction	After construction	Before construction	After construction
1.	Treatment facilities for recirculation water supply	500	20	800	70	7 / 13	≈ 7	150	30
2.	Treatment facilities for additional chemical treatment before discharge into sewers	20	5 / 8 {375 ?}	70	5 / 8 {2.0 ?}	≈ 7	≈ 7 {6.5-8.5 ?}	30	15 {375 ?}

**Subject to revision by ADDY - figures in { } are requirements of Baku City Sewage Authority "Bakkanallizzatcia"

Balajari Tank Wagon Washing Station

Reference

Permissible Emissions to Atmosphere

This reference relating to Azerbaijan Railways has been made according to the basis of first documentation for determination and prediction of air pollution.

In the process used at Balajari Wash Plant, emissions to the atmosphere having a detrimental influence on the environment are mainly : tars, welding fumes, dust, SO_2, CO, NO_2 and light organic compounds.

Characteristics and parameters of waste sources have been made according to the first documentation of Maximum Permitted Pollution (MPP), eco-passport, and statistic references.

The main sources of waste are boiler house, welding area, and collection and purification installations.

Air pollution from the washing plant is less than the maximum permissible levels. The Wagon Washing Plant has a sanitary fence 50 metres wide.

Consequently the Wagon Wash Plant can be considered as a part of third category of risk in categorising plants on risk levels. Therefore all existing pollution must be considered under MPP.

According to the laws of Azerbaijan Republic "Pollution protection" the State Ecology Committee decided that all atmospheric discharges are considered to be under MPP regulations of 29/10/97.

Characteristics of all polluting substances:

	MPP	1996	1997	1998
ALL		74,316	47,465	50,242
Including solids		1,395	3,783	6,468
Gaseous		72,921	43,682	43,774
SO_2		12,559	16,715	9,688
CO	52,000	44,866	20,408	20,373
NO_2	19,448	15,496	5,270	13,713
C	1,270	-	1,270	-
Welding aerosol	0,017	-	0,112	0,011
	0,00078	-	-	0,000075
Oil vapours	0,126	0,100	0,190	0,130

Two new boilers, manufactured in Canada in 1992, which could allow the reduction of atmospheric emissions for 1997-1998, have been installed

Characteristics: Serial numbers 504535, 504536, horizontal flame tube, with a maximum steam pressure of 12 atm, and steam production 8 t/hour. Main fuel is natural gas, reserve fuel -diesel.

I. Equivalence of fuel

$$E=\frac{Q_H}{7000 \text{ k kal/22}}$$ Q_H minimum calorific value of natural gas - 8050 k.kal/kg

for diesel:

$$Eg=\frac{8050}{7000}=1,15 \qquad Ec=\frac{9,590}{7000}=1,37$$

2. Annual amount of fuel used

T gas = 650 m^3 / hour x 24 x 365 = 5.694.000 cu.m
T diesel = 560 lit. / hour x 24 =13400 lit. = 11550 m^3/gas

Diesel is considered as a reserve fuel

Average consumption 560 l / hour
560 l / hour 24 hours =13440 l / day = 1550 kg / day

While burning this amount of diesel, discharges to atmosphere are:

Total		10.1 x 11550 =1,165
among them only	solids	2,0 x 11550 =0,231
	gaseous	8,1 x 11550 =0,934

including

SO_2 3,0 x 11550=0,346
CO 5,0 x 11550=0,577
NO_2 0,1 x 11550=0,011

Annual amount of working hours of the boiler-house is 8760.

Height of discharge is 30 m. Diameter of the pipe orifice is 0,7 m. Parameters of air/gas liquid on the way out of the waste source: speed--9,02 m/s, volume--2,22 m^3/s, temperature--96,5^0.
Here steam is being used in order to clean wagons during the year.

The following report was made according to the recommendation from the office of State Ecology Committee.

CO 0,008 x 5694000 m^3 / gas = 5,694 kg
NO_2 0,034 x 0,075 x 5694000 m^3 / gas = 14,519 kg

Therefore in the year of 1998, discharges to atmosphere consists of:

Total		20,213 kg
among them only	solids	none
	gaseous	20,213 kg

including

SO_2 none
CO 5,694 kg
NO_2 14,519 kg

In a year of 1998 during a period of repairing works (28 days) working with diesel 28 days 24 hours = 672 working hours, discharges to atmosphere:

Total		32,664 kg
among them	solids	6,468
	gaseous	26,196

including

SO_2 9,702
CO 16,170
NO_2 0,324

Until the end of the year, 8088 hours working on natural gas calculations show:
50 m^3 / hour x 8088 working hours = 5257,200 m^3 would be discharged:

CO	0,008 x 5257200 m3	= 4,217 kg
N02	0,034 x 0,075 x 5257200 m3	= 13,405 kg

which makes:

Total	17,622 kg
Solids	none
Gas, liquid	17,622 kg
including	
SO_2	none
CO	4,217 kg
NO_2	13,405 kg

Results: by the end of 1998 discharges to atmosphere will consist of:

	diesel burning	gas burning	All waste
All	32,620	17,622	50,242
Solids	6,468	-	6,468
Gaseous	26,152	17,622	43,774
SO2	9,688	-	9,688
COO	16,156	4,217	20,373
NO2	0,308	13,405	13,713

Water

There are no ponds, sediment, drain systems, reservoirs (except fire reservoirs) and storehouses on the Wagon Washing Plant.

Water use (m^3):

1996	1997	1998
66,260	96,150	118,52

Water source is city water pipe: diameter--100 mm, number of the report D-13, tip of the pipe STV-100.

Daily use of the water is 377,0 m^3/day, for agricultural needs-54,97 m^3 , therefore on industrial needs-323,73 m^3/day.

Waste water is being discharged to the city sewerage system. Water is used in the cleaning process. After the process it can be reused. A special laboratory controls water quality after cleaning.

Quality structure of waste waters in Wagon Washing Plant (daily):

a) Volume of waste	298,28 m^3/day
b) Agricultural	39,97 m^3/day
c) Industrial pollution	258,31 m^3/day
d) From them pure	44,07 m^3/day

Concentration of the basic pollutants in the domestic waste waters of the city sewerage as a norm takes 12,33 m^3 / hour in compositions of N, Cu, chlorides, sulphates and weighted substances.

The Wagon Wash Plant does not use rainwater, as there is no surface water collection system,

Director of Balajari Wagon Wash Plant (Signed) Akhundov T.M.
Head of Environmental Department (Signed) Agadjanli A.A

7.8.98

APPENDIX 4

Azerbaijan State Railways

Balajari Tank Wagon Washing Station

RULES FOR LABOUR SAFETY

"Safe methods of working for the technological process of preparation of tanks for loading and repair"

(see file : safety.doc)

27/11/98

Azerbaijan State Railways

Balajari Tank Wagon Washing Station

RULES FOR LABOUR SAFETY

"Safe methods of working for the technological process of preparation of tanks for loading and repair"

1 GENERAL

Within the structure of the wagon service of Azerbaijan State Railways there is the Tank Wagon Washing Station, as an independent cost centre, located at Balajari station. The main task of the washing station is to prepare railway tanks for loading with oil products.

The washing station with the capacity of 250 tank wagons per day is classified in the 3-d category and carries out the following tasks:
- preparation of tanks for filling or repair, on time and to standard.
- exterior washing of tanks.

Goods transported in tanks, with some exceptions, are a danger to personnel by their characteristics and in most cases are toxic. Incorrect treatment of such goods and the use of prohibited methods of tank treatment may cause intoxication, burns on exposed parts of the body, eye injuries as well as explosions and fire. Due to that the established technological process must be strictly fulfilled and technical Safety and industrial Rules for preparation of tanks for filling and repair must be strictly observed (GOST-1510-60).

The Rules for transportation of goods in tank wagons :- Safety Rules for railway workers on electrified lines, Rules for prevention of leakage of oil-products, acids and other chemicals in water during transportation, loading , unloading and tank washing, as well as the rules of fire safety on the railway transport, must be observed.

All employees of the washing station are to keep strictly to the Technical Safety Rules, to apply appropriate operational methods, to work in special protective clothing, special shoes and with other means of special protection, to be systematically tested as regards their knowledge of the Technical Safety Rules, medically examined and pass the industrial instructions test on labour safety. Persons under 18 years old as well as females are not allowed to work as washers, steam-operators or operators for tank valve filling. By the requirements of the labour safety, tanks being exclusively used by the freight consignors or receivers , as well as tanks attached to the places of filling and discharging for transportation of goods of a special nature, are not treated at the steam-washing station.

To perform correctly the established technological process of tank treatment and for execution of works for prevention of industrial accidents, professional diseases, the following requirements must be observed strictly:

- requirements to constructions, mechanisms and other facilities of the washing station;
- requirements of the Rules for preparation of tanks for filling and repair;
- norms, rates of issue and use of protective clothes, protective shoes and other means of individual protection;

- requirements to observe Technical Safety Rules of industrial sanitation for washers and steam-operators and operators for filling and repair of valves of the outlet devices of the tanks;
- requirements to observe electric safety;
- requirements to private sanitation during production;
- instructions for rendering first aid to injured people and medical care;
- requirements for sanitation and other premises and facilities;
- requirements for the work according to warning signs of the constructions and facilities located on the area of the washing station;
- requirements to keep the established norms of artificial lighting on working places by treatment of tanks;
- requirements of fire-prevention;
- requirements for professional man power selection and examination of labour safety norms of the employees of the washing station;
- control and responsibility for execution of labour safety requirements.

2 MAJOR REQUIREMENTS FOR STRUCTURES, MECHANISMS ,AND OTHER FACILITIES OF THE WAGON WASHING STATION.

The Washing Plant has been built and maintained as per the sanitation and fire – prevention norms.
Parts of the territory of the wash station, where the immediate treatment of tanks takes place are explosive areas and require devices for protection and prevention of the penetration of oil products into the ground, spark proof wiring for exterior lighting to be installed, constructions are to be made of fire-proof materials: concrete, ferro-concrete etc.

For treatment of tanks containing ethyl gasoline /blended gasoline/ or chemicals, individual over-head platforms /gantry/ with installation of special sanitation - amenities premises are separated from common facilities.

Over-head platforms must have properly functioning longitudinal barriers with a height of 1 m, line bridges, grounds and handrails. Decking and steps of the staircases are manufactured from chequered sheet steel.
For feeding of steam and hot water the washing station is equipped with pipeline systems, that are to be covered by heat-isolation materials to protect against burns and to avoid the loss of heat for tank treatment.

Depending on the purpose, pipe-lines are painted in different colours: steam-pipe - in red , hot water pipe – in green, vacuum system – brown.

For draining off waste water and oil products the troughs are arranged along the over-head gantry axis, each pipe to be closed by metallic grating from above.

Troughs are equipped by heating devices.

For labour facilitation and creating of safe labour conditions, pumps, compressors and ventilation devices must be installed at the washing station; by means of pumps oil products are pumped and waste waters removed, compressors feed condensed air to the working places and with the help of ventilation devices the tanks are degassed. Electrical equipment of pump and ventilation must be explosion-safe. Vacuum devices are to conform to the requirements of the Instruction for operation of vacuum-devices at the washing station. For safe operation of the steam-siphon housing and reservoirs, where the residuals from tanks come, are to be earthed.

Devices, equipment, tools applied for washing of tanks are manufactured from spark-proof materials. Belt drives of ventilation and compressor installations are to be fenced. Pump

sections of oil traps, and the oil catchers, attended by people, are equipped with inlet and extraction ventilation and special devices.

Installations for cleaning of waste waters of the washing station are equipped by special filter devices, that drain waste water, safe for reservoirs. At the washing station the fencing system installed for treatment tanks is applied with the help of specially fixed traffic lights, with the signal indication in the direction of the possible movement of the locomotive. Protection stop signals are switched on by the relief master, the indications are repeated on the control panel at the operators. At the over-head platform a warning signal for alarm is envisaged.

Equipment, intended for steaming, washing, deaeration and other purposes, must be kept operational, be installed at fixed places, and not disturb the work and free passage on the over-head platform. Movements on the area of the washing and steaming station to the working places, office, medical center, sanitation premises and facilities, must be done strictly by the established scheme of passage along a safe route.

3 PREPARATION OF TANKS FOR LOADING AND REPAIR

Tanks wagons subject to maintenance are to be inspected thoroughly, and the analysis of the goods remains in them must be carried out at the chemical laboratory.
The technology for tank treatment includes the following operations: removal of the residues from the tank; steaming of the tank with hot water; drying and wiping of the tank walls, degasification of the tank in case of its repair.
The network of pipe-lines and steam-pipes, connected directly with the tank , communicating bridge at each tank, vacuum installations, devices for washing and steam-siphons for rests removal, mechanized devices for tank washing, degassification devices and installations, or steam-ejectors for tank degasification are the means of mechanization, appliance of which reduces maximum the time of washer's stay inside the tank during treatment and thus facilitates his job.

The means for mechanization must be kept completely functional. The attending personnel must be trained to use it properly.
The remains of goods are drained in different reservoirs with the help of vacuum device and pumps.
While using steam and water-siphons these residues are directed into drainage troughs without letting them spray on the tanks and the ground. Before starting steaming or washing of tanks, the worker performing this job must be completely sure that there is no one inside the tank.

In accordance with the technological process for mechanised washing, tanks are washed by water heated up to temperature of 70 ° C , and manually, by means of a flexible hose - not less than 40 C. Cooling off, drying and ventilation of tanks is carried out by ventilation and compressor devices as well as with the help of transportable steam-injectors.

The washers and other operators go down inside the tank by a permanent internal ladder, and when not-available – by a portable ladder. From the moment the washer goes down into the tank and until he goes out of it, the second washer (the 'upper') must stay continuously at the hood of the tank. The second washer puts on similar protective clothing, protective shoes like the first one inside the tank and has a safety belt on with a rope and a hose respirator. He watches the work and the condition of the washer inside the tank, responds to the signals given by means of the rope, renders the necessary assistance in work and in case of accidents saves the injured person, giving the alarm.

Letting the people down in un-steamed tank or the tank with the residue of goods is only allowed when the hose respirator and safety belt is attached to the protective clothing and fixed on the buckle, and the safety rope, with one end being fixed to the upper ring of the

safety belt must be at least 10-12 m and with knots being from each other at the distance of 0,5 m. The safety rope must stand the load of at least 200 kg. Before getting down into the tank, the washer puts on the mask and after being in it at least 3 minutes, makes sure that the hose respirator is in order, checks whether the outer ends of the hose and the safety belt is fixed correctly to the handrails at the hood area from the outer side as well as the correct fixing of the flexible hose with the clutch, feeding the air to the respirator valve.

Tools and materials necessary for the work inside the tank are passed over and pulled out in a bucket, made of material free from spark formation. While getting down into and out of the tank, the washer must not hold any objects in his hands.
The operation of both washers by interior treatment of a tank is coordinated for securing complete safety.

Simultaneous entry of both workers inside the tank is not allowed. By interchanging of work places the established procedure must be observed: at first the inside worker must go out of the boiler and after that the upper worker must go down into the boiler.

The interior treatment of the tanks without a hose respirator must be permitted only if all the works on residue removal, steaming , washing and ventilation by the inflow of air are performed by no less than 60-times exchange. To avoid spark formation and subsequent explosion in the tank, all metallic objects /fallen ladders, wave cutters etc. are removed from the tank and transferred only after complete cleaning, washing and degasification of the tank.

4 RATES OF ISSUE AND USE OF PROTECTIVE CLOTHING, PROTECTIVE SHOES AND OTHER MEANS FOR INDIVIDUAL PROTECTION

The workers engaged in preparation of tanks for filling, - washers, steam - operators, tank cleaners, fitters for repair and charging of valves, are provided with the individual special protective clothing and special protective shoes of the appropriate size, growth with the established type of material impregnation and besides, use the tools for individual protection: a safety belt, a hose respirator with chequered respiratory pipe, respirator, explosion-proof accumulator torch, rubber gloves and boots.

Two spirit-proof suits must be available at the washing station. The mask for the hose device is chosen individually for each operator.

By entering on duty the worker dealing with the tank treatment, puts off his home clothes and puts on special protective clothes, protective shoes instead, as well as the safety belt and has them on in the course of the working day.
During operation inside the tank, working boots must be of tarpaulin on wooden studs and without steel nails and toes.

At the washing station the permanent reserve stock of protective clothing, underwear and hose respiration devices with at least one set per each 20 persons, working in one shift, must be available in order to change timely protective clothes by its contamination by ethyl gasoline or other toxic goods.

Protective clothing for workers must be washed at least once a week, and in each case of considerable pollution. By treatment of tanks out of ethyl/ blended gasoline, protective clothes are washed separately from the other ones, and before washing, are treated by sharp steam at least temperature of 110° C and pressure of 2 atm. for one hour to remove toxic substances containing tetraethyl lead.

Pneumatic suit worked out by the All-Union scientific-research Institute for the Railway Transport in co-operation with the group of the Balajari Washing Station is the most perfect protective clothing for the washer. Pneumatic suit consists of a closed helmet, jacket

with safety belt, trousers and pneumatic system, through which the air is fed into the suit. The helmet looks like double-layered hood with pelerine.

At its front side the hood is covered by an inspection glass with the apron, fixed to the sides of the suit jacket. It is oil-resistant protective clothing under which purified air cooled in summer and heated in winter is fed through a special system. Ventilation facilities in the suit secure the normal air inflow into the respiration area of the washer.

While working in such a suit it is not necessary to use a hose respirator as well as wearing a tarpaulin suit. Working in pneumatic costume the washer does not get tired and contaminated by the remains of the oil-products. In such a suit he is safely protected from penetration of toxic substances from the liquid goods into the body.

All means for individual protection are stored in separate dry rooms, isolated from any other objects and materials, sorted out according to their types, sizes and protective features.

The Administration of the Washing Plant arranges proper maintenance of means for individual protection. It carries out chemical cleaning, washing, repair, degasification, deactivation, decontamination of protective clothes in good time, as well as repairing /mending/ degasification, deactivation and decontamination of protective shoes and other means for individual protection.

Protective clothing and shoes are granted to the workers and employees at the washing station free of charge as per the norms /rates/ of protective clothing issue, declared by the order N 90-N of 18.07.96 of the Head of Azerbaijan State Railway, that identifies which categories of workers and what protective clothing, shoes and terms of their wear they are supposed to have as per their professional position..

The procedure of issue, change, repair, washing, cleaning, storing of protective clothing and shoes is regulated in the Instruction N 90-N, attached to this order, of providing the workers and employees with free protective clothing, shoes and other means for individual protection.

5 REQUIREMENTS OF INDUSTRIAL SAFETY RULES AND INDUSTRIAL SANITATION, FOR WASHERS, STEAM-OPERATORS AND OPERATORS, FOR FILLING AND REPAIRING TANK DRAINAGE VALVES

To avoid industrial injuries and diseases at the washing station, all the workers and employees, depending on the nature of occupations and professions, are to keep strictly to the set-up and acting Directives N CB - 2559 of 20.11.67 on the Safety rules and industrial sanitation for washing and steaming operators, and operators for filling and repair of tank drainage valves.

1. General

§ 1. Various oil-products, part of which are of toxic nature are transported in railway tanks. Consequently washing and steaming operators, as well as operators for filling and repair of drainage system valves need to identify correctly the nature of residues by their colour and viscosity; must know the effects of the main dangerous goods, especially methanol and the blended /ethyl/ gasoline for the human body as well as signs of intoxication, and the first aid rules.

§ 2. The blended gasoline /benzene/, benzol, sulphureous oil, containing free hydrogen, penetrate through the skin and may have toxic effects by contamination of hands and other parts of the body during wearing of contaminated clothing and shoes, as well as by availability of vapour of this products in the tanks.

§ 3. The most dangerous are: petrol of all grades, sulphurous oil, kerosene, kerosene distillate, benzol. Even a short stay of a person inside the tank, having the residues of them, without individual protection means, may cause heavy intoxication of the body. To such substances, irritating and causing skin burns, belong: petrol, ligroin, mazut, oil.

§ 4. The washing and steaming operators and operators for filling and repair drainage valve devices are obliged to know and implement exactly the safety requirements by preparation of tanks for filling and repair.

2. Safety measures before starting to work and by staying on the railway tracks

§ 5. Before starting the work washing and steaming operators, operators for filling and repair of tank drainage valves must put on protective clothes and check it and be sure that hose respirator device and safety belt is in order, check the firmness of fixing of the safety rope /its length must not be less than 12m and the distance between the knots be 0,5 m/. It is not permitted to work without clothes and individual safety/protection/ means.
The work must be executed only with functional tools, devices and explosion-proof torches.

§ 6. To avoid explosion of tanks, it is prohibited by their treatment to use tools, devices spades etc./, manufactured from spark forming materials.

§ 7. The mask for the hose respiration apparatus is selected individually. The length of the hose must be at least 12 m.

§ 8. Being on the railway tracks it is necessary to observe the safety requirements:

a) while walking to pay attention to the approaching trains and locomotive signals;
b) to cross the tracks only at the right angle making sure that they are free;
c) not to cross and run over the tracks in front of the moving locomotive and wagons.

By crossing the tracks occupied by the rolling stock it is necessary to use brake platforms of wagons or go round the train and cross the track behind it at the least distance of 5 m from the automatic coupling;

d) to walk only along the space between tracks, paying attention to the movement of the shunting trains and locomotives on the adjacent tracks;
e) to cross the track between uncoupled wagons, if the distance between their automatic coupling at least 10 m.
by crossing tracks to make sure that there are no moving trains on them and then step over the rail without treading on it.

§ 9. It is prohibited to sit on the rail.

§ 10. It is prohibited to be on the track spacing between the trains by their non-stop running at the station.

§ 11. For carrying of tank spare parts, hoses and other objects across the tracks one should use the brake platform of the wagons as well as specially set-up permanent passages, equipped by coverings at the level of the rail heads.

It is prohibited to transfer spare parts, hoses and other objects under the wagons.

§ 12. By internal inspection of tanks, repair and charging of drainage devices valves in darkness, the washers and fillers must use explosion proof accumulator torches.

3. Safe methods of work

§ 13. One may go up on the tanks only after uncoupling of the locomotive and fencing the train by stop signals.

§ 14. By inspection of uncleaned tanks it is prohibited to look inside through the hatch without a hose respirator.

§ 15. It is forbidden to go down the inside of tank boilers: after drainage of the ethyl /blended/ petrol, chemical goods, with unidentified residues of goods or with the residues of over10 cm;

- by non-availability of the ladder inside the tank boilers;
- without relevant protective clothes and shoes;
- without hose respirator;
- without safety belt and a rope fixed to it;
- without the second operator /upper worker/ at the tank, wearing protective clothing, shoes and having a safety belt with a rope on and ready hose respirator on. The tool and the torch must be handed over to the worker inside the tank in a bucket.

§ 16. Before descending inside the tank it is necessary:

a) to check, whether the hose respiration device is operational and is functioning for 2-3 minutes to make sure, if it is easy to breathe in the mask;
b) to make sure, whether the outer ends of the hose and the safety rope are fixed to the handrails of the hood platform from the outside

to check, if the flexible hose with the clutch feeding the air to the respiration valve is fixed on the belt strap.

§ 17. When the washer is operating inside the tank, it is necessary for the second operator (upper worker) to stay permanently at the hood on the outside and watch the position of the safety rope, respirator hose of the operator, as well as the signals sent from the tank.

The worker inside the tank (the lower operator) and the operator at the hood (the upper) must interchange places. Simultaneous stay of both the 'upper' and 'lower' operators inside the tank is prohibited. By interchanging the places the "upper" goes down into the tank only after the washer comes out of it and stands at the tank hood.

§ 18. If the operator in the tank feels the penetration of gas smell under the mask of the respirator or feels bad, he must immediately go outside, call the team leader or some other person in charge, and check if the device is functional.
Only after finding out the reason of gas and vapour penetration under the mask and its removal and after complete recovery to the normal condition may he continue his work.

§ 19. On discovering the nature. of the unknown substance inside the tank the operator must immediately go up outside and announce to the team leader or foreman the nature of the substance and means of its removal.

§ 20. While wiping the interior surface of the tanks, the workers must use tarpaulin gloves, and when washing the hood and its cover - the protection glasses.

§ 21. Non-steel objects found inside the tanks are taken outside and the fallen ladder, bar and other steel parts must be transferred and removed outside after washing and degasification of the tank.

§ 22. Before tank treatment washers and fitters must check:

- if there are no people inside the tank;
- correct connection of vacuum, steam-pipe or water-pipe sleeve with the mains and the mechanized device, steam-siphon, steam-injector and the functionality and correctness of their installation. Tanks need to be steamed or washed with the hatch cover closed.

To avoid spark formation and prevent explosion of the tank, the hatch cover should be taken down smoothly without blows.

§ 23. While removing the residues of goods and waste water from the tank in a bucket ,it is forbidden to splash them on the exterior surface of the tank, or pour them out on the ground.

The bucket must be filled with the residues of goods and waste water at least up to 2/3 of the bucket's height; and the bucket must be lifted from the boiler with the rope by the worker, standing at the open tank hood platform.

§ 24. A special attention is to be paid to the strict performance of safety measures by preparation of tanks after drainage of blended /ethyl/ gasoline from them. Blended gasoline is a brand of gasoline with the touch of ethyl liquid, containing 50 % of tetraethyl lead.

Tetraethyl lead is able to accumulate :

- in the body and cause sharp and chronic intoxication, that appear not immediately but some hours later and even after 7-10 day's period;

- on the walls and floors of buildings, surrounding objects and clothes of workers.

Consequently, special attention must be drawn to the strict observance of safety measures for the preparation of tanks after drainage of blended gasoline.

§ 25. Getting people down into the tank from which blended gasoline has been drained, is permitted only after removal of the residues, and after washing and degassing the tank.

§ 26. It is prohibited to remove petrol, condensate or waste water in buckets. This job must be done only with a pump or a vacuum device.

§ 27. Each operator engaged in treatment of tanks containing blended/ethyl gasoline must in addition have a tarpaulin suit, boots, mittens and apron on. It is forbidden to work in protective clothes and use the means for individual protection polluted with blended gasoline,.

§ 28. By contamination of protective clothes by blended gasoline, it is necessary to remove them immediately, take a shower, put on clean protective clothes and in case of necessity also the underwear. By a small contamination of protective clothing the stains after blended gasoline may be washed off by pure kerosene.

§ 29. In all cases of hand contamination by the blended/ethyl petrol it is necessary to wipe hands by pure kerosene and wash them with warm water and soap.

§ 30. To watch the operator constantly inside the tank it is necessary to ensure the following signalling:

a) one jerk of the rope means: draw the hose and the rope, and by this they must be pulled after the signalling of 'the upper' and receiving response signal - one jerk- from the tank. If no response followed, urgent measures to extract the worker from the boiler must be taken as the jerk occurred, probably, because of his falling down;

c) two jerks mean: send down the hose and the rope: such a signal is sent to the worker in the boiler when he needs to move in the bottom;

d) three jerks mean: everything is all right. The rope and the hose must be pulled by the operator inside the boiler and that's why 'the upper' must hold the rope and the hose so that not to disturb their getting down and prevent their falling. As soon a the worker stopped moving he must give the signal of three jerks. The "upper", if not receiving signals after cessation of the rope and hose movements, is obliged to inquire by doing one jerk on which he must receive the response of three jerks;

e) two jerks with considerable period of breaks between them mean : "send the bucket down" or "lift" the bucket;
f) Repeated jerks of the rope, sent by the "upper" mean that the person in the tank is obliged to come up to the hood or go up. Similar signals, sent by the worker from down mean to take measures to extract him out of the tank.

§ 31. Before inspection and cleaning of bunker open wagons /ladle cars/ it is necessary to make sure that bunkers are fastened to the frame by hooks from both sides.

§ 32. One should go up and down the bunker only by ladder. Before passing from one bunker to another one must be sure that it is in order and the cover fixed firmly to the bunker. By non-availability of covers transition from one bunker to another must take place by means of scaffolds.

§ 33. Walking at the edge of the bunker and hopping from one bunker to another is prohibited. Before feeding steam into the steam jacket it is necessary to make sure of firmness of steam-pipe sleeve fixing to the bunker. Disconnection of the sleeves from the bunkers must be performed only after closing the tap of the steam-pipe mains.

§ 34. It is not permitted for operators to stay on the bunkers when turning upside down or setting in normal position.

§ 35. One may go down inside the bunker for repair only after removal of oil-bitumen out of it by heating and drainage of the latter in a standing position, setting the bunker in transport position and fastening it by hooks.

4. Electrical safety

§ 36. By lifting on the tanks and bunker open wagons located on special tracks of electrified lines, it is necessary to make inquiries with the foreman or team leader of the Washing Station that the voltage from the contact wire is off and it is earthed.

§ 37. On the sections with direct and alternating current, work without switching the voltage off from contact wires may be performed only without lifting on the tank wagons and bunker open wagons and under the condition that the workers do not approach themselves or through the objects in their hands, nearer than 2 m to the wires of the contact line.

§ 38. It is prohibited to touch the torn wires of the contact line irrespective of the fact, whether they touch or not the earth or the earthed constructions.

§ 39. Washers and fitters for repair and charging the valves after having found the break of the wire or other elements are obliged: to advise immediately the nearest duty post of the contact wire, station master-on-duty, train operator (dispatcher) or power supply operator, to fence this place before the arrival of the contact wire brigade and see that nobody approaches the torn wires at the distance of 10 m.

In case these torn wires or other elements of contact wire go out of the dimensions of the structures and can be touched by a passing train, this area needs to be fenced by stop signals as per the Signalling Instructions as the obstacle area.

§ 40. It is prohibited to touch foreign objects on the contact wires or thrown at them, for example, pieces of wire, ropes, cables and etc.

Washers, operators for filling and repair of valves, having found strange objects on the wires or other elements of contact wire are obliged to act similarly as by finding breaks of wire of the contact line.

5. Industrial hygiene

§ 41. Before taking a meal or smoking, the worker must wash his hands thoroughly with warm water and soap, and rinse his mouth.

§ 42. After work it is necessary to take a warm shower to clean the skin from contamination and to promote better blood circulation, relaxation and a calming down of the central nervous system.

By necessity (skin dryness, cracks and etc.) to use neutral ointment, paste or cream / boric Vaseline, lanolin cream on a doctor's prescription. Protective clothes and shoes should be kept in drying - room or dresser and the means for individual protection and safety belts with ropes - in lockers for work clothing.

§ 43. Wash - steam operators, operators for charging and repair of valves must take care of protective clothing and send them regularly for washing and repair.

It is prohibited to take protective clothes, protective shoes and means for individual protection outside.

§ 44. Taking meals or keeping foodstuffs at work places is not permitted.

§ 45. Washing and steaming operators , as well as fitters for charging and repair of valves, must:

g) apply regularly to the medical institutions to be examined in set-up terms;
h) be able to render the first aid in the absence of the doctor as per the Instructions.

Rules for rendering the first aid to the injured persons and medical care

At the washing and steaming station, a local instruction is in place, in which the order of notification of accidents with appliance of certain signalling is established.

Certain indicated areas and duties of each worker for rendering assistance to injured persons and accident liquidation are attached. All the workers become familiar with this instruction and are guided in their work.

For rendering timely assistance to the injured person, one reserve set of hose respirators with hose, two safety belts with ropes. the safety ropes must be contained separately in sealed wooden boxes with glass doors.

The boxes are to be unsealed weekly for control of the contents and then they are to be sealed again. First aid boxes are to be located near each box.

In the room for the worker-on-duty, the first-aid kit, and oxygen mask is to be available. There must be an oxygen bottle with regulator, resuscitation oxygen device /OAK-1/ at the first aid post. The room of the worker-on-duty, as well as the over-head platforms, are to be equipped with an electrical bell for sending signals to the first aid room, fire brigade, and the office.

The worker, taking the injured person out of the tank, is obliged to put on a hose respirator mask, then go down inside the tank, come up from behind to the injured, seize him above the elbows, bring him quickly to the tank opening and help him out of the tank, head first and hands down. If by doing this there are any difficulties, the rescuer, on taking the injured to the tank opening, must immediately change his hose respirator.
Masks must not be changed in tanks with a hydrogen sulphide smell, or sulphureous mazut,

The rescuer must remember, that an intoxicated person may be often not be of sound mind, and intoxicated with gasoline, ether, alcohol, or benzol vapours - in the same state but of a

wild form, and as a result they can exert resistance to the rescuer, sometimes hard, even striking a blow and biting. Therefore the rescuer must act resolutely, taking precautions by coming to the intoxicated person from behind, unnoticed, grasp him and press him to himself. The hands of the intoxicated must be pressed to the body to prevent him resisting. In most cases of light intoxication, the affected person becomes conscious again in the fresh air. After taking the injured person out of the tank, it is necessary to remove his head gear and the mask, and to loosen his shirt collar. In case of a heavy intoxication, it's necessary to loosen his belt, unfasten his clothes and take him out into the fresh air in the shade, and in winter – into a well ventilated room, and to render first aid before the doctor arrives. In case first aid measures do not help, artificial respiration as per one of the methods used in medicine must be applied. Artificial respiration must be carried out until the injured person starts breathing independently. One should bear in mind, that sometimes artificial respiration must be carried out for 2-3 hours or more, and only after that normal breathing starts.

Artificial respiration must be carried out when the injured does not breathe or breathes with long intervals between breaths. Artificial respiration must be started immediately. Before starting artificial respiration, it is necessary:

i) to release quickly the injured from his garment, undo his collar, untie his scarf etc.;
j) to remove any slime from his mouth the, remove dentures, if any;
k) to bring forward the lower jaw by tightly pressing jaws is necessary so that the lower teeth are a little forward.

All workers in railway transport must be able to carry out the artificial respiration and indirect heart massage.

Artificial respiration, performed by one person (first method)

The injured person must be put on his stomach , his head must be turned on one side and put on the hand of the injured. After that one should stand up on his knees over the injured with the face to his head, so that the thighs of the injured are between the knees of the person, rendering assistance, and put his palms on the back (lower rips) of the injured, grasping him with folded fingers from sides.

Bending forward and leaning on his stretched hands, press the lower ribs of the injured breathing out, then without taking the hands from the back of the injured, to lean back quickly. After 2-3 seconds all the movements must be repeated.

Artificial respiration, performed with the help of assistants (second method).

The injured person must be put on his back, a soft roll of cloth, etc. must be put under his shoulder-blade so that the head of the injured is leaning back, draw out the tongue and hold it, drawing it slightly to the chin. After that, standing up on the knees over the head of the injured the performer must seize him by the hands at the elbow and press them without much effort to the sides of his breast, breathing out. Then lift the hands of the injured up and put them behind his head, breathing in, after 2-3 seconds it must be repeated.

The artificial respiration "from mouth to mouth".

The injured is person is put on his back, with his face up. The face is covered by gauze or handkerchief. The performer stands at the head of the injured, makes a deep breath and then through the gauze or handkerchief blows air directly into the mouth of the injured person. The nose of the injured person must be held and the lips of the performer must be pressed tightly to the mouth of the injured person.
As soon as the thorax of the injured person, after blowing into his mouth, is expanded enough, blowing must be stopped and the thorax will fall. 12-14 of such blows must be made in a minute. If there is a soft rubber pipe of sufficient cross section, then artificial respiration may be carried out by introducing the pipe into one of the nostrils. The other one must be held

and air blown into the lungs through the pipe. The rubber pipe is introduced into the nose a distance of 10-12 cm.

If special air is available,– drain pipe, artificial respiration is made by a mouth-to-mouth method. Both ends of the pipe are bent equally by the shape of the tongue. Any of them must be introduced into the mouth of the injured person, and the loose end is taken into the mouth by the performer.

Artificial respiration by means of the portable device RPA-1 accordion, applied on the spot may be referred to the means of pre-medical assistance. The mask of the device is put tightly on the face of the injured, closing his nose and mouth, then connected to the 'accordion', air is pumped into the lungs of the injured person with a frequency of 15-18 breaths per minute, and a volume of air of 1-2 l.

Indirect heart massage.
One should immediately start indirect heart massage. when carrying out artificial respiration. The indirect heart massage is performed on the unnaked thorax.

To carry out massage the injured person must be laid on his back with his head back and his chin up. At the same time artificial respiration is carried out.

After making the thorax the lower end of the thorax is identified. The massage performer stands to the left of the injured, unbends the left hand and puts it on the lower part of the thorax. The massage performer puts the palm of his right hand on the inner part of his hand and presses in the direction of the spine, trying to cause clenching of the heart between the thorax and the spine. Pressing on the thorax must not be extremely hard to avoid rips and thorax breakage. After each grasping /pressing/ on the thorax, performed as a jerk, the massage performer takes away quickly hands from the thorax of the injured, letting it straighten. After 3-4 pressings a pause of 2-3 seconds is made. Applying heart massage, it is necessary to make 50-60 pressings a minute.

When acid is ingested, a solution of bicarbonate of soda must be given: one tea-spoonful in one water glass or a solution of burnt magnesia– two tea-spoonful to one glass of water or milk, or soap water. At the same time the mouth should be rinsed with a soda solution. In case of ingestion of caustic alkalis, weak solutions of lemon or acetic acid are used, and a 1% solution of lemon or acetic acid is taken as well as warm milk. With alcohol intoxication - wood, denatured alcohol, it is necessary to cause vomiting and provide the inflow of fresh air. The injured person must inhale an ammonia solution cautiously - take a dilute ammonia solution of 5-10 drops in one glass. A cold compress, ice, is put on the head of the injured person. With gasoline /kerosene intoxication it is necessary to cause vomiting, to supply fresh air, and give milk and valerian tincture - 20 drops per glass of water.

If irritants get into the eyes, they must be washed carefully and abundantly by 2 % solution of boric acid or clean water.

With skin burns through hydrochloric acid, either cotton wool must be put on the affected place for absorbing the acid, or the acid must be washed off by a jet of water. The affected place is then powdered with soda, and a bandage with ointment is put on it. With burns from caustic alkali, the affected place is treated by 1-2 % solution of acetic acid or diluted vinegar with subsequent washing off with water.

In case of injuries and wounds they are treated by iodic tincture and bandaged.

The employees of the washing station are allocated milk or substitionary products daily before work starts, as well as soap, in accordance with the order established by the Administration, coordinated with the trade union committee of the station.

The working hours for tank washers and repair and valve filling operators is 6 hours per day, and, as well, additional leave of 12 working days is granted.

Medical attendance on the workers is carried out around-the-clock by the dispensary staff, which is compulsory at the washing station. Medical workers render first aid to the injured workers, carry out occupational intoxication and traumatism prevention service, as well as sending workers with complaints on bad health condition for the urgent medical examination.

Medical diagnosis and prescriptions, at the result of medical examination are compulsory for the Administration and the workers of the washing station.

The dispensary must be located on the ground floor of the building and provided with the necessary medicines, instruments and apparatuses for rendering assistance.

Posters, with tips for rendering first aid in case of loss of consciousness, burns, traumas and intoxication must be displayed.

6. REQUIREMENTS FOR WELFARE ROOMS AND FACILITIES.

At the washing station, emphasis is laid on setting up of good welfare conditions for workers dealing with tank treatment. During tank treatment, clothing, shoes and parts of the body of the workers are contaminated with residues from the tanks. Consequently, the following welfare amenity rooms must be provided at the Balajari Washing Plant:

- cloak-rooms with individual lockers for clothes - 110 places
- room for keeping means of individual protection - 5 places
- the room for drying protection clothing and shoes - 60 cu. m
- showers for men - 4
- shower for women - 2
- wash rooms with hot and cold water - 8
- heated lavatories
- laundries for washing and cleaning protective clothing - 1
- a mess room - 1 - 40 sq. M
- a rest-room - 16 sq. M
- a ladies' room - 1

For chemical cleaning of working clothes, a type KX-014 machine is installed. The laundry for washing protective clothes is equipped by two washing machines CMT-50 and two EP – 10 centrifuges.

For workers engaged in cleaning of tanks containing ethyl /blended/ gasoline, the showers, cloak-rooms and amenities block are located separately from other rooms and close to the tank treatment areas.

In drying rooms, clothes drying must be done during the rest time of the tank washers team. This is achieved by equipping them with relevant heating and ventilation systems. In the showers, individual mixers for cold and hot water are installed to exclude the danger of burns. Sanitation rooms at the Washing station are coated by materials that not subject to contamination and easily cleaned walls, concrete floors etc. In the laundry extraction ventilation is installed.

At the washing station all the amenity rooms must be set up and equipped strictly in conformity with the established norms and rules for their construction, taking into account their sizes and numbers and the personnel numbers.
For a short period of rest and warming of those working on the open platforms the room with telephone communication is available.

7 REQUIREMENTS FOR WARNING SIGNS AT STRUCTURES AND FACILITIES LOCATED IN THE AREA OF THE WASHING PLANT

At the washing station, the structures and facilities that may cause danger for the workers, remaining in or moving along the area of working places, must have warning signs. Such places are:

- hot water pipe-lines
- steam-pipes
- pipe-lines of the vacuum system
- over-head platforms
- pipe-line network of the boiler system,
- fire-prevention measures and facilities for fire extinguishing,
- locking taps, end taps, valves, bolts, taps on pipe-lines,
- gas pipe-line and its elements,
- handrails, railings, over-head platform fencing

The Manager of the Washing Plant is granted the right to include additional structures and extra installed facilities, capable of being a source of traumatism, into the list of constructions and facilities requiring warning signs.

The ends of the gantry platform are painted with yellow and black warning signs. The width of yellow and black stripes must be 100-200 mm.

Depending on the purpose, the pipeline network is painted different colours: the steam-line - red, hot water pipe-line – green, vacuum system – brown, cold water pipe-line – blue. Fire-prevention shields and fire-extinguishing tools - red. Gas pipe-line – in black. Handrails, and platform fencing are painted in main colours of the warning signs: yellow and black. The lacquer and dyeing materials applied must correspond to the nature of material to be painted and operational conditions of the object. The coverings must be smooth, without stains, not flake off and aggravate the operational features of the materials, from which the objects are made.

Warning signs are to e restored and renewed systematically.
It is also necessary to install warning, directing indicating signs as per GOST-12.4.026-76; OST-32.4—76 requirements.

8 REQUIREMENTS FOR KEEPING TO ESTABLISHED NORMS OF ARTIFICIAL LIGHTING AT THE WORK PLACES FOR TANK TREATMENT.

At the Washing Plant the artificial lighting is installed for operation of tank treatment facilities in darkness. With the aim of improving conditions and labour safety, the arrangement of artificial lighting are to be guided by the construction norms and rules CN and P 11-4-79 /"Natural and artificial lighting. Norms and rules" / SN-245-71, section 7 SN and P-10074 /, Rules for installing of electrical facilities /PUE/, 1976 and Rules for technical operation of consumers electrical facilities.

The facilities for artificial lighting on the working places must also be in line with the requirements of the industrial standard of labour safety. OST-32-9-81.

For such objects as the washing and steaming station, lighting devices must be used, with halogen lamps of capacity 1-10 kW and gas-discharging light sources of the type DRL, DRI DKsT.

The intensity of illumination at the washing and steaming station and for loading of oil–products must not be less than 20 lux on the floor surface of the over-head platform, and at the tank hatch.

The surface of the railway track bed at the washing and steaming station must have illumination of at least 2 lux.

Portable 12 V artificial lighting with illumination of at least 1 lux is envisaged for performance of works inside the tank.

The rates of illumination of offices and technical premises, units, of the washing and steaming station, depending on the system of lighting, are given in the table, where the illumination by fluorescent lamps is given without brackets and in brackets by tungsten lamps. Index G is the horizontal plane of lighting; after the hyphen – the figure, indicating the height above the ground level in metres.

N	Names of shops, sectors of working places of the wash station	Plane, surface of illuminat. Rating	Background	Category and subcategory of visual work	Illumination, lux combined illumination General+local	General illumin.	General illumin.
1	2	3	4	5	6	7	8
1.	Washing over-head platforms	G	-	VI	-	-	/50/
2.	Regeneration department	G	-	VI	-	-	/50/ 100
3.	Laboratory	G-0,8	Average	IV,a	/600/ 750	/75/ 150	/200/ 300
4.	Mechanical department	G-0,8	dark	V,b	200 /150/	150 /50/	150 /100/
5.	Department for protective clothes		-	VIII,a	-	-	/75/
6.	Drying rooms		-	VIII,b	-	-	/50/
7.	Rooms for reservoirs and extraction tanks		-	VIII,a	-	-	/75/
8.	Rooms for cleaning facilities		-	VIII,b	-	-	/50/
9.	Boiler platforms for boiler servicing		-	VI	100	-	100

Lights with explosion proof performance are used on over-head washing platforms

9 FIRE SAFETY REQUIREMENTS

The washing station is a fire hazard due to availability of residues of oil and oil-products in the tanks. During the treatment of tanks there exists a real danger of fire, and explosion from contact with the open fire, on the open platforms, oil traps, fuel warehouses where easily-inflammable oil-products /gasoline, kerosene, benzol, etc./ are available

On the area of the washing and steaming station, it is strictly prohibited:

- to light fires
- to smoke in other than at a specially designated place.
- to use gasoline, kerosene lighters, lamps, lanterns and other devices operated with a naked flame.

For securing of fire safety on the industrial sites, technique and facilities for fire extinguishing must be used and be functional. in all workshops, warehouses and on the area of the Washing station.

There is a reservoir of 60 cu. m with a permanent water supply at the washing station. It is necessary to have devices available to supply water from the pool to the place of fire extinguishing.

The washing station, as a high fire hazard risk, where the use of water in certain places and industrial sites as a fire-extinguishing mean is not allowed, chemical facilities (with carbon dioxide and with the specific composition) need to be installed for fire-extinguishing.

It is necessary to equip certain fire-hazardous parts of the washing station with signalling devices in systems of automatic fire protection of the manual start-up, that notifies the reception station of fire and brings the system of automatic fire-extinguishing into operation.

Fire-extinguishers, fire equipment, fire hand tools, fire and other facilities are applied for the purpose of fire-extinguishing.

Fire-extinguishers of the type:

OXP-10, OP-M and etc. (chemical, foam) are used for extinguishing of fire of solid materials as well as various fuel-liquids on the area at least 1 sq. M, with the exception of live electrical installations.

Carbon dioxide fire-extinguishers (OU-2, OU-5, OU-8 and others) are used for fire-extinguishing of liquid and solid substances as well as live electrical installations.

Spray - carbon dioxide- ethyl bromide (OUB-3A, OUB-7A and others) are used for fire-extinguishing of oil products as well as in electrical equipment under voltage.

Powder (OP:OP-10) are used for extinguishing of oil products combustion, highly-inflammable liquids, solvents, solids, including alkali-earth materials as well as for fire-extinguishing in electrical devices.

The fire facilities:

- hydrants, fire and underground, are intended for taking water from the external water-pipe.
- fire column - for opening and closing of underground hydro -tap
- fire cocks – for connecting pressure fire hose to the internal water-pipe mains.
- foam-mixers - for obtaining foaming water solution.
- the foam generators – for obtaining jets of air-mechanical foam from water solution
- foamer - for extinguishing fire of easy-inflammable and hot liquids
- fire barrels - for obtaining of powerful water jets:
- fire hoses - for transportation of water and water solutions;
- connection hose heads - for connection of fire sleeves /hoses/.

To the fire manual tools belong axes, hooks, crows, saws, scissors that are used by fire-extinguishing for opening and dismantling of building constructions, cleaning of rooms.

The fire facilities:

- water kegs - for water storage
- fire buckets – for water transportation
- boxes for sand - sand storage
- boxes of fire cocks - for fire-cocks storage
- fire stands /shields/ - storage of instruments

- asbestos material –for extinguishing of small fire hotbeds.

At the industrial sites, workshops at the units of the Wash Plant the installation for automatic fire-extinguishing facilities with the compulsory air supply to the foam-mixers is needed.

Rates for equipping industrial areas of the washing station with fire extinguishers, fire facilities:

N	Name of the object	Measuring unit	Number of fire-extinguishing facilities			
			Fire extinguishers		Sand boxes - 0,5 cu. m with shovel	Felt or asbestos blankets
			OXP-10 OVP-10	OU-2 OU-5		
1	2	3	4	5	6	7
1.	Washing grounds	every 15 m	1	-	1	-
2.	Over-head washing platforms	every 15 m	1	-	1	-
3.	Oil traps & sediment traps	50	1	-	1	-
4.	Grounds for wagon cleaning	every 15 m	1	-	1	-
5.	Vacuum-pumping stations	??	-	2	-	-

10 REQUIREMENTS FOR SELECTION OF LABOUR, AND TESTING OF KNOWLEDGE OF LABOUR SAFETY OF WORKERS AT THE WASHING PLANT

At the Washing station the establishment of the employees according to the planned volume of works and estimates per the approved staff planing is 115 persons, out of which managerial staff –18 persons, employees – 97, among them women –50. There are no persons under age working at the washing station.

Employees and specialists are trained in safe labour methods. Technical training in labour safety is held, as well as the planned technical training, with the purpose of professional selection and preparation of personnel for working on the industrial sites of the washing station.

As per the acting industrial standards of training and testing of knowledge in labour safety, five types of instructions in labour safety are conducted - introductory, primary instruction on the working place, repeated, additional, and current, instruction.

Except for the labour safety instructions, the primary and repeated examination of labour safety knowledge with compulsory training of newly hired for certain positions with the indication of the time of instruction is envisaged.

All the instructions and training carried out, and the primary testing of knowledge in labour safety, is registered into the special log for registration of instructions as per the established THY-19 form.

Carrying out the introductory, primary instructions in labour safety, training and holding of the primary testing in labour safety are marked on the rear of the Order for employment for the newly employed persons as per the Form T-1 or for persons transferred to another job at the same enterprise, as per the Form T-5.

In the Order for employment, the registration of training carried out in labour safety is also done. According to the calendar plans for technical training in the matters of labour

protection, training of workers of the washing station is envisaged quarterly. Training in safe labour methods at the trade - improvement courses must take place at least once in 5 years.

The employees, engineering staff of the washing station, not covered by the systematic technical training must attend special courses in labour safety at least once every two years.

Training in labour safety by technical training and trade-improvement courses is conducted by the engineering and managerial staff of the enterprise, workshops foremen, medical workers, guest legal advisers, technical labour inspectors of the Railway trade union organization, boiler supervision body, energy supervision body, the staff of the 'Labour Safety' Instruction Wagon, and teachers of educational institutions.

Managers and engineering staff, employees, workers, specialists and junior personnel undergo a periodical testing of knowledge with the aim of checking the level of competence in labour safety. It is necessary to check the knowledge of labour safety of the managers in the process of operation. The examination must be held at the order of the higher organisation.

Periodical testing of knowledge is conducted by the specially composed commission and in terms set up by the Requirement OST-32-36-83.

At the washing station, courses in labour protection are conducted for training new employees with the purpose of studying labour protection courses and matters of ensuring labour safety under local conditions, as a rule with persons without having any qualification and taking professional training

Professional training of newly employed workers is carried out during theoretical studies of the industrial training.

Industrial training is carried out by the engineering staff, a qualified worker- the manager of the industrial training with the work service in his profession at least 3 years.

The thematic plan for the standard programme for conducting technical studies and improvement courses include:

	Subject	number of hours Training	improvement courses
1.	Legislation in labour safety	6	3
2.	Basis of industrial sanitation and labour hygiene	6	3
3.	Prevention of industrial traumatism and occupational diseases	4	2
4.	Electrical safety	6	4
5.	Fire safety prevention	4	2
6.	Occupational Instruction in labour safety	12	6
	Total:	**38**	**20**

If needed, depending on the industrial peculiarities of the occupation, the number of hours for study of The Occupational Instruction may be increased.

Training, taking place at the wash station is aimed at getting the practical habits of safety in performing labour operations on the working place, and is conducted under supervision of the leader of the training. It may be a foreman, team leader, or qualified worker having work

service in this profession at least 3 years; training of engineering personnel is carried out by the heads of industrial sectors, workshops, and other subdivisions of the washing station .

Training is carried out after primary testing of knowledge. Duration is from 2 days up to one month depending on the position.

Training is conducted for workers and engineering staff connected with the jobs of increased danger.

Workers and engineering personnel of the washing station, engaged in technological process for treatment and preparation of tanks, must regularly be medically examined by entering the job and periodically as per the order established by the Health Ministry of Azerbaijan Republic (The Order of the Health Minister of Azerbaijan Republic N 300 of January 1998).

The staff, having undergone a special training for operating the devices for tank treatment and examination of knowledge, are issued with special certificates for the operating facilities of the technological process.

Persons dealing with the technological equipment such as electrical-technological personnel, must have at least the II group in electrical safety training. Persons engaged in repair and start up of electrical equipment, must have the group in electrical safety training in accordance with the requirements of the Rules for technical operation of the electrical equipment. For the persons mentioned, periodical, at least once a year, examination of knowledge in safe performance of work is arranged, conducted by the commission, approved by the Director of the washing station.

11 CONTROL AND RESPONSIBILITY FOR COMPLIANCE WITH LABOUR SAFETY REQUIREMENTS

The washing station as an enterprise with continuous process of work is the object of increased danger.

The control of safety requirements of relevant services /departments/ and organizations is established for undertaking the technological process of tank treatment, with uninterrupted and stable production process for fulfillment of the set up,

Control of labour safety is carried out by:

- the department for labour protection of the Azerbaijan State Railway;
- fire supervision department of the Railway;
- sanitation supervision department and medical and sanitation department of the Railway;
- boiler supervision of the Railway;
- energy supervision department of the Railway; technical labour inspection of the trade union committee of the Railway;
- environmental inspector of the Railway

The controlling bodies indicated, exercise departmental control of condition for safe performance of work at the washing station. In line with the departmental control, control is carried out on the part of relevant bodies of territorial, city and republican administration.

The safety requirements control must be carried out:
- at the stage of design and reconstruction – by estimation of all rated safety parameters;
- at the stage of commissioning – by measuring on the part of the relevant competent bodies by making measurements by controlling devices and visual survey;
- in process of operation – periodical certification of working places, with data conformity requirements of the technical passport data of the enterprise;

- control for the electrical safety conditions – annually, as per the Technical operation Rules at the electrical devices;
- control of fire safety – annually as per the instruction requirements.

At the Azerbaijan State Railway, a three-step control system for the condition of the labour safety, keeping of technical safety rules and other normative acts at the enterprises, including the Balajari Washing station, acts, declared by the Order of the Chief of the Railway N 200 of 11.11.92. is valid.

The first step is carried out by foremen, workshops managers, or other heads of subdivisions of the washing station once in a year.

The second step is conducted by the management and a person in charge for the labour safety of the Washing Station, taking monthly control of the execution of the first step.

The third step is executed by the management and the person in charge for the labour safety of the "Wagon Service" Production Union, as well as by the workers of the higher controlling bodies once a quarter. They make control for the first and second steps. All remarks on carrying out of third step labour safety control system are registered in relevant log.

The immediate control for implementation of all requirements for labour safety must be carried out by a labour protection engineer, who must fulfill only his occupational obligations.

The control of the general state of performance of the labour protection is carried out systematically by the chief engineer of the washing station. He also makes control for the activities of the labour safety engineer.

The control for keeping labour safety norm requirements is also conducted by the deputy head of the Washing station, in charge of certain industrial sectors, workshops and other objects.

Keeping of labour safety Rules is an integral part of performance of the technological process of the enterprise.

Therefore the control for execution of technological process is the responsibility of the technologist of the washing station.

The responsibility for execution of all requirements, norms and labour safety rules established at the Wash station as per the requirements of the adopted "Law on Labour safety " of September 29, is laid on the Manager, labour safety engineer of the Wash station.

The responsibility of the management and the person in charge for the state of labour safety at the wash station is also regulated within the scope of commitments for fulfillment of personal participation normatives in the work for observance of labour protection norms, declared by the Order of the Azerbaijan State Railways, N 76-H dated 07.04.93.

Drawn up by:

Deputy Head of the technical department
for labour protection of the Railway — Ibragimov T.T.

Engineer of the technical department
for labour protection of the Railway — Nadjaf-zade D.K.

23/11/98
Architecture-Project-Production Co-operative "Kontur"

Order 98009

BALAJARI : RECONSTRUCTION OF WAGON WASHING STATION

Technical proposals

(see file lyubacom.doc)

General Technical Information **APPENDIX 5**

23/11/98

Architecture-Project-Production Co-operative "Kontur"

Order 98009

BALAJARI : RECONSTRUCTION OF WAGON WASHING STATION

Technical proposals

General explanatory note

1998

Architecture-Project-Production Co-operative "Kontur

Order 98009

BALAJARI : RECONSTRUCTION OF WAGON WASHING STATION

Technical proposals

General explanatory note

Chairman of APPC "Kontur" _____ L. A. Lavrenchuc

Chief engineer of the project _____ N. V. Lavrenchuc

1998

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PROJECT COMPOSITION

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LIST OF MATERIALS STORED IN THE ARCHIVES

1. Correspondence, according to the internal inventory.

2. Report on topographic and geological calculations, carried out by the staff of the co-operative.

3. Topographic photo on a list of paper.

4. Measuring Drawing

(Russ-page 4)

COMPLIANCE OF PROJECT PROPOSALS WITH VALID NORMS AND REGULATIONS

All the technical proposals in this working project were worked out in full compliance with the actual rules and norms, including fire and explosion safety rules.

Implementation of this project is entirely safe, if fire and explosion safety rules are followed.

The project has been worked out on the basis of the use of approved typical construction and equipment in serial production, containing defensible technical solutions.

The project was worked out on the basis of traditional technical solutions and contains new scientific achievements.

The project would be constructed in one stage.

Chief engineer of the project_____N.V. Lavrenchuc.

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EXPLANATORY NOTES

1. GENERAL

This project has been developed on the basis of instructions of Azerbaijan State Railways, and also by the railway rehabilitation and reconstruction development plan prepared by TACIS.
Reconstruction of equipment and structures for steaming and washing of tank wagons with an increase of the number of wagons to be cleaned will take place on existing plant at Balajari station.
Construction of additional structures and facilities will take place to provide the operation of new facilities compatible with the existing equipment at the plant, and not to interrupt the main process of preparation of wagons for use.

After reconstruction the capacity of the plant will be as follows:

Steaming and washing of wagons for the transportation of light oil products	250 wagons per day,
Steaming and washing of bitumen wagons	5 wagons per day
External washing of wagons	24 wagons per day.

The project includes:

The extension of the boiler room, installation of two additional boilers, proposed by TACIS.

Construction of a new plant for external washing of wagons.

Installation of two sets of equipment for purification of effluents from the steaming and internal wash of tank wagons, and wagons for bitumen.

Repair and partial reconstruction of existing water treatment equipment.

Installation of new water treatment equipment for external wagon wash.

Reconstruction of overhead platforms for wagon steaming;

Reconstruction of track work.

Repair and partial reconstruction of subsidiary buildings and ancillary facilities.

Reconstruction of communication system, installation of additional equipment for dispatching link to the station, and installation of loudspeakers at site.

Reconstruction of electricity supplies system, augmentation of transformer substation at the plant.

(contd)

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Extensive repair and reconstruction of the in-site drainage / water supply and heating systems.

Installation of a new gas supply pipeline of medium pressure, as per the instruction of "Bakgas" Gas Company.

Relaying of external electricity cables and communication lines, as per the instructions of "Avglavenergo" and the Ministry of Communications.

The project has been developed in accordance with the topographical and geological surveys, carried out by APPC "Kontur" in 1998;

Climatic region of the works is IVB, seismicity - 8 degrees, the category of the soil at works 33b and 34b, water is observed at depth up to one meter, water flow out of the soil at works is 30-40 cub. m per hour.

The rated relative resistance of soil on embankments is 1.0 kg per sq sm. and for sub soil 1.8 kg. per sq. cm.

Snow cover is steady, depth of freezing of soil in winter is 0.4 - 0.5 meters.

Rated temperature is -4C;

Civil defence measures are not envisaged.

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2. FEASIBILITY SECTION

Reconstruction of the washing station is envisaged by the approved TACIS programme /Annex ** / and after implementation will ensure complete preparation of tanks for loading or repair.

*

*

Delivery of equipment for extension of the boiler-room, purifying facilities, over-head platforms for interior washing out of bitumen from tanks and wagons, the plant for the exterior washing of tanks – all these have been considered in the resolution for implementation by the TACIS programme.

General construction works, designing, obtaining approvals from different authorities, settlement of issues as regards the linking of communications to the enterprise and their construction, are to be implemented using Railway funds.

Detailed description of works is reflected in respective chapters of the Explanatory Note for each section.

*

Complete specific consumption of material and power resources and their comparison with the analogue are reflected in Table 1.

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3. TECHNICAL SECTION

(nothing received from ADDY by 28th November 1998)

4. TRACK DEVELOPMENT

(Exterior Wash)
Due to the installation of equipment for external washing of wagons prior to steaming and subsequent washing of interiors, is necessary to reconstruct the trackwork at the external wash to replace the existing siding.

An additional siding is required to be provided for marshalling and holding wagons, by-passing the wash plant.

All the alterations to the trackwork will be within the confines of the washing station.

(Interior Wash)
In order to improve working conditions at the platforms, new drainage channels for wash effluent from the wagons will be constructed along the centre line of the tracks under the platforms, together with the reconstruction of the tracks.

Track laying under the platforms will be done on half sleepers. Rails on the sleepers are located on the straight profile on the site.

Sub-grade will consist of drainage soil. Excavated soil and ballast will be removed from the site to the area designated by the city authorities for waste disposal.

Drainage of water from the tracks is dealt with in the chapter - " Organisation of public services and amenities".

Rails of R-65 s/g type are long welded from 25 m. lengths. Sleepers are concrete with spacing of 1840 / 1600 per km. Crossovers are 1/9 type P 50.

Ballast is from a quarry from the Shamkhor region, laid to a depth of 20 cm. below the rails.

To prevent any slippage, a support wall will be installed along the length of the wash line.

Quantities : Length of track to be relayed - 2970 linear metres
Points m 1/9 13 items.

Out of which:

1) <u>For exterior wash plant</u> :
1. Dismantle track (R-5- rails) - 270 linear metres
2. Slewing of track - 160 linear metres
3. Lay new track - 700 linear metres
4. Points of the 1/9 type with R-50-6

2) <u>Over-head platform for bitumen wagons</u> :
1. Dismantle track with R-50 rails, spacing 1600 sleepers/km - 200 linear metres
2. Relay track - 200 linear metres

3) <u>Over-head platform for interior tank cleaning</u>:
1. Dismantle track with R-50 rails, spacing 1600 sleepers/km -1670 linear metres
2. Track relay with new additions -2040 linear metres
3. Switches 1/9 type, new - 4 sets
4. Switches 1/9 type, dismantle and relay - 3 sets

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5. GENERAL PLAN.

The general plan for reconstruction of washing station is worked out, according to the tasks for designing, data on technological placement of additional constructions for increasing the number of wagons. The topographical photos, made by APPC "Kontur", plan of track development, technology of production, were used for preparation of the General Plan,.

Co-ordinates system - B - local
High system - Baltic

Main indicators by plan:

Site area	90,000 m.^{2}
Buildings	18,300 m.^{2}
Surfaced area	16,500 m.
Area of tracks	m.
Planted area	55,200 m.
Percentage of planted area	61 %
Percentage of built up area	20.4 %

The site of the station to be reconstructed is located on the east to Balajari settlement, on south side of the main railway line Balajari-Baku.

The territory of the station is of 600 m long and 150 m. wide.

Entrance to the station site is from Guseynov Street.

The layout of the station is flat, inclining from the north to south, with most fluctuation from the side of soil railway track.

According to the General Plan equipment for external wash and overhead walkways for steaming of wagons will be located at the level of the railway and ancillary building and structures, related to them, will be at a lower level. This creates possibility for gravity flow for effluents and for purification and recycling.

The creation of an ecologically clean climate on the site of the steaming station ,all the access roads, paths, and rest places for personnel are currently covered by asphalt, the rest of the area, free from structures and buildings are planted, giving not only pure air, but also security from strong winds.

The site is fenced off by stone and net enclosure.

The station consists of the following equipment

1) Equipment for external wash.
2) Overhead walkways for steaming of wagons.
3) Water treatment equipment.
4) Administrative and amenity block.
5) Boiler room.
6) Power substation.
7) Boundary walls.
8) Oil trap building.

(Russ- page 10)

6. ARCHITECTURAL AND CONSTRUCTIONAL PROPOSALS.

Installation of equipment for external washing of wagons.

New external wagon wash equipment is designed for installation instead of old one. Size of the construction for the equipment of external wash will be as follows - 36 m. X 9m. high - 5.5 m.

Building will be made of light fencing and bearing constructions on concrete basement.
The complex of external wash includes:
Operator's room.
Place for installing of washing machine.
Reservoirs for collection of waste water after wash.
Pumping station.
Flotation device.
Reservoir for purified water.

Overhead walkways for steaming wagons.

Existing overhead walkways, length 172 m., would be repaired, according to the plan of extension of the site of serving and strengthening of bearing constructions.

Channels for the effluents, according to the design plan, will be located directly under the wagons, between the rails, and will create possibilities for fast flow of the effluents after steaming and washing of wagons.

All effluents will flow to one channel and go towards ... [the existing sand trap.]

Instead of the old surfacing of the site of the overhead walkways, according to the plan, new surfacing made of corrugated steel on top of the metallic channels.

Water treatment equipment.

Because of new technological sets, on the existing site of the water treatment devices, additional constructions will be placed:
Container with the size 12 X 2.4 X 2.4 m., sedimentation - 40 cub. m. - 2 items.
Container with the size 6 X 2.4 X 2.4 m., receiving volume - 28 cub. m - 2 items.
Container with the size 12 X 2.4 X 2.4 m., flotator - Q=12.5 cu. m/hour - 2 items.
Container with the size 6 X 2.4 X 2.4 m., flotator - Q=5 cu. m/hour - 2 items.
Reservoir for heavy oil (mazut) with volume 40 cu. m.
For all the above mentioned items, concrete bases are envisaged.

Administration and amenity building.

Existing 2-floor building need to be repaired.

Boiler room.

Existing boiler room is partially need to be extensively repaired.
Installation of two new boilers of high pressure on a separate base is in progress.

Electricity supplies substation.

Existing building for electricity supply substation needs to be extensively repaired.

Boundary fences of the plant.

Stone and net fences fence of the site of the plant. In the design plan the extensive repair of existing fences and construction of additional fences is foreseen.

Building for mechanical oil trap.

Existing plant needs to be repaired.

(subsequent Russian pages not sequential)

According to the regulation of Bakgas, gas is accepted as a fuel for the boilers both new and old. Heavy oil (mazut) is an option.

Heating capacity of the fuel:
Gas - 800 kcal/hour.
Mazut - 9620 kcal/hour.
Fuel utilisation for boiler room after reconstruction would be:
Gas - 1 700 nm cub/hour.
Mazut - 918 kg/hour.

For supply of mazut to burners, which are the part of set of supply, the installation of utilisation tank and two pumps type RZ-3A is planed.
Supply of mazut to burners and burning of the fuel will be automatic and provision of necessary equipment for that purposes will be done by the manufacturer.

7.2.2 In-site heating network.

Heating load on the heating system is 8490000 kcal/h.

Primary heat bearer (steam in the net) comes to the heating point, planned in the technical documentation of the steaming station. It is planned to install boiler in the heating point for preparation of the heat bearer with the following parameters:

a) overheated water 150-70 ^{0}C - for heating and ventilation systems.
b) hot water t=65 ^{0}C - for supply of the hot water and washing of wagons.
c) steam = 3 atm. for technological needs of steaming of wagons.

Laying of the heating net is planned to be partly in channels and partly on overhead supports.

Compensation for expansion is allowed for by bends in the lines and U shaped compensators. There are valves in both upper and lower parts for bleeding air.

Heating, ventilation pipes ,and pipes for technological needs are to be electrically welded, made of steel, according to the GOST 10704 - 76, and for hot water supply - steel electrically welded pipes by GOST 3262 - 82.

It is planned to lay the pressured air and steam supply pipes for technological need within one heating net.

All the pipes to be insulated. The composition of the insulation materials to be as follows: anti-corrosion layer - isol of two layers by cool isol mastic type MPB - X - T 15;
main layer - mineralised wool.
surface layer - rolled material made of glass and plastic.

Heating loads by the equipment are given by the calculations of heat loss (see appendix).

7.3 Heating and ventilation.

The plan of reconstruction of heating and ventilation of existing and to be built constructions is worked out according to CNAR 2.04.05 - 92 "Ventilation, heating and conditioning of air".

Rating of the system of heating and ventilation is done for the temperature of external weather at - 4^{o}C. Bearer of the heat would be the hot water (150-70 ^{o}C; 95-70 ^{o}C). The decreasing of the temperature of the water will be through elevator.

Heating devices - radiators and convectors. Pipes for heating system and heat supply of radiators will be of steel GOST 3262-80 (for water and gas supply).

New ventilation systems to be installed after the repair of all the buildings are worked out according to the BNAR corresponding to the allocation of the premises.

According to the reconstruction plan all degassing equipment for degassing of the wagons after the wash will be completely replaced.

8. WATER SUPPLY, TREATMENT, AND DISCHARGE

The current section of the present project has been developed on the basis of requirements, expressed in technological process by washing and steaming of tanks and in compliance with the needs of the whole enterprise.

The source for water supply is the existing water-pipe, laid inside the enterprise..
Total consumption of water for household and technological needs make up 1,377.84 m^3 / day.

Complete explanation for water consumption and discharges into sewerage is reflected in the Table of Consumption, see Annex N 4

In this section the following is described:

1. Inter-site water pipe-lines to all buildings of the enterprise;
2. Drainage for domestic sewage and industrial effluents.
3. Cleaning facilities for industrial effluents.
4. Re-circulation water supply.
5. Fire-safe measures.
6. Complete reconstruction of .distribution water pipe-lines and sewers in all existing buildings and structures of the enterprise.

8.2 Water pipe-lines on site

The source of the water supply for enterprises of the washing station is the existing inlet of 150 mm diameter, coming from the Kura river water-mains in Balajari settlement. In accordance with requirements of Bakvodoprovod (Baku Water supply company) at the inlet point of the supply water-pipe to the area, a water meter with the counter of the STB-100 type is installed.

Main inter-site distribution of water-pipes is envisaged for domestic needs in all buildings and structures of the enterprise, for feeding re-circulation water supply reservoirs, for feeding boiler-room reservoirs, for watering plants of the enterprise, to cleaning facilities, to fire reservoirs and fire hydrants of the enterprise.

Construction of additional reservoir for fire safety requirements of capacity 150 cu. m is envisaged.

Asbestos - concrete pipes with the diameter of 100 mm of BT-9 type and steel electrically welded with diameter 108 x 4,0 mm with reinforced hydro-insulation are taken for laying.

Laying of water-pipes in the ground must be in a trench at the depth of at least one metre, and on the platforms – on special fixing/strengthening cantilevers. Water-pipes inside buildings and structures must be to GOST 3262-80, that is fixed to walls by clips, with subsequent painting with two coats of oil paint.

8.3 Sewerage networks on site

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8.3 Sewerage networks on site

Discharge of domestic waste waters from the site section is done into the existing collector of diameter –1400 mm., going to the pump-station N4.
Existing inter-site sewage accepts drains from administration and ancillary buildings of the station. Discharge of water excess from the recirculation water supply for tank washing is intended into existing sewage. Before discharge into sewage the waste water must undergo additional cleaning. Two flotators by the capacity of per 5 cu. m/hour (120 cu. m/day) are envisaged. Degree of purification for residual oil-products from these units must be less than 0.2 mg / l.

On the site area two separate sewerage systems must be laid : household sewage system and industrial effluent system.

Discharge of drainage from administration buildings is envisaged into the household sewage system. Estimated consumption of house-hold drains of the station make up: Q = 5.35 l/sec.

Drains from the wagon-washing plant, the unit for mazut heating, boiler-room, compressor-room, platforms for tanks steaming and bitumen wagons emptying are all industrial effluent. Besides, effluent from discharges of recirculation system due to repair and cleaning are also industrial effluent.

Total discharge of effluent after recirculation makes up Q_2 = 2.4 l / sec. (8.62 m^3 / hour). Discharges of industrial effluent to the domestic sewage system are subject to additional chemical treatment with capacity of 10 $m.^3$ / hour.

High degree of purification at these plants (0.2 -2.0 mg/l for residuals of oil-products) allows the industrial effluent to be discharged into the city sewerage system on the basis of the " Rules for acceptance of industrial waste waters into the sewerage system of the residential areas".

The design envisages laying of new inter -section lines with the diameter of 200 mm, total length – 150 m. Detailed characteristics of industrial effluents is shown in Table N 4.

8. 4. Recirculating water supply

In order to conserve fresh water consumption, the project envisages recirculating water supply facility. The system for recirculation water supply is intended for the compressor house for cooling of compressors, for washing and steaming of tanks and bitumen wagons emptying, and for exterior washing of wagons.

Supply of purified water from recirculation water reservoirs to the tank interior washing platforms is performed by two pumps of type ЦНСТ 60 –231 with technical specifications:
Q = 60 $m.^3$/ hour, H = 231 m, N = 75 kVt. Installation of these pumps is intended instead of old ones, of type ЦНСТ 60 -198.

Estimated consumption of recirculation water in the interior wash system is :
Q = 250 x 3.0 = 750 $m.^3$/ day, and in the exterior wash system Q = 24 x 12.0 = 288 $m.^3$/ day.

Recirculated water is supplied by gravity feed after tank washing to the purifying facilities and then to the recirculation water reservoirs. Water in the reservoirs is heated up to 75 ° C by steam coils.

8.5. Cleaning of effluent from steaming and interior washing of tanks

The Balajari Washing station carries out at present the washing out of 200 four-axle tanks of oil-products per day. After reconstruction this figure will be increased to 255 tanks.

As per time rates for water consumption, consumption of water for interior treatment of one tank is 3.0 m.^{3} Existing purifying facilities for cleaning and preparation for subsequent reuse produce up to 360 cu. m/day.

The principle of operation of the existing washing station is as follows :
Effluent after tank washing flows into troughs, located under the platforms, and then goes to sand catchers, and from there goes by gravity feed through the collector, diameter 300 mm , into the acceptance well in front of the treatment facilities.
From the acceptance well the effluent is pumped over to the 60 cu. m accumulating tanks, and from there, by another pump, with capacity of 8 cu. m/hour to the purifying facilities of German production, with capacity of 120 cu. m/day, installed in containers on the site.
Primary and secondary cleaning from oil-products takes place at these facilities.
Purified water goes to reservoirs (7 tanks each 60 cu. m) of recirculation water.
Excess water for discharge to sewerage goes through additional secondary cleaning:

The balance of the effluent, amounting to 240 m^3 / day, flows from the reception well by gravity feed to the oil trap building, where mechanical cleaning takes place. Effluent goes to the first sludge section, from there oil products that have come to the surface go to the overflow compartment, and from there to the collector compartment for mazut.
Mazut is pumped over to two 300 cu. m mazut collection reservoirs, located on the site.

Partly cleaned effluent goes from the first compartment to the old type flotator, where additional cleaning takes place. Cleaning efficiency of the flotator is very low, therefore it is subject to replacement.
After that supposedly clean effluent goes into two acceptance reservoirs (tanks of 60 cu. m) on the site.
From here the effluent is pumped over an oil skimmer, from where mazut goes back to the collector compartment in the oil-trap building and purified water – into an intermediate reservoir on the site (tank of 60 cu. m).
From the intermediate reservoir, water is fed by pump to the recirculation water reservoirs, where heating takes place.
In these reservoirs mixing of water after purification with water from old oil catchers takes place in German reservoirs.
Recirculating water with an oil products content from 400 to 800 mg/l is fed by a pump for tank washing.

For purifying of such amount of effluent, modern cleaning facilities with a high degree of purification will be required. Existing cleaning facilities of German production, located in containers on the site with capacity Q=120 cu. m/day, having high degree of purification – 10-70 mg/l of oil products. Existing mechanical cleaning facilities of FSU production with capacity of 240 cu. m/day do not meet the modern cleaning requirements. Their degree of purification is rather low. –400-800 mg / l of oil products. Therefore additional installation of modern compact cleaning facilities is required for circulation water supply with capacity of 600 cu. m/day.

The accepted cleaning facility of German production with total capacity of 600 cu. m/day or 25 cu. m / hour gives a high degree of purification (10-70 mg/l of oil products). These plants are compact and simple by adjustment. The cleaning facilities are composed of the following units:

• Container	12 x 2.4 x 2.4 m size,	by segmenting – 40 cu. m	-2 pieces
• Container	6 x 2.4 x 2.4 m size,	acceptance capacity - 28 cu. m	-2 pieces
• Container	6 x 2.4 x 2.4 m size,	flotator – Q= 12,5 cu. m/hour	-2 pieces
• Container	6 x 2.4 x 2.4 m,	KST –Q= 5 cu.m/hour	-1 piece.

The last container is designated for secondary cleaning of recirculation water before discharge into external sewage. The degree of purification at this plant is very high – 0,2 mg/l of residual oil products.

For tank washing, the water containing some hundreds mg/l of oil products may be used., therefore only the excess of water from the recirculation system must be removed from it. A new adopted cleaning facility, with the capacity of 600 cu. m/day (25 cu. m/hour), consists of two groups and as per capacity is equal 300 cu. m/day (12,5 cu. m/hour), that will be operating parallel for cleaning.

Effluent will be pumped over from acceptance well of the oil trap building by pump SD25/14, with capacity of Q = 25 cu. m / hour, H = 14m.

After being cleaned at these plants, the water goes to reservoirs for recirculation water (7 tanks per 60 cu. m). In these reservoirs water is heated by steam up to 75 ° C. Then the recirculation water is fed by pump 60-231 to over-head platform for interior washing of tanks by pipe-line, by diameter of 200 mm.

After putting the new cleaning facilities into operation, the old oil traps must be temporarily stopped for capital repair. All equipment must be cleaned from the accumulated mud and sand. After complete repair, the existing oil trap building will operate as reserve ones in case of delay of new cleaning facilities. Due to insufficient degree of purifying, repaired cleaning facilities will operate only for recirculating water supply, without discharge of effluent to sewers.

Discharge of excess effluent to sewerage will be carried out after treatment at the cleaning plants. For this purpose two flotators in containers with capacity per 5 cu. m/hour are installed, where secondary cleaning takes place.

Residual content of oil products and suspended substances after secondary purification is taken:
0.2 –2.0 mg. / l. .BPK (Biological demand for oxygen) - 20-30 mgO_2 / l,
XPK (Chemical demand for oxygen) – 50-100 mgO2/l.

After installation of new purifying facilities, with capacity of 600 cu. m/day for interior tank washing, reconstruction of old [FSU] cleaning facilities is required for further joint operation.

For this is required :

1. Replacement of two recirculation water pumps of type ЦНСГ 60-198 at the pump house by pumps of type ЦНСГ 60 – 231, N = 75 kVt
2. Replacement of suction and pressure pipeline. Diameter 150 mm for pipe-line, diameter 200 mm, total length 500m.
3. Laying of pipe, diameter 125 mm along the over-head platform, length 600 m, for washing.
4. Installation of reservoir for mazut (tank of 60 cu. m).
5. Installation of two oil pumps of НК 65/35 – 70 type, N= 22 kVt.
6. Laying of pipes, diameter 80 mm, for supply mazut to new treatment / cleaning facilities at the reception reservoir.
7. Installation of two sewage pumps of СД 25/14 type for delivery of effluent to new treatment facilities at the reception reservoir.
8. Laying of sewage, diameter of 200 mm, length 80 m from new purifying facilities.
9. Cleaning from mud and sand all reservoirs in the oil catcher building.
10. Installation of two pumps in the oil trap building, in place of one non-operational, reserve - of ФГ 144/10,5 type.
11. Replacement of one non-operational, reserve piston pump for mazut for two new aggregates of НК 65/35-70 type, N=22 kVt.
12. Installation of a new floatator ЛОНИИ, with the capacity of 10 cu. m/hour (2400 cu. m/day), in the oil trap building, in place of the old one.

8.6. Cleaning of effluent from the exterior washing of tanks

Water consumption for exterior tank washing as per the norms is Q = 24 x 12 = 382.5 cu. m/day.

Exterior washing of tanks is carried out with effluent which is repeatedly recycled.
Effluent treatment after exterior washing is the following :
Water from mains is fed to recirculation water supply reservoirs (tank with capacity of 60 cu. m), where it is heated up to 75 ° C.
From the reservoir it is fed to the washing machine nozzles by a pump, with technical specification Q = 30 cu. m / hour p = 20 atm.
After washing, the effluent goes to a trough, and from there by gravity feed to the sand catcher facility, where 85-90 % of heavy suspension falls out.
The effluent then goes to treatment plants with capacity 10 l. / sec, as per the standard design 902-2-410.86.
After the flotator, the purified water with residual oil products content of 30 - 70 mg. / l. goes to the recirculation water reservoir and the process is repeated again.
For further purification of excess effluent for discharge into the sewage installation, a floatator with the capacity of 1 $m.^3$ / hour (24 $m.^3$ / day) is envisaged.
Installation of one tank of 60 cu. m for mazut collection is included into the complex of cleaning facilities.
For pumping over mazut into the existing 300 cu. m capacity reservoirs, two pumps of HK 65/35 – 70 type, N = 22 kVt are installed.

Main indicators of the performance of effluent treatment facilities

Table N

N	Reconstruction stage	Concentration of contaminants (mg/l)							
		Suspended substances		Oil products		pH		BPK complete	
		Before reconstruction	After reconstruction	Before reconstruction	After reconstruction	Before reconstruction	After reconstruction	Before reconstruction	After reconstruction
1.	Treatment facilities for recirculating water supply	500	20	800	70	7 / 13	≈ 7	150	30
2.	Treatment facilities for additional chemical treatment before discharge into sewers	20	5 / 8 {375 ?}	70	5 / 8 {2.0 ?}	≈ 7	≈ 7 {6.5-8.5 ?}	30	15 {375 ?}

9. ELECTRICAL SECTION

The present section of the project reconstruction of the existing power distribution network of the plant, augmentation of the transformer substation, feeding the object. The whole section is solved in line with the technological part by tanks treatment, as well as in line with the solutions by effluent treatment after steaming and washing of tanks.

At present the specific consumption of power supply at the washing station makes up 10 kVt per tank by the programme of 200 tanks/day. Total power supply consumption of the enterprise at the moment is 300 kVt, the yearly power supply consumption is: 300 x 5870 =1761000 kVt/h/year/

By reconstruction of the object, systems of power supply for all buildings and structures of the Washing Station.

Reconstruction of the following structures is envisaged in the project:

- Over-head platforms for steaming of tanks out of light oil-products, out of bitumen;
- Washing facility for exterior washing of tanks;
- Compressor-room;
- Purification facilities;
- Pumping stations for pumping over of oil-products;
- Ancillary structures;
- Amenity premises

As a result of the reconstruction of the Washing station, the output increases up to 255 tanks per day. Therefore, the specific consumption of power supply will increase up to 16,89 kVt/h/tank for main shops.

$W_{1=} R_p K_1 A_p \tau + 1/n (K_2 A_2 \tau_2 + A_3 \tau_3 + A_4 \tau_4)$

$W_1 = 1 \times 1 \times 280 \times 0{,}003 + 1/225 (1 \times 46 \times 8{,}4) = 16{,}89$ kVth/tank

For ancillary divisions:
$W_2 = Kp \quad K_1 \; A1 + 1/n (K_2 \; A_2 \; \tau_2 + A_3 \; \tau_3)$

$W_2 = 0{,}59 \times 1 \times 280 \times 0{,}003 + 1/255 \; (1 \times 46 \times 8{,}4) = 3{,}47$ kVt h/tank

Total: $W=W_1 + W_2 = 16{,}89+3{,}47 = 20{,}36$ kVth/tank

Consumption of power supply for external lighting:
$W_{no} = 30x0{,}9 \times 7{,}2 \times 4{,}0 = 1360{,}8$ kith/month

Yearly/annual power supply consumption makes up:
W= 255 x 20,36 x 360 + 1360,8 = 18700408,8 kVth

Rated load, kVt
$P_p = W/T = 1870408{,}8/5870 = 350$ kVt

The main source of power supply is the existing substation, situated within the Washing Station.

One more transformer of 630 kVt capacity is installed at the substation. Taking into account, that power receivers of the Washing Station belong to the 1-st category as far as the power supply, then installation one more transformer of the same capacity, i.e. 630 kVa is needed.

Old switch-boards are dismantled and the switch-boards of the SHO-70 type are installed; low-voltage shields are sectioned with the installation of the shield of the ABP type.

Existing low-voltage shields are subject to partial replacement, cables of the AAB-1 are taken for laying between the structures. By reconstruction within the Washing Station projector lighting, security, repair lighting are subject to reconstruction.

All power supply networks inside the buildings and structures are subject to reconstruction in line with technological and constructural part tasks.

Power receivers and automatic switch-boards on the overhead platforms for tanks steaming, will be fed from the switch-board transformer substation in line with the passport data of the equipment being installed.

10. GAS and FUEL SUPPLY

Gas supply

Due to the reconstruction of the washing station and increased steam consumption for industrial needs, the demand for gas is increasing. Demand for gas after reconstruction of the existing boiler-room will make up 1700 Hcu.m / hour.

At present the gas supply of the boiler-room is intended from the gas mains (Baku-Sumgait) of medium pressure 0.2 kg/sq. cm by diameter of 700 mm, total length nearly 4000m. As per technical conditions, issued by Bakgas N ÝA-848/5-10 dated 19 June, it is necessary to provide in the project replacement of gas –pipe from the connection point up to Gas distribution point (existing one) for 250 mm diameter, furthermore, from the Gas distribution point up to the boiler-house of the Washing station.

Up to boiler-room of the Washing station laying of new gas –pipe is envisaged by diameter of 150 mm. In front of the boiler-room the Gas distribution Point is arranged for maintaining of the necessary gas parameters.

Laying of gas-pipe is intended as over-ground on low and high supports according to the relief of the location and conditions for laying.

Pipes are taken of steel, electrically welded, GOST 10704 –76, anti-corrosive covering – lacquer BT-177, by priming GF –021 two times.

Indicators of the gas-pipe under design:

Beyond-the-site gas pipe:
Pipes, electrically-welded GOST 10704 –76, diameter 150 mm .....3500 m
Pipes, electrically welded GOST 10704 – 76, diameter 250 mm ..... 500 m

Free standing at the boiler-house building Gas distribution point (of the box type) – RD BK1-100 with two RG-1000 gas meters.

Reconstruction of the existing Gas distribution Point.

Dismantling of the existing gas-pipe from the point connection up to Gas Distribution Point (existing one) and inside the Washing station:
Pipes, electrically-welded, GOST 10704 – 76, diameter 150 mm .....450 m
Pipes, electrically welded, GOST 10704 – 76, diameter 200 mm..... 160 m

Fuel Supply

Reserve fuel supply for the boiler is mazut (heavy fuel oil).
Mazut supply to the boiler-room is from the existing reservoirs on the area with mazut from processing of the residuals wastes after tank steaming. Through the pipe-line by means of pumps, located in the boiler-room, mazut comes to the header tank, and then to the burners.

11. TELEPHONE COMMUNICATION, MASTER CLOCK, LOUDSPEAKER COMMUNICATION

11.1 General

Installation of telephone operative communication and two-line of loudspeaking notification communication is envisaged at the Washing station. Telephone communication is

11.2. Telephone operative communication

For organisation of the telephone operative communication of the dispatcher on-duty of the Washing station, the switchboard of station communication for small stations KSM-2 is installed at the post, that is designated for switching of 16 lines of the station communication, one line of selective communication, one line of ATS (Automatic Exchange Station), two feeders of two-side park communication.

One line of telephone communication is led to the central post, to the station master (the length of the cable is 2 km). The length of the whole cable network within the Washing station will make up 1800 m.

Electrical supply of the KSM-2 switchboard is performed from the AC network with the frequency of 50 Hz and voltage of 220 V.

11.3. Two- side park communication of loud-speaker communication

Along the over-head platforms the system of park communication for loud-speaker communication is envisaged to be installed. With the view, that the capacity of the loud-speakers to be installed does not exceed 200 V, the facility for park communication as per the PSGO system on the amplifiers of the UM – 100 type is being designed. Signal lights masts by 8 m high (5 pieces), on which 10 GR-35 megaphone loud-speakers (7 pieces) and simplified UNPP outer telephone box (5 pieces). Near the office by the over-head platform the UNPP box on wooden mast is also installed.
Cable network of the park communication is performed by SBB .. 3x1 cable in the ground, the length is 1,5 km.

11.4. External telephone communication

To connect the washing station with the railway telephone exchange the facility of telephone ducts from asbestos-cement pipes, diameter 100 mm, length 3 km is needed.
It is necessary to lay cables in telephone ducts as follows:

1. for telephone communication - twin
2. for selective communication - four-fold

For city telephone communication the system for telephone canalisation in one canal, length 700 m, is needed.

12. ENVIRONMENTAL PROTECTION, LABOUR SAFETY, FIRE SAFETY MEASURES

12.1. Labour safety

For the benefit of the staff of the Washing station there are amenities, canteen, leisure sites available.
Sanitation and amenities are provided according to the staff number of the Washing station and the type of their contamination.

Lighting of the area is provided with the rated lighting of 20 lux. All connections of metallic constructions of depot equipment are earthed by shunting /shunted/ cross-pieces to ensure electrical safety of the operating personnel.
Sites free of constructions will be planted by trees and shrubs. Access roads are designed to all buildings and facilities of the Washing station.

12.2. Environmental Protection

General

Measures for environmental protection are made up in order to exclude negative impact of the productions of the Washing station on water reservoirs/ponds/ and soil of adjacent areas with the account of acting/existing/ norms for designing.

Measures for environmental protection

Technological process of production are accompanied with the emission of toxic substances by washing and steaming of tanks, local purifying receivers are foreseen for that purpose.

12.3. Fire-safety measures

Degree of fire-resistance of buildings П. As per their explosion-safety, the buildings refer to categories Д, В.
For evacuation of people and valuable material inside the buildings two exits are foreseen.
The doors on the evacuation ways are opened to the direction of the building exit.
A fire water-pipe is foreseen within the area / site.
The buildings are equipped by fire-alarm system.

`12.4 Arrangement of sanitation & protection area.

The main kind of industrial damages are discharge of industrial drains, subject to cleaning and discharge into city sewage system.

13. DESIGN / CONSTRUCTION ARRANGEMENTS

(No text received from ADDY by 28th November 1998)

(Preliminary drawings received are attached)

Annexes

ANNEX

Calculation of heat demand at the Washing Station

Washing station in Balajari

The rate for heat consumption per one tank for the work:

In the summer time:
Q l= t (w) • q (w) + t (m) • q (m) Gcal/tank
Where q (winter) , q (steam.), q (wash.) - initial rates for heat consumption for steaming and washing
T (steam.) , t (wash.) – time period, necessary for steaming and washing, in min.

In winter time
Q (winter) = t (steam).x q (steam.) + t (wash.)x q (wash.) + q (winter) .... Gcal/tank
Where q (w) - additional heat consumption for tanks heating in winter time.

Initial rate of heat consumption for tanks steaming:

q (steam.)=q steam. x α g cal/min.

By results of control testing:

Q (steam.) = 0,0085 gcal/min. By pressure p= 5 kg. / sq.cm.

α - ratio, introduced by decrease of steam pressure.

By p <4 atm α=0,8
Q (steam.) 0,0085x0,8 = 0,0068 gcal/min

The rate of heat consumption for tanks washing is identified by the formula:

$$Qm = 50 \cdot 10^{-6} \beta(t \text{ outlet} - t \text{ inlet}) \text{ gcal/min}$$

Where 250 kg/min –average water consumption by the work of mechanical device

β - correction factor, taking into account changes in water consumption in front of the over-head platform

by p = 8 kg./ sq. cm β=1,07

t (outlet), t (inlet) - temperature of water at the inlet and outlet of the boiler, ° C;

Parameters of the washing water:

T (inlet)=15 °C, t outlet = 75 °C, p (outlet) = 8 kg./cm

Average temperature of the air outside t (av.)=5,1°C

Q (wash.) = 250x10 $^{-}$ 6 x1,07 (75-15) = 0,016 gcal/min

By the technology approved and dependent on the character of tanks treatment steaming t (steam.) and washing t (wash.) take up the following time:

a) out of the light oil-products for light ones "GS"

t (steam.) = 12 min., t (wash.) =15 min.

b) out of the heavy oil-products for light and repair "GTS"
t (steam.) = 22 min., t (wash.) = 35 min.

Additional consumption of heat in winter for heating of tank q (winter):
Q (winter)=20 – t(winter) aver.[1150+3,5(t (steam.)+ t(wash.)x10 $^{-}$ 6]

a) for treatment of tanks out of the light oil-products
q (winter)=(20-5,1)[1150+3,5(12+15)x10 $^{-}$ 6] = 0,02 gcal/tank

b) for treatment of tanks out of the heavy oil-products for light ones and repair:
q (winter)=(20-5,1)[1150+3,5(22+35)x10 $^{-}$
] =0,02 gcal/tank

1. The rate for heat consumption per one tank in summer and winter periods by treatment of out of the light oil-products for light ones:

Q (summer) = q (steam.) x t (steam.) + q (wash.) x t (wash.)
Q (summer) = 0,0068 x 12 + 0,016 x 15 = 0,322 g cal/tank
Q (winter)= q (steam.) x t (steam.) + q (wash.) x t (wash.) + q (winter)
Q (winter) = 0,0068 x 12 +0,016 x 15 +0,02 = 0,342 g cal/tank

2. The rate of heat consumption per one tank:

Q (summer) = q (steam.) x t (steam.) + q (wash.) x t (wash.)
Q (summer) = 0,0068 x 22 + 0,016 x 35=0,71 g cal/tank
Q (winter) = q (steam.)xt(steam.) + q (wash.)x t(wash.) + q (winter)
Q (winter) = 0,0068 x 2 22 + 0,016 x 35 +0,02 =0,73 g cal./tank

Calculation N 1

(consumption of heat power for tank treatment per quarters)

Table N

Quarter	Type of treatment	Number of tanks, treated by hot way		Rate of heat energy consumption per one tank	Consumption of heat energy G cal.	
		200	255		200	255
I quarter	Light fuel	6066	7735	0.34	2062	2630
91 days	Heavy fuel	121134	15470	0.73	8857	11293
Total		18200	23205		10919	13923
II quarter	Light fuel	1000	1275	0.34	340	434
15 winter days	Heavy fuel	2000	2550	0.73	1460	1862
76 summer days	Light fuel	5067	6460	0.32	1621	2067
	Heavy fuel	10133	12920	0.71	7194	9173
Total for II quarter	Light fuel Heavy fuel	6067 12133	7735 15470		1961 8654	2501 11035
Total II quarter		18200	23205		10615	13536
III quarter	Light fuel	6133	7820	0.32	3925	2502
92 days	Heavy fuel	12267	15640	0.71	8710	11104
Total III quarter		18400	23460		12635	13606
IV quarter	Light fuel	3133	3995	0.34	1065	1358
47 winter days	Heavy fuel	6267	7990	0.73	4574	5833
45 summer days	Light fuel Heavy fuel	3000 6000	3825 7650	0.32 0.71	960 4260	1224 5432
Total	Light fuel Heavy fuel	6133 12267	7820 15640		2025 8835	2582 11265
Total for IV quarter		18400	23460		10860	13847
Total for a year		73200	93330		45029	54912

CSM 29/11/98

DRAFT 29/11/98

Azerbaijan State Railways
Azerbaijan Dovlet Demir Yolu - ADDY

Exterior Wash Plant for Railway Tank Wagons

TECHNICAL SPECIFICATION

ATTACHMENTS

Location of Balajari
Site Layout - Balajari Washing Station

Wagon Dimensions
- Type 62 (1972)
- Type 62 (1984)
- Type 71
- Type 73

Trackwork Layout - Exterior Wash
Proposed Exterior Wash Layout I
Proposed Exterior Wash Layout II
Proposed Washing Shed Layout - Plan and Elevation
Proposed Washing Shed Layout - Cross Section

(To follow by post)

DRAFT 29/11/98

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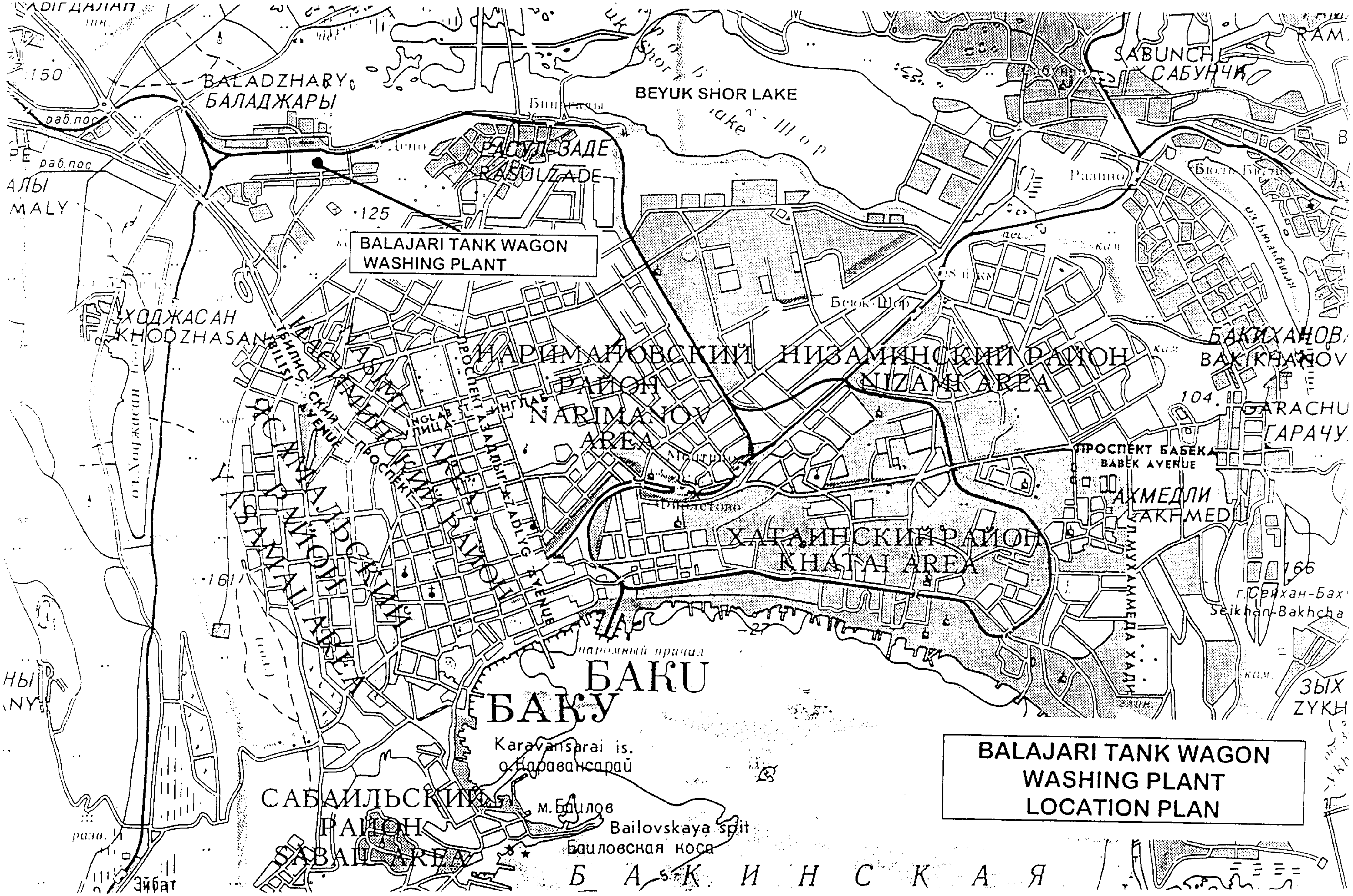
BALAJARI TANK WAGON WASHING PLANT LOCATION PLAN
BALAJARI TANK WAGON WASHING PLANT
BEYUK SHOR LAKE
BALADZHARY
БАЛАДЖАРЫ
РАСУЛ-ЗАДЕ
RASULZADE
SABUNCHI
САБУНЧИ
ХОДЖАСАН
KHODZHASAN
НАРИМАНОВСКИЙ РАЙОН
NARIMANOV AREA
НИЗАМИНСКИЙ РАЙОН
NIZAMI AREA
ХАТАИНСКИЙ РАЙОН
KHATAI AREA
БАКИХАНОВ
BAKIKHANOV
ГАРАЧУ
ПРОСПЕКТ БАБЕКА
BABEK AVENUE
АХМЕДЛИ
AKHMEDLI
УЛ. МУХАММЕДА ХАДИ
ЯСАМАЛЬСКИЙ РАЙОН
YASAMAL AREA
САБАИЛЬСКИЙ РАЙОН
SABAIL AREA
ПРОСПЕКТ АЗАДЛЫГ
AZADLYG AVENUE
ТБИЛИССКИЙ ПРОСПЕКТ
TBILISI AVENUE
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Bailovskaya spit
Баиловская коса
Seikhan-Bakhcha
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ЗЫХ
ZYKH
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104
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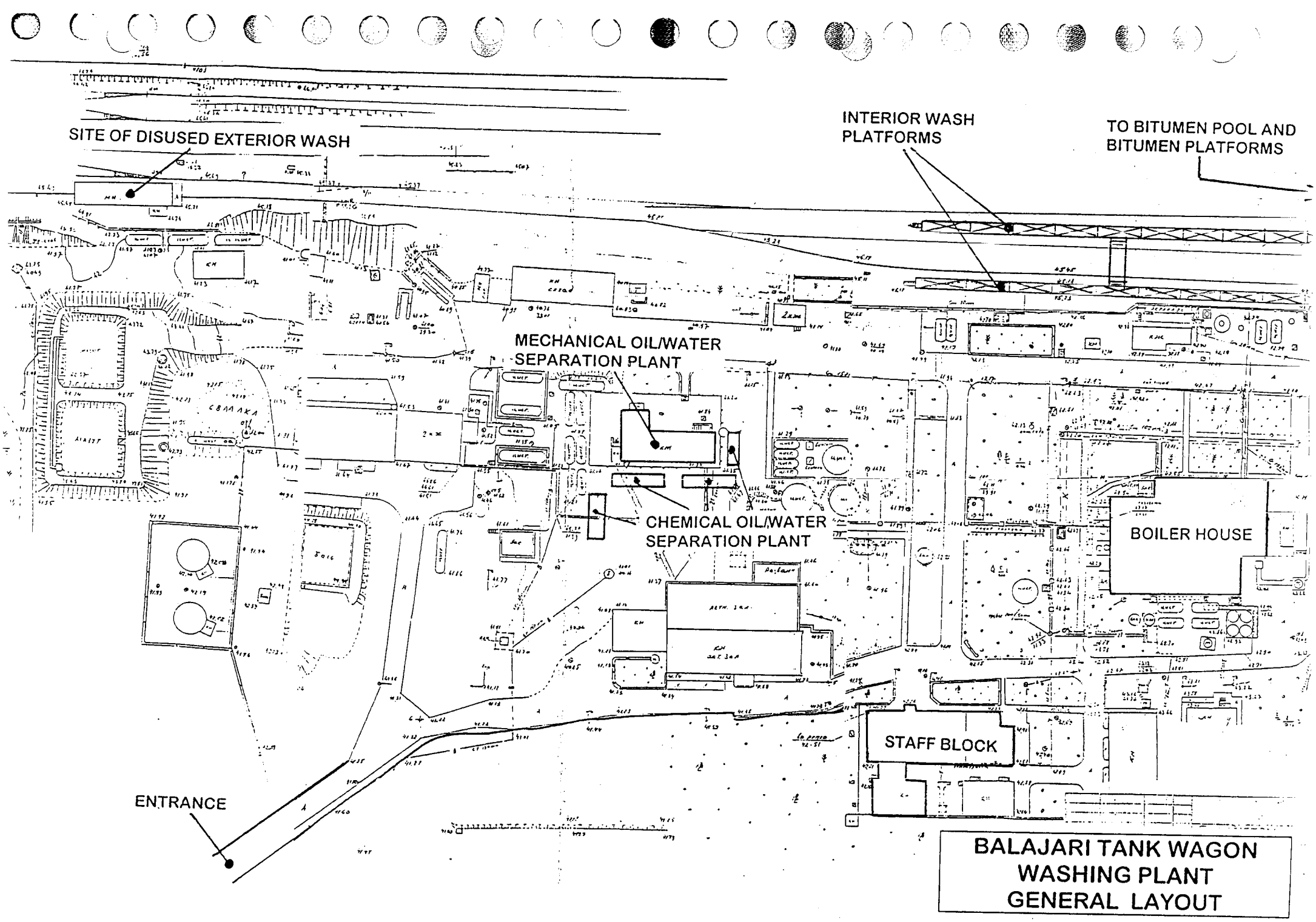
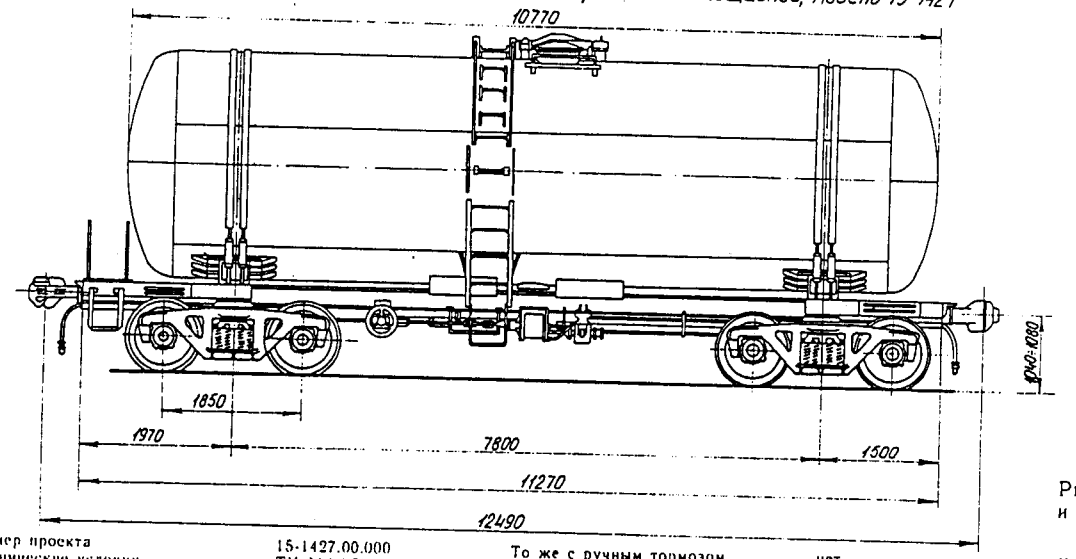
165
Б А К И Н С К А Я


SITE OF DISUSED EXTERIOR WASH
INTERIOR WASH PLATFORMS
TO BITUMEN POOL AND BITUMEN PLATFORMS
MECHANICAL OIL/WATER SEPARATION PLANT
CHEMICAL OIL/WATER SEPARATION PLANT
BOILER HOUSE
STAFF BLOCK
ENTRANCE
BALAJARI TANK WAGON WASHING PLANT GENERAL LAYOUT

TYPE 62 (1984)

4-осная цистерна для бензина с переходной площадкой, модель 15-1427



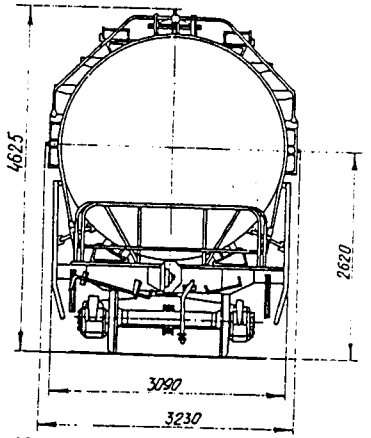


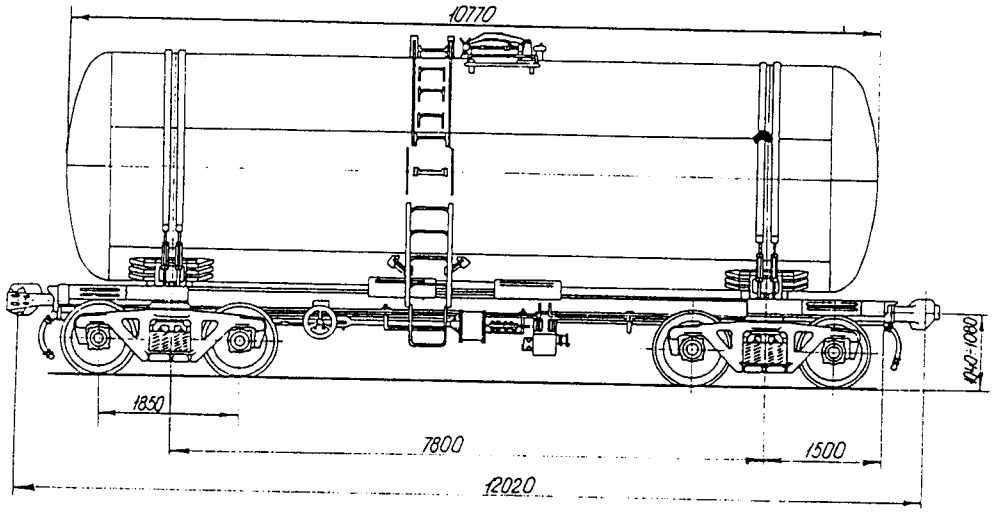
Рис. 87. Назначение: для перевозки бензина и других светлых нефтепродуктов (с переходной площадкой)

Номер проекта	15-1427.00.000
Технические условия	ТУ 24.00.530-83
Модель вагона	15-1427
Тип вагона	731
Изготовитель	ПО «Ждановтяжмаш»
Грузоподъемность, т	60
Масса вагона (тара), т	23,4
Нагрузка:	
от оси колесной пары на рельсы, кН (тс)	205 (20,9)
на один погонный метр пути, кН/м (тс/м)	65,5 (6,68)
Скорость конструкционная, км/ч	120
Габарит	02-ВМ (02-Т)
База вагона, мм	7 800
Длина, мм:	
по осям сцепления автосцепок	12 490
» концевым балкам рамы (длина рамы)	11 270
Высота от уровня верха головок рельсов максимальная, мм	4 625
Количество осей, шт.	4
Модель 2-осной тележки	18-100
Тип автосцепки	СА-3
Наличие переходной площадки	есть
То же с ручным тормозом	нет
Наличие стояночного тормоза	есть
Тип воздухораспределителя	№ 483-000
Тип регулятора рычажных передач	№ 574 Б
Тип авторежима	№ 265-А-1
Тип поглощающего аппарата	Ш-2-В
Объем котла, м³:	
полный	73,1
полезный	71,7
Диаметр котла внутренний, мм	3 000
Длина котла наружная, мм	10 770
Высота центра тяжести цистерны, мм:	
порожней	1 462
груженой	2 415
Удельный объем, м³/т	1,19
Количество верхних люков, шт.	1
Наличие уклона котла к сливному прибору	есть
Условное рабочее давление в котле (по регулировке предохранительного клапана), МПа (кгс/см²)	0,15 (1,5)
Давление, создаваемое в котле при гидравлическом испытании, МПа (кгс/см²)	0,39 (4,0)
Материал котла	сталь 09Г2, 09Г2Д, 09Г2СД, 09Г2С
Количество секций котла, шт.	1
Наличие парообогревательной рубашки	нет
Наличие теплоизоляции	нет
Толщина изоляции, мм	—
Наличие теневой защиты	нет
Наличие предохранительного клапана	нет
Наличие предохранительно-впускного клапана	есть
Способ налива и слива	налив — верхний, слив — нижний самотеком
Количество лестниц, шт.:	
наружных	2
внутренних	1
Калибровочный тип	62
Максимально допустимая температура загружаемого продукта, °С	—
Год постановки на серийное производство или закупки вагона	1984
Год снятия с производства или последний год закупки вагонов данной модели	...
Возможность установки буферов	нет

TYPE 62

(1972)

4-осная цистерна для бензина и светлых нефтепродуктов, модель 15-1443



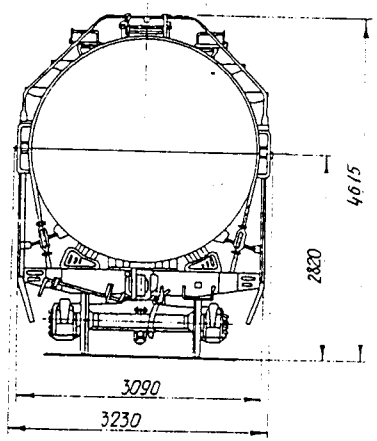


Рис. 86. Назначение: для перевозки бензина и светлых нефтепродуктов

Номер проекта	1443.00.000-5
Технические условия	ТУ 24.00.129-82
Модель вагона	15-1443
Тип вагона	730
Изготовитель	ПО «Ждановтяжмаш»
Грузоподъемность, т	60
Масса вагона (тара), т	23,2
Нагрузка:	
от оси колесной пары на рельсы, кН (тс)	204,0 (20,8)
на один погонный метр пути, кН/м (тс/м)	67,9 (6,92)
Скорость конструкционная, км/ч	120
Габарит	02-ВМ (02-Т)
База вагона, мм	7800
Длина, мм:	
по осям сцепления автосцепок	12 020
» концевым балкам рамы (длина рамы)	10 800
Высота от уровня верха головок рельсов максимальная, мм	4 615
Количество осей, шт.	4
Модель 2-осной тележки	18-100
Тип автосцепки	СА-3
Наличие переходной площадки	нет
То же с ручным тормозом	нет

Наличие стояночного тормоза	есть
Тип воздухораспределителя	№ 483.000
Тип регулятора рычажных передач	№ 574 Б
Тип авторежима	№ 265-А-1
Тип поглощающего аппарата	Ш-2-В
Объем котла, м³:	
полный	73,1
полезный	71,7
Диаметр котла внутренний, мм	3 000
Длина котла наружная, мм	10 770
Высота центра тяжести цистерны, мм:	
порожней	1 462
груженой	2 415
Удельный объем, м³/т	1,19
Количество верхних люков, шт.	1
Наличие уклона котла к сливному прибору	есть
Условное рабочее давление в котле (по регулировке предохранительного клапана), МПа (кгс/см²)	0,147 (1,5)
Давление, создаваемое в котле при гидравлическом испытании, МПа (кгс/см²)	0,39 (4)
Материал котла	сталь 09Г2, 09Г2С, 09Г2Д, 09Г2СД
Количество секций котла, шт.	1

Наличие парообогревательной рубашки	нет
Наличие теплоизоляции	нет
Толщина изоляции, мм	—
Наличие теневой защиты	нет
Наличие предохранительного клапана	нет
Наличие предохранительно-впускного клапана	1
Способ налива и слива	налив — верхний, слив — нижний самотеком
Количество лестниц, шт.:	
наружных	2
внутренних	1
Калибровочный тип	62
Максимально допустимая температура загружаемого продукта, °С	—
Год постановки на серийное производство или закупки вагона	1972
Год снятия с производства или последний год закупки вагонов данной модели	—
Возможность установки буферов	нет

TYPE 71

8-осная цистерна для светлых нефтепродуктов, модель 15-1500

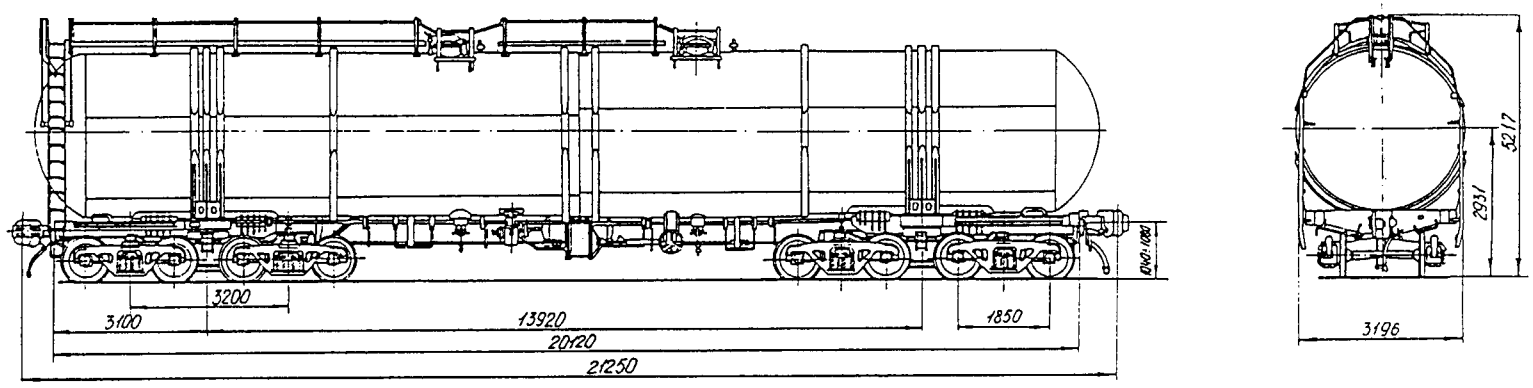


Рис. 83. Назначение: для светлых нефтепродуктов (кроме бензинов)

Номер проекта	1500.00.000-2
Технические условия	ТУ 24.05.519-81
Модель вагона	15-1500
Тип вагона	798
Изготовитель	ПО «Ждановтяжмаш»
Грузоподъемность, т	125
Масса вагона (тара), т	51
Нагрузка:	
от оси колесной пары на рельсы, кН (тс)	215,8 (22)
на один погонный метр пути, кН/м (тс/м)	81,23 (8,28)
Скорость конструкционная, км/ч	120
Габарит	1-Т
База вагона, мм	13 920
Длина, мм:	
по осям сцепления автосцепок	21 250
» концевым балкам рамы (длина рамы)	20 120
Высота от уровня верха головок рельсов максимальная, мм	5 217
Количество осей, шт.	8
Модель 4-осной тележки	по черт. 871.10.000-3
Тип автосцепки	СА усиленного типа
Наличие переходной площадки	нет
То же с ручным тормозом	нет
Наличие стояночного тормоза	есть
Тип воздухораспределителя	№ 483-000
Тип регулятора рычажных передач	№ 574 Б
Тип авторежима	№ 265-А
Тип поглощающего аппарата	Ш-2-Т
Объем котла, м³:	
полный	161,6
полезный	156,25
Диаметр котла внутренний, мм	3 200
Длина котла наружная, мм	20 650
Высота центра тяжести цистерны, мм:	
порожней	1 542
груженой	2 418
Удельный объем, м³/т	1,25
Количество верхних люков, шт.	2
Наличие уклона котла к сливному прибору	есть
Условное рабочее давление в котле (по регулировке предохранительного клапана), МПа (кгс/см²)	0,15 (1,5)
Давление, создаваемое в котле при гидравлическом испытании, МПа (кгс/см²)	0,4 (4)
Материал котла	сталь 09Г2С, 09Г2, 09Г2Д-12, 09Г2СД
Количество секций котла, шт.	1
Наличие пароподогревательной рубашки	нет
Наличие теплоизоляции	нет
Наличие теневой защиты	нет
Толщина изоляции, мм	—
Наличие предохранительного клапана	нет
Наличие предохранительно-впускного клапана	есть
Способ налива и слива	налив — верхний, слив — нижний самотеком
Количество лестниц, шт.:	
наружных	2
внутренних	1
Калибровочный тип	71
Максимально допустимая температура загружаемого продукта, °С	—
Год постановки на серийное производство или закупки вагона	1988
Год снятия с производства или последний год закупки вагонов данной модели	—
Возможность установки буферов	нет

Примечания. 1. Изготовлены два опытных образца.

2. При переходе на серийное производство лестница перенесена в торец котла со стороны [illegible]

нагрузка от оси колесной пары на рельс[illegible]

5260

TYPE 73

8-осная цистерна для нефти, модель 15-880

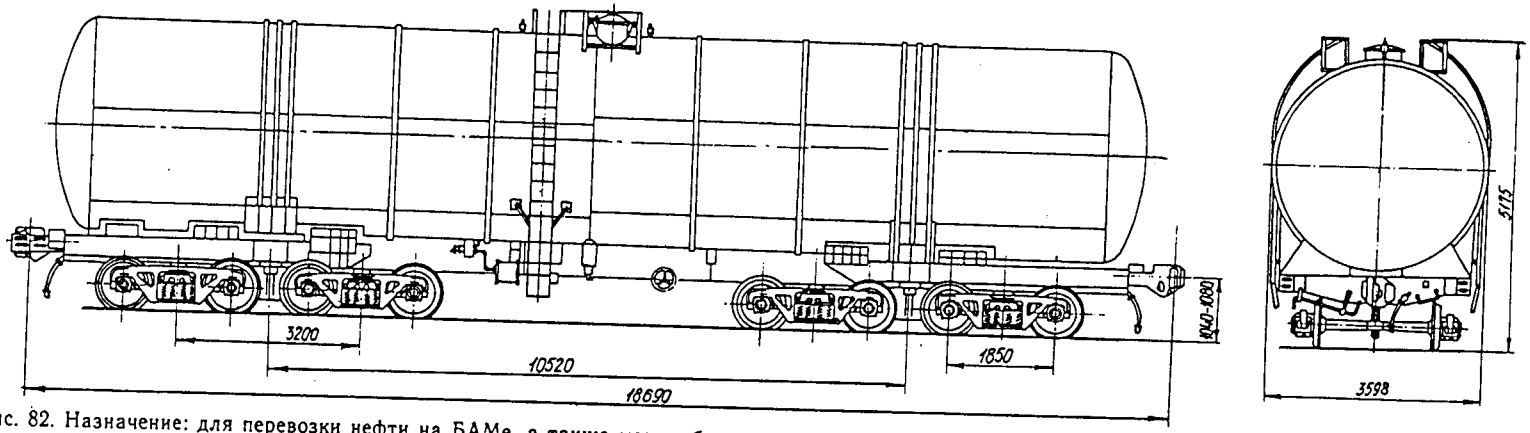
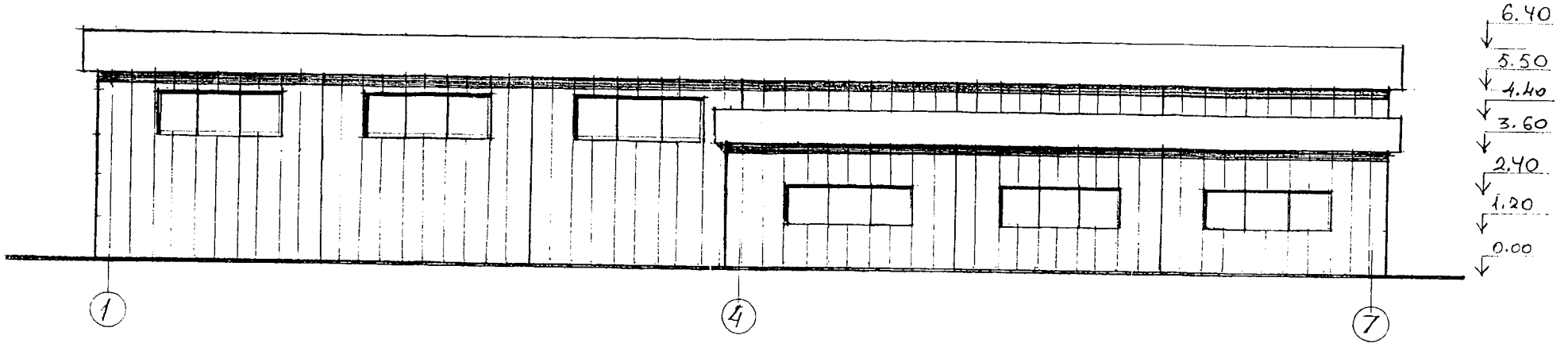


Рис. 82. Назначение: для перевозки нефти на БАМе, а также может быть использована для перевозки нефтепродуктов на всех участках магистральных дорог СССР, где допускается эксплуатация подвижного состава, построенного в габарите Т

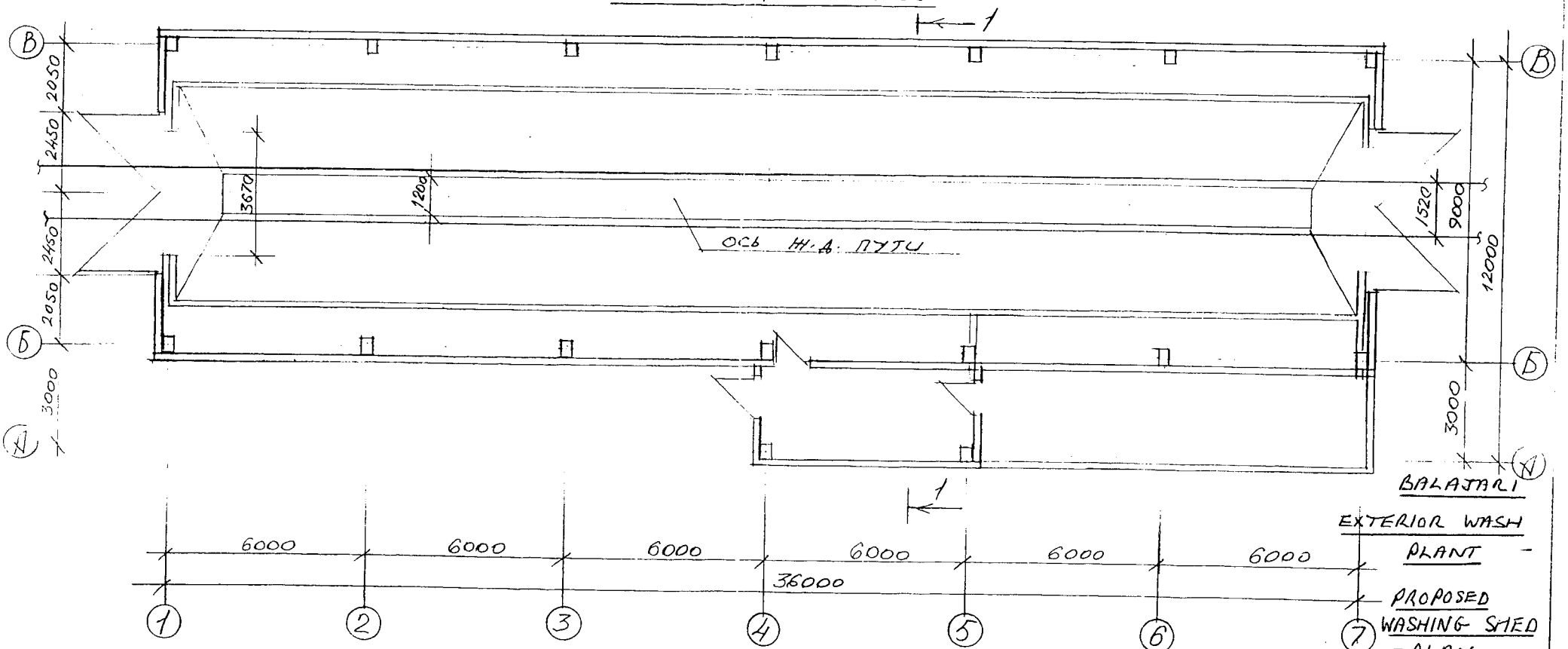
Номер проекта	880.00.000
Технические условия	ТУ 24-1-14-107-75
Модель вагона	15-880
Тип вагона	790
Изготовитель	ПО «Ждановтяжмаш»
Грузоподъемность, т	125
Масса вагона (тара), т	51
Нагрузка:	
от оси колесной пары на рельсы, кН (тс)	215,8 (22,0)
на один погонный метр пути, кН/м (тс/м)	92,32 (9,42)
Скорость конструкционная, км/ч	120
Габарит	Т
База вагона, мм	10 520
Длина, мм:	
по осям сцепления автосцепок	18 690
» концевым балкам рамы	17 560
Высота от уровня верха головок рельсов максимальная, мм	5 175
Колнчество осей, шт.	8
Модель 4-осной тележки	по черт. 871.10.000-3
Тип автосцепки	СА усиленного типа
Наличие переходной площадки	нет
Наличие переходной площадки с ручным тормозом	нет
Наличие стояночного тормоза	есть
Тип воздухораспределителя	№ 270-005-1 или 483-000
Тип регулятора рычажных передач	№ 574 Б
Тип авторежима	№ 265-А
Тип поглощающего аппарата	ГА-500 или Ш-2-Т
Объем котла, м³:	
полный	159,5
полезный	156,3
Диаметр котла внутренний, мм	3 400
Длина котла наружная, мм	18 090
Высота центра тяжести цистерны, мм:	
порожней	1 600
груженой	2 580
Удельный объем, м³/т	1,25
Количество верхних люков, шт.	1
Наличие уклона котла к сливному прибору	есть
Условное рабочее давление в котле (по регулировке предохранительного клапана), МПа (кгс/см²)	0,15 (1,5)
Давление, создаваемое в котле при гидравлическом испытании, МПа (кгс/см²)	0,4 (4,0)
Материал котла	сталь 09Г2С-12
Количество секций котла, шт.	1
Наличие парообогревательной рубашки	нет
Наличие теплоизоляции	нет
Толщина изоляции, мм	—
Наличие теневой защиты	нет
Наличие предохранительного клапана	нет
Наличие предохранительно-впускного клапана	есть
Способ налива и слива	налив — верхний, слив — нижний самотеком
Количество лестниц, шт.:	
наружных	2
внутренних	1
Калибровочный тип	73 V
Максимально допустимая температура загружаемого продукта, °С	—
Год постановки на серийное производство или закупки вагона	—
Год снятия с производства или последний год закупки вагонов данной модели	—
Возможность установки буферов	нет

Примечание. Изготовлены три опытных образца в 1977 г.

ФАСАД 1-7



ПЛАН НА ОТМ ±0.00

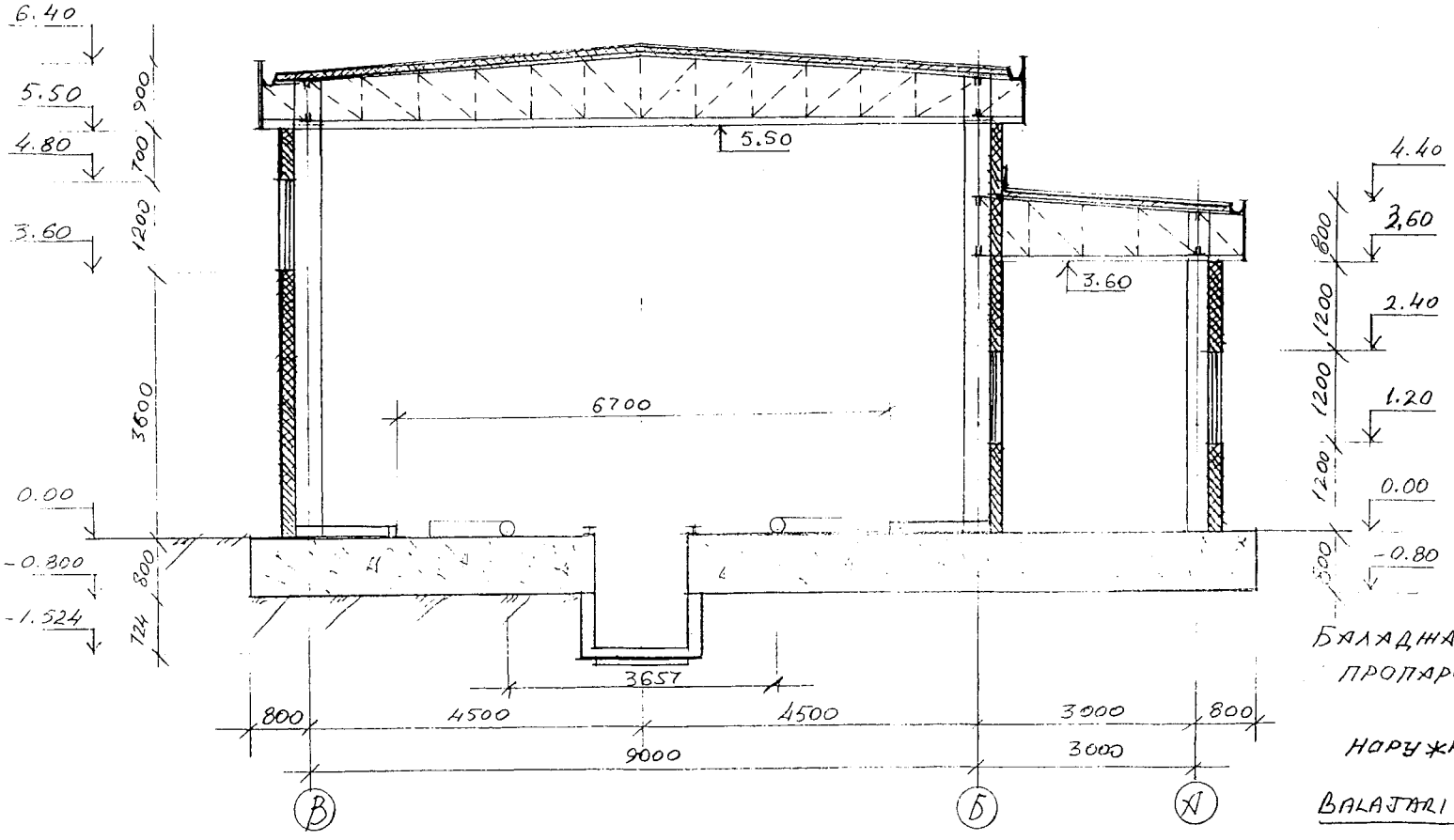


BALAJARI
EXTERIOR WASH PLANT - PROPOSED WASHING SHED - PLAN

БАЛАДЖАРЫ – реконструкция моечного ангара (наружная сеть)

ПЛАН НА ОТМ. ±0.000. ФАСАД 1-7 ЗАКАЗ 98009

1 - 1



Заказ 98009

БАЛАДЖАРЫ – РЕКОНСТРУКЦИЯ ПРОПАРОЧНОЙ СТАНЦИИ.

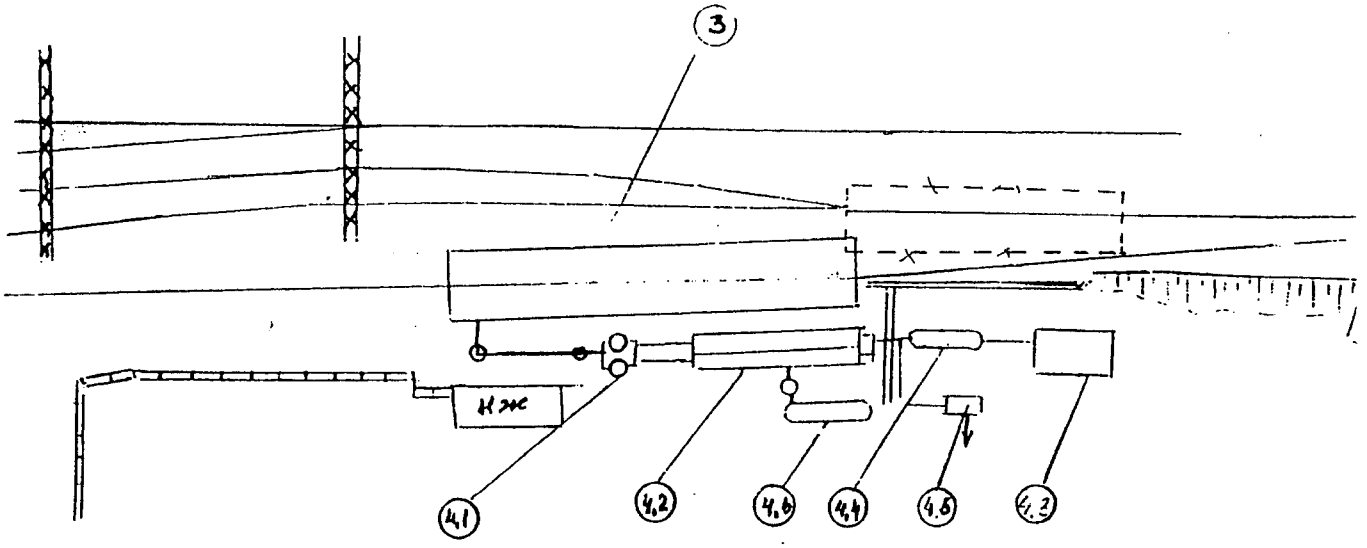
НАРУЖНАЯ ОБМЫВКА

BALAJARI – EXTERIOR WASH PLANT

CROSS SECTION OF PROPOSED WASHING SHED

Выколировка из генплана

SECTION OF GENERAL LAYOUT



Экспликация сооружений наружной обмывки
EXPLANATION OF STRUCTURES FOR EXTERIOR WASH

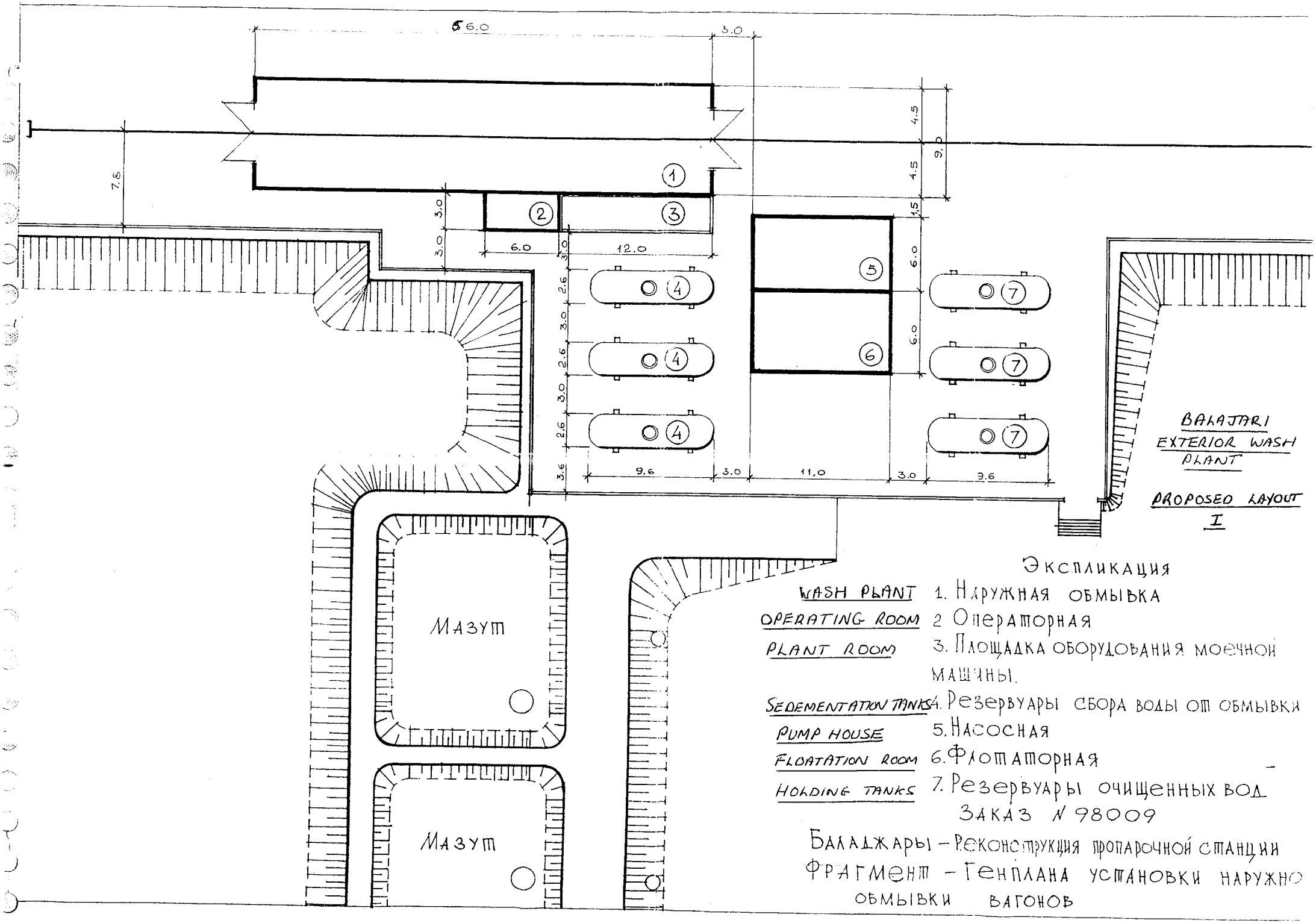
3. Ангар для наружной обмывки цистерн.
EXTERIOR WASH SHED
4.1 Песколовки т.п. 902-2-21 тип III
SAND TRAP
4.2 Отстойники приема и очистки стоков т.п. 902-2-410.86
SEDIMENTATION TANKS FOR RECEPTION & TREATMENT OF WASTE WATER
4.3 Насосная
PUMP HOUSE
4.4 Резервуар аккумулирующей чистой воды
HOLDING TANKS FOR CLEANED WATER FOR RECIRCULATION
4.5 Контейнер второй степени очистки.
SECONDARY TREATMENT PLANT FOR DISCHARGE TO SEWERS
4.6 Нефтесборник
OIL COLLECTING TANK

PROPOSED LAYOUT II

BALAJTARI — CONSTRUCTION OF EXTERIOR WASH PLANT

Заказ № 98009

Балаэжары - реконструкция пропарочной станции



BALAJARI
EXTERIOR WASH
PLANT

PROPOSED LAYOUT
I

Экспликация

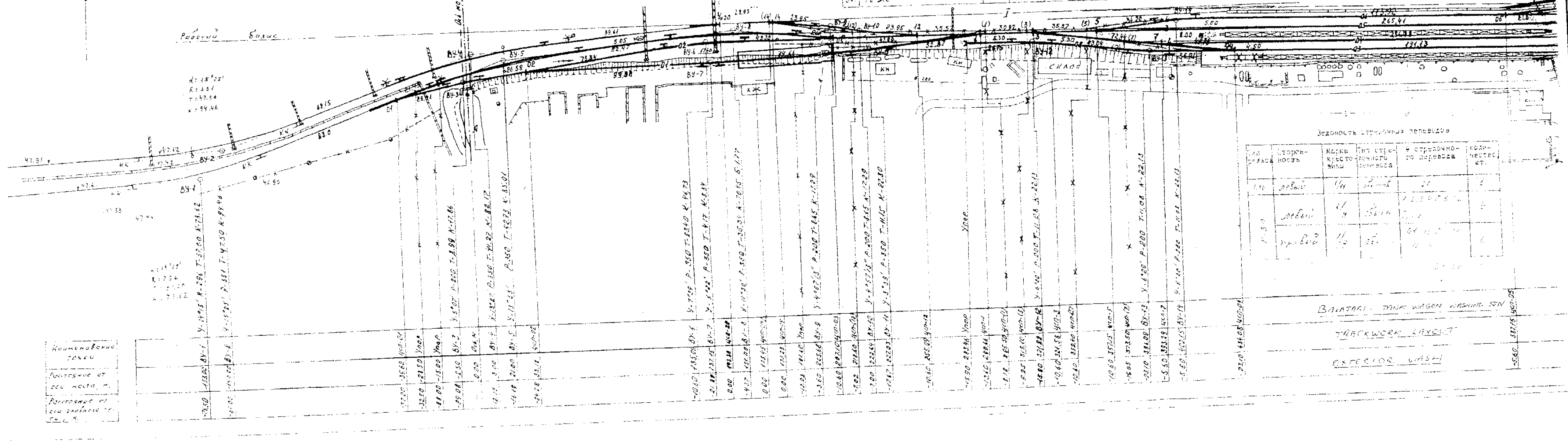
WASH PLANT 1. Наружная обмывка
OPERATING ROOM 2 Операторная
PLANT ROOM 3. Площадка оборудования моечной машины.
SEDEMENTATION TANKS 4. Резервуары сбора воды от обмывки
PUMP HOUSE 5. Насосная
FLOATATION ROOM 6. Флотаторная
HOLDING TANKS 7. Резервуары очищенных вод

Заказ N 98009

Баладжары – Реконструкция пропарочной станции
Фрагмент – Генплана установки наружно обмывки вагонов

Ведомость железнодорожных путей

№ пути	Наименование пути	Границы пути: от стрел. кн.огражд.	Границы пути: через стрелку	Границы пути: до стрел. кн.упора	Длина пути, м: полная	Длина пути, м: полезная	Тип рельса
01	Пути наружной обмывки	02	—	1	289.07	180	Р-50
02	Выставочный	01	02	03	279.14	100	"
03	Путь пропарки цистерн	3	2.04	07	412.10	263.40	"
04	То же	7	07.08	6	451.53	280.00	"
05	То же	5	4	8	485.58	380	Р-50
06	Соединительный	01	03,12,1 5,05	06	757.35	—	"
07	Путь мойки битум. цистерн	08	—	Уп	190.46	130	"
08	Путь слива мазута	04	—	Уп	166.42	110	"



Ведомость стрелочных переводов

Тип рельса	Сторонность	Марка крестовины	Тип стрелочного перевода	№ стрелочного перевода	Количество шт.
Р-50	левый	1/11	[illegible]	2?	1
Р-50	левый	1/9	[illegible]	[illegible]	[illegible]
Р-50	правый	1/9	[illegible]	[illegible]	[illegible]

SECTION B RECONSTRUCTION OF INTERIOR WASH PLANTS FOR RAILWAY TANK WAGONS (DESIGN AND BUILD)

DRAFT 30/11/98

Item**: Reconstruction of Interior Wash Plants for Railway Tank Wagons (Design and Build)

TECHNICAL SPECIFICATION

Table of Contents

1. General Description

The Specification describes the requirements for the reconstruction of the washing plant for the interiors of railway tank wagons situated at Balajari, near Baku, Azerbaijan, together with the construction of a new plant on an adjacent site for the discharging of residues from the interiors of bitumen wagons.

The Contract shall be let on a design and build basis by the Beneficiary as mentioned in Section 5.

Interior Wash Plant
The existing plant, built in 1938, is showing considerable signs of its age, and lack of funds for proper maintenance in recent years.

The access platform structure, and all the walkway surfaces, lighting, handrails, steps, steam and water pipework, ducts, and hose davits, as well as heating pipes in the drainage channels, are life expired, corroded, and a study has shown that complete replacement of the structure is the most expedient option.

In addition, discharges from the wagons fall directly onto a concrete apron, and then must flow to the sides before collection in channels. This practice is considered environmentally no longer acceptable, and new channels must be constructed, between the rails under the wagons, for the effluent to be collected directly. The existing concrete apron is to be replaced.

Bitumen Wagon Plant
An additional platform structure is also required to be constructed, on an adjacent track, for the collection of bitumen from the interiors of partially discharged bitumen tank wagons.

It will be equipped with a steam supply to enable the wagons to be heated and allow the bitumen to be liquefied so that it can be pumped to a storage tank wagon, the remaining residues are then to flow out of the bottom discharge point of the wagons to an adjoining bitumen pool.

Other Items
New portable pumping equipment is required for pumping the heated bitumen from the wagons.
The pumping equipment is also to be used to pump out collected bitumen from the adjacent bitumen pool.

Supply of equipment for operator safety is included in the Contract, such as rotary hot water spray lances to enable the operators to carry out most of the rinsing operation from outside the tank, respirators, spark proof lamps, and oil resistant protective clothing.

The Tenderer should also price for the laying of a new gas main to the plant, as an optional extra to the contract.

A general technical description of the Balajari Tank Wagon Washing Station, prepared by the Beneficiary's design institute, is included as Annex 5.

Separate contracts are to be let for the supply of additional water treatment plant and a new exterior wash plant.

2. Operational Characteristics

2.1 General Characteristics

The interior wash platforms are to be replaced by structures of modern design.
They shall differ from the existing platforms as follows :

- The platform edges on the working sides shall be constructed closer to the tank top manholes, to eliminate the need for access gangways, and give a safe stepping distance.
- The working platforms shall be 65 cm. higher.

A new platform of similar design is required for the cleaning of bitumen wagons.

2.2 Capacity Requirements

The interior wash plant shall have the capacity to clean the exteriors of 250 tank wagons per day, and the bitumen cleaning plant shall have the capacity to clean 5 wagons per day.

The replacement interior wash plant shall have the existing working capacity of three lines of fifteen wagons each line. The bitumen plant shall have the working capacity of five wagons on one line.

The plant shall be capable of accommodating the following types of wagons, which are considered maximum their relative dimensions :

The length of 4 axle wagon,	type-62 - 12490 mm.
The length of 8 axle wagon,	type-71 - 21250 mm.
The height of 8 axle wagon,	type-71 - 5217 mm.
The width of 8 axle wagon,	type-73 - 3598 mm.

Outline Wagon Drawings are attached.

2.3 Maximum Dimensions

It is anticipated that the new interior wash plant base will have dimensions of approximately 200 m. x 20 m. (existing base is approximately 4,000 m^2).

It is anticipated that the overall measurements of the concrete base on which the bitumen wagon plant is to be situated will be approximately 85 m. x 9 m.

Sketches representing the sites are attached.

2.4 Existing Situation and Future Working Pattern

The Tank Wagon Washing Plant at Balajari, 10 km from Baku, Azerbaijan, washes the interior of all tank wagons used for the transportation of crude, heavy refined, and light refined, oils, and liquid bitumen The oil / water mix is mechanically and chemically separated and the oil is recovered.

It consists of three tracks holding fifteen wagons each, with two platforms each 172 m. long running alongside platforms at tank top level for operator access. Tanks are cleaned out with steam lances and residues then rinsed out with hot water. Heavy oils require a pre-spray of diesel oil to the interiors. Lighter oils require fumes to be vented. All waste oil / water is discharged onto a concrete area beneath the tracks contained by a bund wall. There are drainage channels at each side where the emulsified oil is collected and pumped to a mechanical separation plant where the oil is skimmed off for resale (3200 tonnes per annum). The sludge on the apron is collected periodically, together with processing sludge which is collected in a concrete lined pond, and taken to a designated dumping area.

A fuller technical description of the operation of the plant is given in Appendix 5.

The operating cycle is 24 hours per day throughout the year.

The Contractor shall ensure that the interior wash plant can continue to operate on at least one full line continuously throughout the period of reconstruction.

The Contractor shall propose, and the Benefactor shall approve, an acceptable phasing of work to ensure continuity of operations.

The bitumen wagon cleaning programme is currently suspended, and the Contractor may have complete possession of that part of the site during construction.

2.5 Power Supply

The Beneficiary will make available a power supply, to a new main lockable isolation switch panel for the interior wash, to be supplied and installed by the Contractor, at the interior wash platforms.

The Contractor shall supply and lay a new underground power supply cable, from the main sub station to a new main lockable isolation switch panel, to be supplied and installed by the Contractor, at the bitumen platform.

The power supply characteristics shall be as follows :

Voltage	380 volts 3 phase and neutral (4 wire)
Voltage fluctuation max.	+/ - 10 %
Frequency	50 Hz
Frequency fluctuation max.	+ / - 1 %

2.6 Steam Supply

The new interior wash platforms will make use of the existing steam main up to the site, and the Contractor shall supply new isolation valves and all steam distribution from that point to the platforms.

The Contractor shall provide a new insulated overhead connection and steam main, from a point on the main steam supply for the interior wash platforms/ the pressure regulating valve in the boiler house, to a new isolation valve at the bitumen wagon platform,. and all steam distribution from that point to the platform.

The Beneficiary shall make available to the site a steam supply between 2-8 bar.

2.7 Recycled Water Supply

The new interior wash platforms will make use of the existing hot recycled water supply to the site.

The new interior wash platforms will make use of the existing hot water mains up to the site, and the Contractor shall supply new isolation valves and all water distribution from that point to the platforms.

The Beneficiary shall make available to the site a hot water supply between 40 - 60 °c.

2.8 Discharges

The Contractor shall ensure that there is provision for complete containment of all discharges from the interior cleaning of tank wagons, and that they are channelled effectively to the existing collecting sand trap, in an effective and environmentally acceptable manner.

The processing of the collected discharges from the sand trap will be done by others.

2.9 Site Data

Location	Balajari, near Baku, Azerbaijan
Altitude asl	375 m.
Ambient temperature	minus 20° C to plus 40° C.

2.10 Scope of Contract

Design and reconstruct a tank wagon interior wash plant, design and construct a bitumen wagon discharge plant, and supply associated equipment and parts, as outlined below, to the satisfaction of the Beneficiary and the relevant Azeri Authorities.

Supply full set of working drawings and detailed technical specifications for the proposed plants for prior approval by the Beneficiary before the commencement of construction.

The interior wash plant part of the contract shall include:

Removal of the existing structures and concrete base.
Construction of:
Two new operator access platforms each 172 m long, complete with handrails, toe boards, and safety surfaces.
New access steps and crossover footbridge as per existing.
New retractable steam supply pipelines, hoses, and all associated fixtures and fittings.
New retractable hot water supply pipelines, hoses, and all associated fixtures and fittings.
New retractable diesel oil supply pipelines, hoses, and all associated fixtures and fittings.
New swivelling purging air supply ducts, with flexible skirts, and all associated fixtures and fittings.
New purging air fan(s), motor(s), and controls.
New platform lighting and controls.
Platform electric panel.
Communication system.
Wagon movement security system.
Fire safety system, including alarms.
New effluent collecting channels, with heating coils, between the rails, for the platform trackwork.
New concrete base and containment walls.

The bitumen plant part of the contract shall include:

Construction of :
One operator access platform 72 m long, including all handrails, toe boards, and safety surfaces.
Access steps at each end.
Steam supply pipeline, hoses, and all associated fixtures and fittings.
Platform lighting and controls.
Platform electric panel, including supply for portable pumps.
Communication system.

Fire Safety system, including alarms.
Concrete base and run off to bitumen pool.
Approach roads to platform.

Other items to be supplied as part of the contract include :

Portable bitumen pumps.
Cleaning lances.
Safety equipment.

Construction of gas main - (optional extra)

Training of the Beneficiary's staff in the operation and maintenance of supplied equipment.

The appointed Contractor will be solely responsible for ensuring that the total plant will operate in a satisfactory manner and in compliance with all regulations.

The Beneficiary shall, after due notice which shall be agreed beforehand, remove and re-install the trackwork to meet the working requirements of the Contractor, at the Benefactor's own expense.

3. Main Technical and Design Demands

3.1 Interior Wash Plant

3.1.1 Platforms

The Contractor shall demolish and remove from site the existing wash platforms in a phased manner to suit the operational requirements of the Beneficiary.
The platforms shall be constructed from steel to GOST standard, or equivalent, according to SNP P-23-81 Construction Norms and Rules, or equivalent.
They shall conform to the dimensions in, and be generally in accordance with drawings no. 98009 1 and 2.
Access steps and a footbridge similar to existing shall be provided
The platforms and steps shall have a safe walking surface when contaminated with oil.
Handrails, on both sides, with provision for access to wagon manholes, to be provided.

3.1.2 Steam Supply Pipelines

The steam supply pipelines shall be electrically welded, steel, to GOST 10704 - 76, or equivalent.
They shall be 100 mm. dia for 100 m along platforms, and 89 mm dia. thereafter.
There shall be one supply line to each platform, with separate isolating valves at the point of supply.
There shall be one take of point at each wagon position, 50 mm dia. approximately 2 m. long, with an isolation ball valve type DU 25, or similar.
All pipework shall be insulated. The composition of the insulation materials to be as follows:

anti-corrosion layer - isol of two layers by cool isol mastic type MPB - X - T 15, or equivalent.
main layer - mineralised wool.
surface layer - rolled material made of glass and plastic.

Retractable steam hoses and fittings shall be provided to access the tank interiors.
They shall be 100 dia. End fittings proposed to be approved by the Beneficiary.

3.1.3 Recycled Water Supply Pipelines

The recycled hot water supply pipelines shall be electrically welded, steel, to GOST 10704 - 76, or equivalent.
They shall be 100 mm. dia for 100 m along platforms, and 89 mm dia. thereafter.
There shall be one supply line to each platform, with separate isolating valves at the point of supply.
There shall be one take of point at each wagon position, 50 mm dia. approximately 2 m. long, with an isolation ball valve type DU 25, or similar.
All pipework shall be insulated. The composition of the insulation materials to be as follows:

anti-corrosion layer - isol of two layers by cool isol mastic type MPB - X - T 15, or equivalent.
main layer - mineralised wool.
surface layer - rolled material made of glass and plastic.

Retractable hot water hoses and fittings shall be provided to access the tank interiors.
They shall be 100 dia., and have suitable connections for attaching trigger nozzles, and rotary spray lances as per para. 3.3.2. below

3.1.4 Diesel Oil Supply Pipelines

The diesel oil supply pipelines shall be electrically welded, steel, to GOST 10704 - 76, or equivalent.
They shall be 32 mm. dia.
There shall be one supply line to each platform, with separate isolating valves at the point of supply.
There shall be overhead take off points on each platform , with isolating valves.

Retractable hoses suitable for diesel oil and fittings shall be provided to access the tank interiors for the spraying of diesel oil for cleaning.

3.1.5 Tank Purging System

The air supply for tank purging should preferably be supplied from one large centrifugal fan.
Ducts shall be from lightweight steel 200 mm. dia.

They should be positioned on the platforms in such a way that they can be swivelled over the tank man holes, and should be fitted with flexible skirts.

Capacity should be a minimum of m^3 / min.

3.1.6 Lighting

The platforms shall be fitted with spark-proof lighting situated above the centreline of the wagons, of the H45 - 300 MA type or equivalent, to give an illumination of a minimum of 2 (??) lux on the working platforms, and 0..5 (??) lux elsewhere.

A general layout of the required lighting scheme is shown on Drawing 98009 -

3.1.7 Communications

The Contractor shall provide an effective means of voice communication between each of the following points

- The interior wash platforms.
- The boiler house.
- The pump house.
- The dispatcher's office.
- The plant director's office.

The No. 2 wash platform shall be provided with three points, and the No. 1 platform with one point, all points to operate in parallel. Each apparatus shall consist of a loudspeaker / microphone mounted in a panel at head height, with a means of selecting communication with the above points individually

The dispatcher's office shall be provided with a similar hands free apparatus.

The boiler house, pump house and director's office shall be provided with a hand set with a selective direct calling facility.

3.1.8 Wagon Movement Security System

The Contractor shall provide a separate wagon security system for each line.

It shall consist of, for each line, two signal lamps at the end of the platform, clearly visible along the entire length of the corresponding platform, and shall be connected to a separate repeater light for each line in the dispatcher's office.

Each system shall have a red and a white lens, and a two position switch. The repeater lamp in the dispatcher's office shall be "on" when the wagons are cleared for movement and the signal light is "white".

3.1.9 Fire Safety System

Requirements to be advised by the Beneficiary as soon as the information is received from the Fire Authority.

3.1.10 Base and Effluent Channels

The Contractor shall break up, and remove from site to a designated dumping area, the existing concrete base and contaminated sub grade, all associated channels, heating pipes, etc., in a phased manner to suit the operational requirements of the Beneficiary.

A new concrete base and effluent channels under the tracks shall be constructed generally in accordance with Drawing No 98009 -1-AC.

The channels shall be fitted with 89 mm steam heating pipes,

3.1.11 Trackwork

The Beneficiary shall remove the existing trackwork, and replace the trackwork, in phases to suit his operational requirements, and with prior agreement and due notice from the Contractor.

It is proposed to relay the track on half sleepers in the area of the effluent channels.

The General arrangement of the trackwork is shown on drawing no 9808 - 0

3.2. Bitumen Wagon Plant

3.2.1 Bitumen Platform

The platform shall be constructed from steel to GOST standard, or equivalent. according to SNP P-23-81 Construction Norms and Rules, or equivalent.
It shall conform to the dimensions in, and be generally in accordance with, drawing no. 98009 -2-KM.
Access steps shall be provided at both ends.
The platforms and steps shall have a safe walking surface when contaminated with oil.
Handrails, on both sides, with provision for access to wagon manholes, shall be provided.

3.2.2 Steam Supply Pipeline

The steam supply pipeline shall be electrically welded, steel, to GOST 10704 - 76, or equivalent.
It shall be 100 mm. dia to the platform, and 89 mm dia. thereafter.
There shall be an isolating valve at the point of supply.
There shall be one take of point at each wagon position, 50 mm dia. approximately 2 m. long, with an isolation ball valve type DU 25, or similar.
All pipework shall be insulated. The composition of the insulation materials to be as follows:

anti-corrosion layer - isol of two layers by cool isol mastic type MPB - X - T 15, or equivalent.
main layer - mineralised wool.
surface layer - rolled material made of glass and plastic.

Steam hoses and fittings shall be provided to access the steaming coil connections on bitumen wagons, and to connect with portable coils for insertion into the tank interiors.
They shall be 100 dia. End fittings proposed to be approved by the Beneficiary.

3.2.3 Lighting

The platform shall be fitted with spark-proof lighting situated above the centreline of the wagons, of the H45 - 300 MA type or equivalent, to give an illumination of a minimum of 2 (?) lux on the working platforms, and 0..5 (?) lux elsewhere.

A general layout of the required lighting scheme is shown on Drawing 98009 -

3.2.4 Electricity Supply

The Contractor shall lay a new underground electricity cable to supply lighting and power points for portable bitumen pump operation, from the main sub-station on the wash station to a lockable main isolation switch at the bitumen platform.

Two power points with isolation switches for portable bitumen pump operation shall be provided on the platform.

3.2.5 Communications

The Contractor shall provide an effective means of voice communication between the bitumen platform and the dispatcher's office.

The apparatus shall consist of a loudspeaker / microphone mounted in a panel at head height.

3.2.6 Fire Safety System

Requirements to be advised by the Beneficiary as soon as the information is received from the Fire Authority.

3.2.7 Base

The Contractor shall provide a concrete base approximately 85 m. x 9 m., as shown on Drawing No 98009-2-KM, below the platform area. The base shall slope sideways towards the bitumen pool to provide a run off for discharged residues

3.2.8 Trackwork

The Beneficiary, having been given adequate notice, shall remove and replace the trackwork to suit the requirements of the Contractor.

Other Items

3.3.1 Portable Bitumen Pumps

The Contractor shall supply three portable electric pumps, of capacity 30 tonnes per hour, suitable for pumping heated bitumen of high viscosity with a head of 8-10 metres.

3.3.2 Cleaning Lances

The Contractor shall supply thirty high pressure water rotary spray lances, for insertion into the tanks, for spraying the interior walls with hot water after steaming.

3.3.3 Safety Equipment

The Contractor shall supply the following safety equipment:

Oil resistant overalls.	120 no.
Industrial safety boots - oil resistant	120 no.
Respirators	120 no.
Spark-proof lamps -rechargeable	35 no.

3.3.4 Gas Supply Pipeline

The Tenderer shall include, as a optional extra to the contract, for the laying of a new gas main to the plant from a connection on the main "Bakgas" Gas Company pipeline neat the Baku - Sumgait highway, to the boiler house of the Balajari Wagon Wash Plant.

The installation shall meet the technical conditions laid down by "Bakgas" in their letter of 09/06/98.

Technical information on the materials required is given in Appendix 6, and an attachment gives details of the route.

3.4 Signalling

The entire system of internal wash and bitumen platforms should comply with signal and blocking requirements.

3.5 Interfaces with Existing Equipment

The Contractor shall supply all components and materials to interface with the existing water feed lines, steam lines, and electricity supply.

3.6 Surface Protection

All structures and parts which are not made of non corrosive material shall be primed and painted. The Tenderer shall attach to the tender full paint specifications to be used..

3.7 Design Criteria

3.7.1 Specifications

The specification generally refers to Russian State Standards, Codes of Practices, Sanitary Standards, All-Union standards, Departmental Standards, Guidance Documents and Regulations, which in most cases still apply in Azerbaijan.

Where these standards are not required by law, the use of equivalent international or national standards is acceptable. The latest available edition of any named standard or code shall apply, unless indicated specifically to the contrary.

All regulations applying must be as per the law of Azerbaijan.

The Tenderer shall include in his Tender full details of all standards and codes of practice which he proposes to apply to the contract.

3.7.2 Drawings

A list of drawings supplied as part of the contract documents is appended.

These are supplied as an aid to the Contractor to enable his design to meet the requirements of the Beneficiary.

3.7.3 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors shall be incorporated into the design, whenever practical.

3.7.4 Accessibility

Restricted accessibility of modules, assemblies and other items is a large contributor to the extension of repair time. Configuration of the structure and the layout of services and equipment shall allow free and easy access for maintenance personnel and for tools and equipment which are required to perform the repair task.

3.8 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high standard of construction. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and controls over all testing and special processes, checking manufacturing and construction methods, materials and bought-in items, for compliance with applicable specifications, making reports of inspections and tests to be provided to the Beneficiary as will be outlined in the final contract agreement. Test and inspection reports shall be furnished.

The Contractor shall submit a certificate of his quality control system according to ISO 9000 - 9004.

3.9 Training

On completion of the construction, during the commissioning period the Contractor shall provide training and instruct, in the Russian language, the Benefactor's staff on the operation and maintenance of equipment supplied.

3.10 Final Adjustment and Testing

After the plants have been constructed and otherwise made ready for operations, they shall be tested to demonstrate conformance to all requirements defined in these Specifications.

3.11 Safety Arrangements

General construction and detailed design of equipment supplied shall conform to all safety regulations and codes applicable in Azerbaijan, with the addition of the following:

Sufficient labelling of controls should be provided to ensure the safe operation of all equipment. All labelling must be in the Russian language, as well as in the contractor's own language if different.

3.12 Documentation

The Tenderer shall provide the following "as built" documentation, in the Russian language, as well as one copy in the contractors own language, if different, delivered to site not later than one month after completion:

General Construction Layout Drawings	4 copies
Operation and Maintenance Manuals for equipment supplied	4 copies
Wiring and Pipework Diagrams	4 copies

3.13 General Instructions

The Tenderer shall submit with his proposal detailed drawings to enable the Beneficiary to assess the proposed design.

The Tenderer shall submit with his proposal detailed specifications of equipment to be supplied, together with all associated fixtures, fittings and connections to existing plant.

The Tenderer shall offer standard products as close as possible to the given technical specifications.

All materials and goods supplied must be new.

3.14 Warranty Period and Defects during Warranty Period

The Contractor shall, at his own expense, make good any defects arising during the period of 24 months following acceptance.

The Tenderer should outline his proposals for dealing with defects during the warranty period.

4 Spares

The Tenderer shall submit with his bid a list of recommended spare parts for the fittings and equipment to be supplied, including consumables for a period of three years, duly completed and priced, to the value of 5% of the total ex-works price of the fittings and equipment part of the contract.

The spare parts lists should include the following data elements:

- Sequence number
- Tenderer's part number
- Item description
- Figure and item number in the illustrated parts breakdown drawing if applicable
- Quantity
- Unit price
- Total price

5. Bill of Quantities

Beneficiary : Azerbaijan Dovlet Demir Yolu (ADDY) - Azerbaijan Railways

5.1 Tender

The Tenderer shall provide a fully priced itemised Bill of Quantities with his Tender, giving a full breakdown of the total tendered price.

5.2 List of Spares included in the Tender

The Tenderer shall attach a priced list of spare parts included in the Tender

5.3 Optional Item in Tender - Gas Main

The Tenderer shall provide a separate itemised fully priced Bill of Quantities for the optional gas main, with his Tender,.

APPENDIX 1

Balajari Tank Wagon Washing Station

Oil Specifications

Heavy Fuel Oil

Heavy fuel oil known as **"Mazut"** to Specification M 40.

Specific Gravity : 0.930 - 0.940

Oil may occasionally be to Specification M 100.

A recent analysis is as follows :

Mazut of M-40 type, low sulphur
GOST 10585-75 with changes., N5

N	Indicator	Actual
1	Viscosity at 80, not more than, conventional, degree , corresponding to sq m/sec c (CT)	8 59
2	Ash content, not more than	0.12
3	Percentage of water % not more than	1
4	Percentage of mechanical mixtures, % not more than	0.5
5	Content of water soluble acids and alkalines	not present
6	Portion of sulphur for not more than	1
7	Flash temperature for detecting in open crucible, not less than	90
8	Freezing temperature,C not lower	25
9	Lowest combustion heat to convert to dry fuel Jl/kg/Kca//kg	3 40740*10 /9730/
10	Density at 20 C,g/sm, not more than	no standard

Recovered Oil

The boilers are required to burn a proportion of recovered oil after separation from the oil / water emulsion, known as **"Sno"** :

	Average	Range
Viscosity centistokes	24	24-35
Specific gravity.	0.923	0.900-0.940
Flash point c	140	
Water content %	7.5	3-10

May contain up to 10-12 Kg of crude oil in 60 tonnes.
There are plans for an increased reduction in water content.

Above information supplied by Balajari Wash Plant.

Recovered oil analysis from sample taken for EBRD Environmental Report June 1998:

Viscosity	1.453 E which is 5.7 mm2/s
Specific gravity.	0.9007 g/cm2
Marcusson flash point	98 c
Ignition Temperature	118 c
Water content	8-10 %

APPENDIX 2

Balajari Tank Wagon Washing Station

Results

Boiler Feed Water Analysis 1998

Selective operation control of the chemical water-preparing unit of the boiler-room has been carried out. The hardness of the feed water after nitric cationic filters, of the Ist and 2nd stages, and the hardness of water in the deaerator, have been measured.

The average results obtained are as follows:

	After stage 1	After stage 2	In deaerator
Hardness mg equiv./l	0,35 - 0,60	0,01 - 0,02	0,01 - 0,03
PH	-	-	7 - 9

Chief Engineer of Balajari Wagon Washing Plant (Signed) Agaev A.A.

Head of the Laboratory - Balajari Wagon Washing Plant (Signed) Makhmudov C.N.

Water analysis from samples taken for EBRD Environmental Report June 1998:

	Conductivity Micro Siemens / cm	Hardness CaO mg / l
Raw water	925	179
Boiler feed water	1060	4.4

MAIN INDICATORS OF THE PERFORMANCE OF EFFLUENT TREATMENT FACILITIES

N	Name of process	Concentration of contaminations (mg/l)							
		Suspended substances		Oil products		pH		BPK complete	
		Before construction	After construction	Before construction	After construction	Before construction	After construction	Before construction	After construction
1.	Treatment facilities for recirculation water supply	500	20	800	70	7 / 13	≈ 7	150	30
2.	Treatment facilities for additional chemical treatment before discharge into sewers	20	5 / 8 {375 ?}	70	5 / 8 {2.0 ?}	≈ 7	≈ 7 {6.5-8.5 ?}	30	15 {375 ?}

**Subject to revision by ADDY - figures in { } are requirements of Baku City Sewage Authority "Bakkanallizzatcia"

Balajari Tank Wagon Washing Station

Reference

Permissible Emissions to Atmosphere

This reference relating to Azerbaijan Railways has been made according to the basis of first documentation for determination and prediction of air pollution.

In the process used at Balajari Wash Plant, emissions to the atmosphere having a detrimental influence on the environment are mainly : tars, welding fumes, dust, SO_2, CO, NO_2 and light organic compounds.

Characteristics and parameters of waste sources have been made according to the first documentation of Maximum Permitted Pollution (MPP), eco-passport, and statistic references.

The main sources of waste are boiler house, welding area, and collection and purification installations.

Air pollution from the washing plant is less than the maximum permissible levels. The Wagon Washing Plant has a sanitary fence 50 metres wide.

Consequently the Wagon Wash Plant can be considered as a part of third category of risk in categorising plants on risk levels. Therefore all existing pollution must be considered under MPP.

According to the laws of Azerbaijan Republic "Pollution protection" the State Ecology Committee decided that all atmospheric discharges are considered to be under MPP regulations of 29/10/97.

Characteristics of all polluting substances:

	MPP	1996	1997	1998
ALL		74,316	47,465	50,242
Including solids		1,395	3,783	6,468
Gaseous		72,921	43,682	43,774
SO_2		12,559	16,715	9,688
CO	52,000	44,866	20,408	20,373
NO_2	19,448	15,496	5,270	13,713
C	1,270	-	1,270	-
Welding aerosol	0,017	-	0,112	0,011
	0,00078	-	-	0,000075
Oil vapours	0,126	0,100	0,190	0,130

Two new boilers, manufactured in Canada in 1992, which could allow the reduction of atmospheric emissions for 1997-1998, have been installed

Characteristics: Serial numbers 504535, 504536, horizontal flame tube, with a maximum steam pressure of 12 atm, and steam production 8 t/hour. Main fuel is natural gas, reserve fuel -diesel.

I. Equivalence of fuel

$$E = \frac{Q_H}{7000\ k\ kal/22}$$

Q_H minimum calorific value of natural gas - 8050 k.kal/kg

for diesel:

$$Eg = \frac{8050}{7000} = 1,15 \qquad Ec = \frac{9,590}{7000} = 1,37$$

2. Annual amount of fuel used

T gas = 650 m^3 / hour x 24 x 365 = 5.694.000 cu.m
T diesel = 560 lit. / hour x 24 =13400 lit. = 11550 m^3/gas

Diesel is considered as a reserve fuel

Average consumption 560 l / hour
560 l / hour 24 hours =13440 l / day = 1550 kg / day

While burning this amount of diesel, discharges to atmosphere are:

Total	10.1 x 11550	=1,165
among them only solids	2,0 x 11550	=0,231
gaseous	8,1 x 11550	=0,934

including

SO_2 3,0 x 11550=0,346
CO 5,0 x 11550=0,577
NO_2 0,1 x 11550=0,011

Annual amount of working hours of the boiler-house is 8760.

Height of discharge is 30 m. Diameter of the pipe orifice is 0,7 m. Parameters of air/gas liquid on the way out of the waste source: speed--9,02 m/s, volume--2,22 m^3/s, temperature--96,5^0.
Here steam is being used in order to clean wagons during the year.

The following report was made according to the recommendation from the office of State Ecology Committee.

CO 0,008 x 5694000 m^3 / gas = 5,694 kg
NO_2 0,034 x 0,075 x 5694000 m^3 / gas = 14,519 kg

Therefore in the year of 1998, discharges to atmosphere consists of:

Total		20,213 kg
among them only	solids	none
	gaseous	20,213 kg

including

SO_2	none
CO	5,694 kg
NO_2	14,519 kg

In a year of 1998 during a period of repairing works (28 days) working with diesel 28 days 24 hours = 672 working hours, discharges to atmosphere:

Total		32,664 kg
among them	solids	6,468
	gaseous	26,196

including

SO_2	9,702
CO	16,170
NO_2	0,324

Until the end of the year, 8088 hours working on natural gas calculations show:
50 m^3 / hour x 8088 working hours = 5257,200 m^3 would be discharged:

CO	0,008 x 5257200 m3	= 4,217 kg
N02	0,034 x 0,075 x 5257200 m3	= 13,405 kg

which makes:

Total	17,622 kg
Solids	none
Gas, liquid	17,622 kg
including	
SO_2	none
CO	4,217 kg
NO_2	13,405 kg

Results: by the end of 1998 discharges to atmosphere will consist of:

	diesel burning	gas burning	All waste
All	32,620	17,622	50,242
Solids	6,468	-	6,468
Gaseous	26,152	17,622	43,774
SO2	9,688	-	9,688
COO	16,156	4,217	20,373
NO2	0,308	13,405	13,713

Water

There are no ponds, sediment, drain systems, reservoirs (except fire reservoirs) and storehouses on the Wagon Washing Plant.

Water use (m^3):

1996	1997	1998
66,260	96,150	118,52

Water source is city water pipe: diameter--100 mm, number of the report D-13, tip of the pipe STV-100.

Daily use of the water is 377,0 m^3/day, for agricultural needs-54,97 m^3 , therefore on industrial needs-323,73 m^3/day.

Waste water is being discharged to the city sewerage system. Water is used in the cleaning process. After the process it can be reused. A special laboratory controls water quality after cleaning.

Quality structure of waste waters in Wagon Washing Plant (daily):

a) Volume of waste 298,28 m^3/day
b) Agricultural 39,97 m^3/day
c) Industrial pollution 258,31 m^3/day
d) From them pure 44,07 m^3/day

Concentration of the basic pollutants in the domestic waste waters of the city sewerage as a norm takes 12,33 m^3 / hour in compositions of N, Cu, chlorides, sulphates and weighted substances.

The Wagon Wash Plant does not use rainwater, as there is no surface water collection system,

Director of Balajari Wagon Wash Plant (Signed) Akhundov T.M.
Head of Environmental Department (Signed) Agadjanli A.A

7.8.98

APPENDIX 4

27/11/98

Azerbaijan State Railways

Balajari Tank Wagon Washing Station

RULES FOR LABOUR SAFETY

"Safe methods of working for the technological process of preparation of tanks for loading and repair"

(see file : safety.doc)

Azerbaijan State Railways

Balajari Tank Wagon Washing Station

RULES FOR LABOUR SAFETY

"Safe methods of working for the technological process of preparation of tanks for loading and repair"

1 GENERAL

Within the structure of the wagon service of Azerbaijan State Railways there is the Tank Wagon Washing Station, as an independent cost centre, located at Balajari station. The main task of the washing station is to prepare railway tanks for loading with oil products.

The washing station with the capacity of 250 tank wagons per day is classified in the 3-d category and carries out the following tasks:
- preparation of tanks for filling or repair, on time and to standard.
- exterior washing of tanks.

Goods transported in tanks, with some exceptions, are a danger to personnel by their characteristics and in most cases are toxic. Incorrect treatment of such goods and the use of prohibited methods of tank treatment may cause intoxication, burns on exposed parts of the body, eye injuries as well as explosions and fire. Due to that the established technological process must be strictly fulfilled and technical Safety and industrial Rules for preparation of tanks for filling and repair must be strictly observed (GOST-1510-60).

The Rules for transportation of goods in tank wagons :- Safety Rules for railway workers on electrified lines, Rules for prevention of leakage of oil-products, acids and other chemicals in water during transportation, loading , unloading and tank washing, as well as the rules of fire safety on the railway transport, must be observed.

All employees of the washing station are to keep strictly to the Technical Safety Rules, to apply appropriate operational methods, to work in special protective clothing, special shoes and with other means of special protection, to be systematically tested as regards their knowledge of the Technical Safety Rules, medically examined and pass the industrial instructions test on labour safety. Persons under 18 years old as well as females are not allowed to work as washers, steam-operators or operators for tank valve filling. By the requirements of the labour safety, tanks being exclusively used by the freight consignors or receivers , as well as tanks attached to the places of filling and discharging for transportation of goods of a special nature, are not treated at the steam-washing station.

To perform correctly the established technological process of tank treatment and for execution of works for prevention of industrial accidents, professional diseases, the following requirements must be observed strictly:

- requirements to constructions, mechanisms and other facilities of the washing station;
- requirements of the Rules for preparation of tanks for filling and repair;
- norms, rates of issue and use of protective clothes, protective shoes and other means of individual protection;

- requirements to observe Technical Safety Rules of industrial sanitation for washers and steam-operators and operators for filling and repair of valves of the outlet devices of the tanks;
- requirements to observe electric safety;
- requirements to private sanitation during production;
- instructions for rendering first aid to injured people and medical care;
- requirements for sanitation and other premises and facilities;
- requirements for the work according to warning signs of the constructions and facilities located on the area of the washing station;
- requirements to keep the established norms of artificial lighting on working places by treatment of tanks;
- requirements of fire-prevention;
- requirements for professional man power selection and examination of labour safety norms of the employees of the washing station;
- control and responsibility for execution of labour safety requirements.

2 MAJOR REQUIREMENTS FOR STRUCTURES, MECHANISMS ,AND OTHER FACILITIES OF THE WAGON WASHING STATION.

The Washing Plant has been built and maintained as per the sanitation and fire – prevention norms.
Parts of the territory of the wash station, where the immediate treatment of tanks takes place are explosive areas and require devices for protection and prevention of the penetration of oil products into the ground, spark proof wiring for exterior lighting to be installed, constructions are to be made of fire-proof materials: concrete, ferro-concrete etc.

For treatment of tanks containing ethyl gasoline /blended gasoline/ or chemicals, individual over-head platforms /gantry/ with installation of special sanitation - amenities premises are separated from common facilities.

Over-head platforms must have properly functioning longitudinal barriers with a height of 1 m, line bridges, grounds and handrails. Decking and steps of the staircases are manufactured from chequered sheet steel.
For feeding of steam and hot water the washing station is equipped with pipeline systems, that are to be covered by heat-isolation materials to protect against burns and to avoid the loss of heat for tank treatment.

Depending on the purpose, pipe-lines are painted in different colours: steam-pipe - in red , hot water pipe – in green, vacuum system – brown.

For draining off waste water and oil products the troughs are arranged along the over-head gantry axis, each pipe to be closed by metallic grating from above.

Troughs are equipped by heating devices.

For labour facilitation and creating of safe labour conditions, pumps, compressors and ventilation devices must be installed at the washing station; by means of pumps oil products are pumped and waste waters removed, compressors feed condensed air to the working places and with the help of ventilation devices the tanks are degassed. Electrical equipment of pump and ventilation must be explosion-safe. Vacuum devices are to conform to the requirements of the Instruction for operation of vacuum-devices at the washing station. For safe operation of the steam-siphon housing and reservoirs, where the residuals from tanks come, are to be earthed.

Devices, equipment, tools applied for washing of tanks are manufactured from spark-proof materials. Belt drives of ventilation and compressor installations are to be fenced. Pump

sections of oil traps, and the oil catchers, attended by people, are equipped with inlet and extraction ventilation and special devices.

Installations for cleaning of waste waters of the washing station are equipped by special filter devices, that drain waste water, safe for reservoirs. At the washing station the fencing system installed for treatment tanks is applied with the help of specially fixed traffic lights, with the signal indication in the direction of the possible movement of the locomotive. Protection stop signals are switched on by the relief master, the indications are repeated on the control panel at the operators. At the over-head platform a warning signal for alarm is envisaged.

Equipment, intended for steaming, washing, deaeration and other purposes, must be kept operational, be installed at fixed places, and not disturb the work and free passage on the over-head platform. Movements on the area of the washing and steaming station to the working places, office, medical center, sanitation premises and facilities, must be done strictly by the established scheme of passage along a safe route.

3 PREPARATION OF TANKS FOR LOADING AND REPAIR

Tanks wagons subject to maintenance are to be inspected thoroughly, and the analysis of the goods remains in them must be carried out at the chemical laboratory.
The technology for tank treatment includes the following operations: removal of the residues from the tank; steaming of the tank with hot water; drying and wiping of the tank walls, degasification of the tank in case of its repair.
The network of pipe-lines and steam-pipes, connected directly with the tank , communicating bridge at each tank, vacuum installations, devices for washing and steam-siphons for rests removal, mechanized devices for tank washing, degassification devices and installations, or steam-ejectors for tank degasification are the means of mechanization, appliance of which reduces maximum the time of washer's stay inside the tank during treatment and thus facilitates his job.

The means for mechanization must be kept completely functional. The attending personnel must be trained to use it properly.
The remains of goods are drained in different reservoirs with the help of vacuum device and pumps.
While using steam and water-siphons these residues are directed into drainage troughs without letting them spray on the tanks and the ground. Before starting steaming or washing of tanks, the worker performing this job must be completely sure that there is no one inside the tank.

In accordance with the technological process for mechanised washing, tanks are washed by water heated up to temperature of 70 ° C , and manually, by means of a flexible hose - not less than 40 C. Cooling off, drying and ventilation of tanks is carried out by ventilation and compressor devices as well as with the help of transportable steam-injectors.

The washers and other operators go down inside the tank by a permanent internal ladder, and when not-available – by a portable ladder. From the moment the washer goes down into the tank and until he goes out of it, the second washer (the 'upper') must stay continuously at the hood of the tank. The second washer puts on similar protective clothing, protective shoes like the first one inside the tank and has a safety belt on with a rope and a hose respirator. He watches the work and the condition of the washer inside the tank, responds to the signals given by means of the rope, renders the necessary assistance in work and in case of accidents saves the injured person, giving the alarm.

Letting the people down in un-steamed tank or the tank with the residue of goods is only allowed when the hose respirator and safety belt is attached to the protective clothing and fixed on the buckle, and the safety rope, with one end being fixed to the upper ring of the

safety belt must be at least 10-12 m and with knots being from each other at the distance of 0,5 m. The safety rope must stand the load of at least 200 kg. Before getting down into the tank, the washer puts on the mask and after being in it at least 3 minutes, makes sure that the hose respirator is in order, checks whether the outer ends of the hose and the safety belt is fixed correctly to the handrails at the hood area from the outer side as well as the correct fixing of the flexible hose with the clutch, feeding the air to the respirator valve.

Tools and materials necessary for the work inside the tank are passed over and pulled out in a bucket, made of material free from spark formation. While getting down into and out of the tank, the washer must not hold any objects in his hands.
The operation of both washers by interior treatment of a tank is coordinated for securing complete safety.

Simultaneous entry of both workers inside the tank is not allowed. By interchanging of work places the established procedure must be observed: at first the inside worker must go out of the boiler and after that the upper worker must go down into the boiler.

The interior treatment of the tanks without a hose respirator must be permitted only if all the works on residue removal, steaming , washing and ventilation by the inflow of air are performed by no less than 60-times exchange. To avoid spark formation and subsequent explosion in the tank, all metallic objects /fallen ladders, wave cutters etc. are removed from the tank and transferred only after complete cleaning, washing and degasification of the tank.

4 RATES OF ISSUE AND USE OF PROTECTIVE CLOTHING, PROTECTIVE SHOES AND OTHER MEANS FOR INDIVIDUAL PROTECTION

The workers engaged in preparation of tanks for filling, - washers, steam - operators, tank cleaners, fitters for repair and charging of valves, are provided with the individual special protective clothing and special protective shoes of the appropriate size, growth with the established type of material impregnation and besides, use the tools for individual protection: a safety belt, a hose respirator with chequered respiratory pipe, respirator, explosion-proof accumulator torch, rubber gloves and boots.

Two spirit-proof suits must be available at the washing station. The mask for the hose device is chosen individually for each operator.

By entering on duty the worker dealing with the tank treatment, puts off his home clothes and puts on special protective clothes, protective shoes instead, as well as the safety belt and has them on in the course of the working day.
During operation inside the tank, working boots must be of tarpaulin on wooden studs and without steel nails and toes.

At the washing station the permanent reserve stock of protective clothing, underwear and hose respiration devices with at least one set per each 20 persons, working in one shift, must be available in order to change timely protective clothes by its contamination by ethyl gasoline or other toxic goods.

Protective clothing for workers must be washed at least once a week, and in each case of considerable pollution. By treatment of tanks out of ethyl/ blended gasoline, protective clothes are washed separately from the other ones, and before washing, are treated by sharp steam at least temperature of 110° C and pressure of 2 atm. for one hour to remove toxic substances containing tetraethyl lead.

Pneumatic suit worked out by the All-Union scientific-research Institute for the Railway Transport in co-operation with the group of the Balajari Washing Station is the most perfect protective clothing for the washer. Pneumatic suit consists of a closed helmet, jacket

with safety belt, trousers and pneumatic system, through which the air is fed into the suit. The helmet looks like double-layered hood with pelerine.

At its front side the hood is covered by an inspection glass with the apron, fixed to the sides of the suit jacket. It is oil-resistant protective clothing under which purified air cooled in summer and heated in winter is fed through a special system. Ventilation facilities in the suit secure the normal air inflow into the respiration area of the washer.

While working in such a suit it is not necessary to use a hose respirator as well as wearing a tarpaulin suit. Working in pneumatic costume the washer does not get tired and contaminated by the remains of the oil-products. In such a suit he is safely protected from penetration of toxic substances from the liquid goods into the body.

All means for individual protection are stored in separate dry rooms, isolated from any other objects and materials, sorted out according to their types, sizes and protective features.

The Administration of the Washing Plant arranges proper maintenance of means for individual protection. It carries out chemical cleaning, washing, repair, degasification, deactivation, decontamination of protective clothes in good time, as well as repairing /mending/ degasification, deactivation and decontamination of protective shoes and other means for individual protection.

Protective clothing and shoes are granted to the workers and employees at the washing station free of charge as per the norms /rates/ of protective clothing issue, declared by the order N 90-N of 18.07.96 of the Head of Azerbaijan State Railway, that identifies which categories of workers and what protective clothing, shoes and terms of their wear they are supposed to have as per their professional position..

The procedure of issue, change, repair, washing, cleaning, storing of protective clothing and shoes is regulated in the Instruction N 90-N, attached to this order, of providing the workers and employees with free protective clothing, shoes and other means for individual protection.

5 REQUIREMENTS OF INDUSTRIAL SAFETY RULES AND INDUSTRIAL SANITATION, FOR WASHERS, STEAM-OPERATORS AND OPERATORS, FOR FILLING AND REPAIRING TANK DRAINAGE VALVES

To avoid industrial injuries and diseases at the washing station, all the workers and employees, depending on the nature of occupations and professions, are to keep strictly to the set-up and acting Directives N CB - 2559 of 20.11.67 on the Safety rules and industrial sanitation for washing and steaming operators, and operators for filling and repair of tank drainage valves.

1. General

§ 1. Various oil-products, part of which are of toxic nature are transported in railway tanks. Consequently washing and steaming operators, as well as operators for filling and repair of drainage system valves need to identify correctly the nature of residues by their colour and viscosity; must know the effects of the main dangerous goods, especially methanol and the blended /ethyl/ gasoline for the human body as well as signs of intoxication, and the first aid rules.

§ 2. The blended gasoline /benzene/, benzol, sulphureous oil, containing free hydrogen, penetrate through the skin and may have toxic effects by contamination of hands and other parts of the body during wearing of contaminated clothing and shoes, as well as by availability of vapour of this products in the tanks.

§ 3. The most dangerous are: petrol of all grades, sulphurous oil, kerosene, kerosene distillate, benzol. Even a short stay of a person inside the tank, having the residues of them, without individual protection means, may cause heavy intoxication of the body. To such substances, irritating and causing skin burns, belong: petrol, ligroin, mazut, oil.

§ 4. The washing and steaming operators and operators for filling and repair drainage valve devices are obliged to know and implement exactly the safety requirements by preparation of tanks for filling and repair.

2. Safety measures before starting to work and by staying on the railway tracks

§ 5. Before starting the work washing and steaming operators, operators for filling and repair of tank drainage valves must put on protective clothes and check it and be sure that hose respirator device and safety belt is in order, check the firmness of fixing of the safety rope /its length must not be less than 12m and the distance between the knots be 0,5 m/. It is not permitted to work without clothes and individual safety/protection/ means.
The work must be executed only with functional tools, devices and explosion-proof torches.

§ 6. To avoid explosion of tanks, it is prohibited by their treatment to use tools, devices spades etc./, manufactured from spark forming materials.

§ 7. The mask for the hose respiration apparatus is selected individually. The length of the hose must be at least 12 m.

§ 8. Being on the railway tracks it is necessary to observe the safety requirements:

a) while walking to pay attention to the approaching trains and locomotive signals;
b) to cross the tracks only at the right angle making sure that they are free;
c) not to cross and run over the tracks in front of the moving locomotive and wagons.

By crossing the tracks occupied by the rolling stock it is necessary to use brake platforms of wagons or go round the train and cross the track behind it at the least distance of 5 m from the automatic coupling;

d) to walk only along the space between tracks, paying attention to the movement of the shunting trains and locomotives on the adjacent tracks;
e) to cross the track between uncoupled wagons, if the distance between their automatic coupling at least 10 m.
by crossing tracks to make sure that there are no moving trains on them and then step over the rail without treading on it.

§ 9. It is prohibited to sit on the rail.

§ 10. It is prohibited to be on the track spacing between the trains by their non-stop running at the station.

§ 11. For carrying of tank spare parts, hoses and other objects across the tracks one should use the brake platform of the wagons as well as specially set-up permanent passages, equipped by coverings at the level of the rail heads.

It is prohibited to transfer spare parts, hoses and other objects under the wagons.

§ 12. By internal inspection of tanks, repair and charging of drainage devices valves in darkness, the washers and fillers must use explosion proof accumulator torches.

3. Safe methods of work

§ 13. One may go up on the tanks only after uncoupling of the locomotive and fencing the train by stop signals.

§ 14. By inspection of uncleaned tanks it is prohibited to look inside through the hatch without a hose respirator.

§ 15. It is forbidden to go down the inside of tank boilers: after drainage of the ethyl /blended/ petrol, chemical goods, with unidentified residues of goods or with the residues of over10 cm;

- by non-availability of the ladder inside the tank boilers;
- without relevant protective clothes and shoes;
- without hose respirator;
- without safety belt and a rope fixed to it;
- without the second operator /upper worker/ at the tank, wearing protective clothing, shoes and having a safety belt with a rope on and ready hose respirator on. The tool and the torch must be handed over to the worker inside the tank in a bucket.

§ 16. Before descending inside the tank it is necessary:

a) to check, whether the hose respiration device is operational and is functioning for 2-3 minutes to make sure, if it is easy to breathe in the mask;
b) to make sure, whether the outer ends of the hose and the safety rope are fixed to the handrails of the hood platform from the outside

to check, if the flexible hose with the clutch feeding the air to the respiration valve is fixed on the belt strap.

§ 17. When the washer is operating inside the tank, it is necessary for the second operator (upper worker) to stay permanently at the hood on the outside and watch the position of the safety rope, respirator hose of the operator, as well as the signals sent from the tank.

The worker inside the tank (the lower operator) and the operator at the hood (the upper) must interchange places. Simultaneous stay of both the 'upper' and 'lower' operators inside the tank is prohibited. By interchanging the places the "upper" goes down into the tank only after the washer comes out of it and stands at the tank hood.

§ 18. If the operator in the tank feels the penetration of gas smell under the mask of the respirator or feels bad, he must immediately go outside, call the team leader or some other person in charge, and check if the device is functional.
Only after finding out the reason of gas and vapour penetration under the mask and its removal and after complete recovery to the normal condition may he continue his work.

§ 19. On discovering the nature. of the unknown substance inside the tank the operator must immediately go up outside and announce to the team leader or foreman the nature of the substance and means of its removal.

§ 20. While wiping the interior surface of the tanks, the workers must use tarpaulin gloves, and when washing the hood and its cover - the protection glasses.

§ 21. Non-steel objects found inside the tanks are taken outside and the fallen ladder, bar and other steel parts must be transferred and removed outside after washing and degasification of the tank.

§ 22. Before tank treatment washers and fitters must check:

- if there are no people inside the tank;
- correct connection of vacuum, steam-pipe or water-pipe sleeve with the mains and the mechanized device, steam-siphon, steam-injector and the functionality and correctness of their installation. Tanks need to be steamed or washed with the hatch cover closed.

To avoid spark formation and prevent explosion of the tank, the hatch cover should be taken down smoothly without blows.

§ 23. While removing the residues of goods and waste water from the tank in a bucket ,it is forbidden to splash them on the exterior surface of the tank, or pour them out on the ground.

The bucket must be filled with the residues of goods and waste water at least up to 2/3 of the bucket's height; and the bucket must be lifted from the boiler with the rope by the worker, standing at the open tank hood platform.

§ 24. A special attention is to be paid to the strict performance of safety measures by preparation of tanks after drainage of blended /ethyl/ gasoline from them. Blended gasoline is a brand of gasoline with the touch of ethyl liquid, containing 50 % of tetraethyl lead.

Tetraethyl lead is able to accumulate :

- in the body and cause sharp and chronic intoxication, that appear not immediately but some hours later and even after 7-10 day's period;

- on the walls and floors of buildings, surrounding objects and clothes of workers.

Consequently, special attention must be drawn to the strict observance of safety measures for the preparation of tanks after drainage of blended gasoline.

§ 25. Getting people down into the tank from which blended gasoline has been drained, is permitted only after removal of the residues, and after washing and degassing the tank.

§ 26. It is prohibited to remove petrol, condensate or waste water in buckets. This job must be done only with a pump or a vacuum device.

§ 27. Each operator engaged in treatment of tanks containing blended/ethyl gasoline must in addition have a tarpaulin suit, boots, mittens and apron on. It is forbidden to work in protective clothes and use the means for individual protection polluted with blended gasoline,.

§ 28. By contamination of protective clothes by blended gasoline, it is necessary to remove them immediately, take a shower, put on clean protective clothes and in case of necessity also the underwear. By a small contamination of protective clothing the stains after blended gasoline may be washed off by pure kerosene.

§ 29. In all cases of hand contamination by the blended/ethyl petrol it is necessary to wipe hands by pure kerosene and wash them with warm water and soap.

§ 30. To watch the operator constantly inside the tank it is necessary to ensure the following signalling:

a) one jerk of the rope means: draw the hose and the rope, and by this they must be pulled after the signalling of 'the upper' and receiving response signal - one jerk- from the tank. If no response followed, urgent measures to extract the worker from the boiler must be taken as the jerk occurred, probably, because of his falling down;

c) two jerks mean: send down the hose and the rope: such a signal is sent to the worker in the boiler when he needs to move in the bottom;

d) three jerks mean: everything is all right. The rope and the hose must be pulled by the operator inside the boiler and that's why 'the upper' must hold the rope and the hose so that not to disturb their getting down and prevent their falling. As soon a the worker stopped moving he must give the signal of three jerks. The "upper", if not receiving signals after cessation of the rope and hose movements, is obliged to inquire by doing one jerk on which he must receive the response of three jerks;

e) two jerks with considerable period of breaks between them mean : "send the bucket down" or "lift" the bucket;
f) Repeated jerks of the rope, sent by the "upper" mean that the person in the tank is obliged to come up to the hood or go up. Similar signals, sent by the worker from down mean to take measures to extract him out of the tank.

§ 31. Before inspection and cleaning of bunker open wagons /ladle cars/ it is necessary to make sure that bunkers are fastened to the frame by hooks from both sides.

§ 32. One should go up and down the bunker only by ladder. Before passing from one bunker to another one must be sure that it is in order and the cover fixed firmly to the bunker.
By non-availability of covers transition from one bunker to another must take place by means of scaffolds.

§ 33. Walking at the edge of the bunker and hopping from one bunker to another is prohibited. Before feeding steam into the steam jacket it is necessary to make sure of firmness of steam-pipe sleeve fixing to the bunker. Disconnection of the sleeves from the bunkers must be performed only after closing the tap of the steam-pipe mains.

§ 34. It is not permitted for operators to stay on the bunkers when turning upside down or setting in normal position.

§ 35. One may go down inside the bunker for repair only after removal of oil-bitumen out of it by heating and drainage of the latter in a standing position, setting the bunker in transport position and fastening it by hooks.

4. Electrical safety

§ 36. By lifting on the tanks and bunker open wagons located on special tracks of electrified lines, it is necessary to make inquiries with the foreman or team leader of the Washing Station that the voltage from the contact wire is off and it is earthed.

§ 37. On the sections with direct and alternating current, work without switching the voltage off from contact wires may be performed only without lifting on the tank wagons and bunker open wagons and under the condition that the workers do not approach themselves or through the objects in their hands, nearer than 2 m to the wires of the contact line.

§ 38. It is prohibited to touch the torn wires of the contact line irrespective of the fact, whether they touch or not the earth or the earthed constructions.

§ 39. Washers and fitters for repair and charging the valves after having found the break of the wire or other elements are obliged: to advise immediately the nearest duty post of the contact wire, station master-on-duty, train operator (dispatcher) or power supply operator, to fence this place before the arrival of the contact wire brigade and see that nobody approaches the torn wires at the distance of 10 m.

In case these torn wires or other elements of contact wire go out of the dimensions of the structures and can be touched by a passing train, this area needs to be fenced by stop signals as per the Signalling Instructions as the obstacle area.

§ 40. It is prohibited to touch foreign objects on the contact wires or thrown at them, for example, pieces of wire, ropes, cables and etc.

Washers, operators for filling and repair of valves, having found strange objects on the wires or other elements of contact wire are obliged to act similarly as by finding breaks of wire of the contact line.

5. Industrial hygiene

§ 41. Before taking a meal or smoking, the worker must wash his hands thoroughly with warm water and soap, and rinse his mouth.

§ 42. After work it is necessary to take a warm shower to clean the skin from contamination and to promote better blood circulation, relaxation and a calming down of the central nervous system.

By necessity (skin dryness, cracks and etc.) to use neutral ointment, paste or cream / boric Vaseline, lanolin cream on a doctor's prescription. Protective clothes and shoes should be kept in drying - room or dresser and the means for individual protection and safety belts with ropes - in lockers for work clothing.

§ 43. Wash - steam operators, operators for charging and repair of valves must take care of protective clothing and send them regularly for washing and repair.

It is prohibited to take protective clothes, protective shoes and means for individual protection outside.

§ 44. Taking meals or keeping foodstuffs at work places is not permitted.

§ 45. Washing and steaming operators , as well as fitters for charging and repair of valves, must:

g) apply regularly to the medical institutions to be examined in set-up terms;
h) be able to render the first aid in the absence of the doctor as per the Instructions.

Rules for rendering the first aid to the injured persons and medical care

At the washing and steaming station, a local instruction is in place, in which the order of notification of accidents with appliance of certain signalling is established.

Certain indicated areas and duties of each worker for rendering assistance to injured persons and accident liquidation are attached. All the workers become familiar with this instruction and are guided in their work.

For rendering timely assistance to the injured person, one reserve set of hose respirators with hose, two safety belts with ropes. the safety ropes must be contained separately in sealed wooden boxes with glass doors.

The boxes are to be unsealed weekly for control of the contents and then they are to be sealed again. First aid boxes are to be located near each box.

In the room for the worker-on-duty, the first-aid kit, and oxygen mask is to be available. There must be an oxygen bottle with regulator, resuscitation oxygen device /OAK-1/ at the first aid post. The room of the worker-on-duty, as well as the over-head platforms, are to be equipped with an electrical bell for sending signals to the first aid room, fire brigade, and the office.

The worker, taking the injured person out of the tank, is obliged to put on a hose respirator mask, then go down inside the tank, come up from behind to the injured, seize him above the elbows, bring him quickly to the tank opening and help him out of the tank, head first and hands down. If by doing this there are any difficulties, the rescuer, on taking the injured to the tank opening, must immediately change his hose respirator.
Masks must not be changed in tanks with a hydrogen sulphide smell, or sulphureous mazut,

The rescuer must remember, that an intoxicated person may be often not be of sound mind, and intoxicated with gasoline, ether, alcohol, or benzol vapours - in the same state but of a

wild form, and as a result they can exert resistance to the rescuer, sometimes hard, even striking a blow and biting. Therefore the rescuer must act resolutely, taking precautions by coming to the intoxicated person from behind, unnoticed, grasp him and press him to himself. The hands of the intoxicated must be pressed to the body to prevent him resisting. In most cases of light intoxication, the affected person becomes conscious again in the fresh air. After taking the injured person out of the tank, it is necessary to remove his head gear and the mask, and to loosen his shirt collar. In case of a heavy intoxication, it's necessary to loosen his belt, unfasten his clothes and take him out into the fresh air in the shade, and in winter – into a well ventilated room, and to render first aid before the doctor arrives. In case first aid measures do not help, artificial respiration as per one of the methods used in medicine must be applied. Artificial respiration must be carried out until the injured person starts breathing independently. One should bear in mind, that sometimes artificial respiration must be carried out for 2-3 hours or more, and only after that normal breathing starts.

Artificial respiration must be carried out when the injured does not breathe or breathes with long intervals between breaths. Artificial respiration must be started immediately. Before starting artificial respiration, it is necessary:

i) to release quickly the injured from his garment, undo his collar, untie his scarf etc.;
j) to remove any slime from his mouth the, remove dentures, if any;
k) to bring forward the lower jaw by tightly pressing jaws is necessary so that the lower teeth are a little forward.

All workers in railway transport must be able to carry out the artificial respiration and indirect heart massage.

Artificial respiration, performed by one person (first method)

The injured person must be put on his stomach , his head must be turned on one side and put on the hand of the injured. After that one should stand up on his knees over the injured with the face to his head, so that the thighs of the injured are between the knees of the person, rendering assistance, and put his palms on the back (lower rips) of the injured, grasping him with folded fingers from sides.

Bending forward and leaning on his stretched hands, press the lower ribs of the injured breathing out, then without taking the hands from the back of the injured, to lean back quickly. After 2-3 seconds all the movements must be repeated.

Artificial respiration, performed with the help of assistants (second method).

The injured person must be put on his back, a soft roll of cloth, etc. must be put under his shoulder-blade so that the head of the injured is leaning back, draw out the tongue and hold it, drawing it slightly to the chin. After that, standing up on the knees over the head of the injured the performer must seize him by the hands at the elbow and press them without much effort to the sides of his breast, breathing out. Then lift the hands of the injured up and put them behind his head, breathing in, after 2-3 seconds it must be repeated.

The artificial respiration "from mouth to mouth".

The injured is person is put on his back, with his face up. The face is covered by gauze or handkerchief. The performer stands at the head of the injured, makes a deep breath and then through the gauze or handkerchief blows air directly into the mouth of the injured person. The nose of the injured person must be held and the lips of the performer must be pressed tightly to the mouth of the injured person.
As soon as the thorax of the injured person, after blowing into his mouth, is expanded enough, blowing must be stopped and the thorax will fall. 12-14 of such blows must be made in a minute. If there is a soft rubber pipe of sufficient cross section, then artificial respiration may be carried out by introducing the pipe into one of the nostrils. The other one must be held

and air blown into the lungs through the pipe. The rubber pipe is introduced into the nose a distance of 10-12 cm.

If special air is available,– drain pipe, artificial respiration is made by a mouth-to-mouth method. Both ends of the pipe are bent equally by the shape of the tongue. Any of them must be introduced into the mouth of the injured person, and the loose end is taken into the mouth by the performer.

Artificial respiration by means of the portable device RPA-1 accordion, applied on the spot may be referred to the means of pre-medical assistance. The mask of the device is put tightly on the face of the injured, closing his nose and mouth, then connected to the 'accordion', air is pumped into the lungs of the injured person with a frequency of 15-18 breaths per minute, and a volume of air of 1-2 l.

Indirect heart massage.
One should immediately start indirect heart massage. when carrying out artificial respiration. The indirect heart massage is performed on the unnaked thorax.

To carry out massage the injured person must be laid on his back with his head back and his chin up. At the same time artificial respiration is carried out.

After making the thorax the lower end of the thorax is identified. The massage performer stands to the left of the injured, unbends the left hand and puts it on the lower part of the thorax. The massage performer puts the palm of his right hand on the inner part of his hand and presses in the direction of the spine, trying to cause clenching of the heart between the thorax and the spine. Pressing on the thorax must not be extremely hard to avoid rips and thorax breakage. After each grasping /pressing/ on the thorax, performed as a jerk, the massage performer takes away quickly hands from the thorax of the injured, letting it straighten. After 3-4 pressings a pause of 2-3 seconds is made. Applying heart massage, it is necessary to make 50-60 pressings a minute.

When acid is ingested, a solution of bicarbonate of soda must be given: one tea-spoonful in one water glass or a solution of burnt magnesia– two tea-spoonful to one glass of water or milk, or soap water. At the same time the mouth should be rinsed with a soda solution. In case of ingestion of caustic alkalis, weak solutions of lemon or acetic acid are used, and a 1% solution of lemon or acetic acid is taken as well as warm milk. With alcohol intoxication - wood, denatured alcohol, it is necessary to cause vomiting and provide the inflow of fresh air. The injured person must inhale an ammonia solution cautiously - take a dilute ammonia solution of 5-10 drops in one glass. A cold compress, ice, is put on the head of the injured person. With gasoline /kerosene intoxication it is necessary to cause vomiting, to supply fresh air, and give milk and valerian tincture - 20 drops per glass of water.

If irritants get into the eyes, they must be washed carefully and abundantly by 2 % solution of boric acid or clean water.

With skin burns through hydrochloric acid, either cotton wool must be put on the affected place for absorbing the acid, or the acid must be washed off by a jet of water. The affected place is then powdered with soda, and a bandage with ointment is put on it. With burns from caustic alkali, the affected place is treated by 1-2 % solution of acetic acid or diluted vinegar with subsequent washing off with water.

In case of injuries and wounds they are treated by iodic tincture and bandaged.

The employees of the washing station are allocated milk or substitionary products daily before work starts, as well as soap, in accordance with the order established by the Administration, coordinated with the trade union committee of the station.

The working hours for tank washers and repair and valve filling operators is 6 hours per day, and, as well, additional leave of 12 working days is granted.

Medical attendance on the workers is carried out around-the-clock by the dispensary staff, which is compulsory at the washing station. Medical workers render first aid to the injured workers, carry out occupational intoxication and traumatism prevention service, as well as sending workers with complaints on bad health condition for the urgent medical examination.

Medical diagnosis and prescriptions, at the result of medical examination are compulsory for the Administration and the workers of the washing station.

The dispensary must be located on the ground floor of the building and provided with the necessary medicines, instruments and apparatuses for rendering assistance.

Posters, with tips for rendering first aid in case of loss of consciousness, burns, traumas and intoxication must be displayed.

6. REQUIREMENTS FOR WELFARE ROOMS AND FACILITIES.

At the washing station, emphasis is laid on setting up of good welfare conditions for workers dealing with tank treatment. During tank treatment, clothing, shoes and parts of the body of the workers are contaminated with residues from the tanks. Consequently, the following welfare amenity rooms must be provided at the Balajari Washing Plant:

- cloak-rooms with individual lockers for clothes - 110 places
- room for keeping means of individual protection - 5 places
- the room for drying protection clothing and shoes - 60 cu. m
- showers for men - 4
- shower for women - 2
- wash rooms with hot and cold water - 8
- heated lavatories
- laundries for washing and cleaning protective clothing - 1
- a mess room - 1 - 40 sq. M
- a rest-room - 16 sq. M
- a ladies' room - 1

For chemical cleaning of working clothes, a type KX-014 machine is installed. The laundry for washing protective clothes is equipped by two washing machines CMT-50 and two EP – 10 centrifuges.

For workers engaged in cleaning of tanks containing ethyl /blended/ gasoline, the showers, cloak-rooms and amenities block are located separately from other rooms and close to the tank treatment areas.

In drying rooms, clothes drying must be done during the rest time of the tank washers team. This is achieved by equipping them with relevant heating and ventilation systems. In the showers, individual mixers for cold and hot water are installed to exclude the danger of burns. Sanitation rooms at the Washing station are coated by materials that not subject to contamination and easily cleaned walls, concrete floors etc. In the laundry extraction ventilation is installed.

At the washing station all the amenity rooms must be set up and equipped strictly in conformity with the established norms and rules for their construction, taking into account their sizes and numbers and the personnel numbers.
For a short period of rest and warming of those working on the open platforms the room with telephone communication is available.

7 REQUIREMENTS FOR WARNING SIGNS AT STRUCTURES AND FACILITIES LOCATED IN THE AREA OF THE WASHING PLANT

At the washing station, the structures and facilities that may cause danger for the workers, remaining in or moving along the area of working places, must have warning signs. Such places are:

- hot water pipe-lines
- steam-pipes
- pipe-lines of the vacuum system
- over-head platforms
- pipe-line network of the boiler system,
- fire-prevention measures and facilities for fire extinguishing,
- locking taps, end taps, valves, bolts, taps on pipe-lines,
- gas pipe-line and its elements,
- handrails, railings, over-head platform fencing

The Manager of the Washing Plant is granted the right to include additional structures and extra installed facilities, capable of being a source of traumatism, into the list of constructions and facilities requiring warning signs.

The ends of the gantry platform are painted with yellow and black warning signs. The width of yellow and black stripes must be 100-200 mm.

Depending on the purpose, the pipeline network is painted different colours: the steam-line - red, hot water pipe-line – green, vacuum system – brown, cold water pipe-line – blue. Fire-prevention shields and fire-extinguishing tools - red. Gas pipe-line – in black. Handrails, and platform fencing are painted in main colours of the warning signs: yellow and black. The lacquer and dyeing materials applied must correspond to the nature of material to be painted and operational conditions of the object. The coverings must be smooth, without stains, not flake off and aggravate the operational features of the materials, from which the objects are made.

Warning signs are to e restored and renewed systematically.
It is also necessary to install warning, directing indicating signs as per GOST-12.4.026-76; OST-32.4—76 requirements.

8 REQUIREMENTS FOR KEEPING TO ESTABLISHED NORMS OF ARTIFICIAL LIGHTING AT THE WORK PLACES FOR TANK TREATMENT.

At the Washing Plant the artificial lighting is installed for operation of tank treatment facilities in darkness. With the aim of improving conditions and labour safety, the arrangement of artificial lighting are to be guided by the construction norms and rules CN and P 11-4-79 /"Natural and artificial lighting. Norms and rules" / SN-245-71, section 7 SN and P-10074 /, Rules for installing of electrical facilities /PUE/, 1976 and Rules for technical operation of consumers electrical facilities.

The facilities for artificial lighting on the working places must also be in line with the requirements of the industrial standard of labour safety. OST-32-9-81.

For such objects as the washing and steaming station, lighting devices must be used, with halogen lamps of capacity 1-10 kW and gas-discharging light sources of the type DRL, DRI DKsT.

The intensity of illumination at the washing and steaming station and for loading of oil–products must not be less than 20 lux on the floor surface of the over-head platform, and at the tank hatch.

The surface of the railway track bed at the washing and steaming station must have illumination of at least 2 lux.

Portable 12 V artificial lighting with illumination of at least 1 lux is envisaged for performance of works inside the tank.

The rates of illumination of offices and technical premises, units, of the washing and steaming station, depending on the system of lighting, are given in the table, where the illumination by fluorescent lamps is given without brackets and in brackets by tungsten lamps. Index G is the horizontal plane of lighting; after the hyphen – the figure, indicating the height above the ground level in metres.

N	Names of shops, sectors of working places of the wash station	Plane, surface of illuminat. Rating	Background	Category and subcategory of visual work	Illumination, lux combined illumination General+local	General illumin.	General illumin.
1	2	3	4	5	6	7	8
1.	Washing over-head platforms	G	-	VI	-	-	/50/
2.	Regeneration department	G	-	VI	-	-	/50/ 100
3.	Laboratory	G-0,8	Average	IV,a	/600/ 750	/75/ 150	/200/ 300
4.	Mechanical department	G-0,8	dark	V,b	200 /150/	150 /50/	150 /100/
5.	Department for protective clothes		-	VIII,a	-	-	/75/
6.	Drying rooms		-	VIII,b	-	-	/50/
7.	Rooms for reservoirs and extraction tanks		-	VIII,a	-	-	/75/
8.	Rooms for cleaning facilities		-	VIII,b	-	-	/50/
9.	Boiler platforms for boiler servicing		-	VI	100	-	100

Lights with explosion proof performance are used on over-head washing platforms

9 FIRE SAFETY REQUIREMENTS

The washing station is a fire hazard due to availability of residues of oil and oil-products in the tanks. During the treatment of tanks there exists a real danger of fire, and explosion from contact with the open fire, on the open platforms, oil traps, fuel warehouses where easily-inflammable oil-products /gasoline, kerosene, benzol, etc./ are available

On the area of the washing and steaming station, it is strictly prohibited:

- to light fires
- to smoke in other than at a specially designated place.
- to use gasoline, kerosene lighters, lamps, lanterns and other devices operated with a naked flame.

For securing of fire safety on the industrial sites, technique and facilities for fire extinguishing must be used and be functional. in all workshops, warehouses and on the area of the Washing station.

There is a reservoir of 60 cu. m with a permanent water supply at the washing station. It is necessary to have devices available to supply water from the pool to the place of fire extinguishing.

The washing station, as a high fire hazard risk, where the use of water in certain places and industrial sites as a fire-extinguishing mean is not allowed, chemical facilities (with carbon dioxide and with the specific composition) need to be installed for fire-extinguishing.

It is necessary to equip certain fire-hazardous parts of the washing station with signalling devices in systems of automatic fire protection of the manual start-up, that notifies the reception station of fire and brings the system of automatic fire-extinguishing into operation.

Fire-extinguishers, fire equipment, fire hand tools, fire and other facilities are applied for the purpose of fire-extinguishing.

Fire-extinguishers of the type:

OXP-10, OP-M and etc. (chemical, foam) are used for extinguishing of fire of solid materials as well as various fuel-liquids on the area at least 1 sq. M, with the exception of live electrical installations.

Carbon dioxide fire-extinguishers (OU-2, OU-5, OU-8 and others) are used for fire-extinguishing of liquid and solid substances as well as live electrical installations.

Spray - carbon dioxide- ethyl bromide (OUB-3A, OUB-7A and others) are used for fire-extinguishing of oil products as well as in electrical equipment under voltage.

Powder (OP:OP-10) are used for extinguishing of oil products combustion, highly-inflammable liquids, solvents, solids, including alkali-earth materials as well as for fire-extinguishing in electrical devices.

The fire facilities:

- hydrants, fire and underground, are intended for taking water from the external water-pipe.
- fire column - for opening and closing of underground hydro -tap
- fire cocks – for connecting pressure fire hose to the internal water-pipe mains.
- foam-mixers - for obtaining foaming water solution.
- the foam generators – for obtaining jets of air-mechanical foam from water solution
- foamer - for extinguishing fire of easy-inflammable and hot liquids
- fire barrels - for obtaining of powerful water jets:
- fire hoses - for transportation of water and water solutions;
- connection hose heads - for connection of fire sleeves /hoses/.

To the fire manual tools belong axes, hooks, crows, saws, scissors that are used by fire-extinguishing for opening and dismantling of building constructions, cleaning of rooms.

The fire facilities:

- water kegs - for water storage
- fire buckets – for water transportation
- boxes for sand - sand storage
- boxes of fire cocks - for fire-cocks storage
- fire stands /shields/ - storage of instruments

- asbestos material –for extinguishing of small fire hotbeds.

At the industrial sites, workshops at the units of the Wash Plant the installation for automatic fire-extinguishing facilities with the compulsory air supply to the foam-mixers is needed.

Rates for equipping industrial areas of the washing station with fire extinguishers, fire facilities:

N	Name of the object	Measuring unit	Number of fire-extinguishing facilities			
			Fire extinguishers		Sand boxes - 0,5 cu. m with shovel	Felt or asbestos blankets
			OXP-10 OVP-10	OU-2 OU-5		
1	2	3	4	5	6	7
1.	Washing grounds	every 15 m	1	-	1	-
2.	Over-head washing platforms	every 15 m	1	-	1	-
3.	Oil traps & sediment traps	50	1	-	1	-
4.	Grounds for wagon cleaning	every 15 m	1	-	1	-
5.	Vacuum-pumping stations	??	-	2	-	-

10 REQUIREMENTS FOR SELECTION OF LABOUR, AND TESTING OF KNOWLEDGE OF LABOUR SAFETY OF WORKERS AT THE WASHING PLANT

At the Washing station the establishment of the employees according to the planned volume of works and estimates per the approved staff planing is 115 persons, out of which managerial staff –18 persons, employees – 97, among them women –50. There are no persons under age working at the washing station.

Employees and specialists are trained in safe labour methods. Technical training in labour safety is held, as well as the planned technical training, with the purpose of professional selection and preparation of personnel for working on the industrial sites of the washing station.

As per the acting industrial standards of training and testing of knowledge in labour safety, five types of instructions in labour safety are conducted - introductory, primary instruction on the working place, repeated, additional, and current, instruction.

Except for the labour safety instructions, the primary and repeated examination of labour safety knowledge with compulsory training of newly hired for certain positions with the indication of the time of instruction is envisaged.

All the instructions and training carried out, and the primary testing of knowledge in labour safety, is registered into the special log for registration of instructions as per the established THY-19 form.

Carrying out the introductory, primary instructions in labour safety, training and holding of the primary testing in labour safety are marked on the rear of the Order for employment for the newly employed persons as per the Form T-1 or for persons transferred to another job at the same enterprise, as per the Form T-5.

In the Order for employment, the registration of training carried out in labour safety is also done. According to the calendar plans for technical training in the matters of labour

protection, training of workers of the washing station is envisaged quarterly. Training in safe labour methods at the trade - improvement courses must take place at least once in 5 years.

The employees, engineering staff of the washing station, not covered by the systematic technical training must attend special courses in labour safety at least once every two years.

Training in labour safety by technical training and trade-improvement courses is conducted by the engineering and managerial staff of the enterprise, workshops foremen, medical workers, guest legal advisers, technical labour inspectors of the Railway trade union organization, boiler supervision body, energy supervision body, the staff of the 'Labour Safety' Instruction Wagon, and teachers of educational institutions.

Managers and engineering staff, employees, workers, specialists and junior personnel undergo a periodical testing of knowledge with the aim of checking the level of competence in labour safety. It is necessary to check the knowledge of labour safety of the managers in the process of operation. The examination must be held at the order of the higher organisation.

Periodical testing of knowledge is conducted by the specially composed commission and in terms set up by the Requirement OST-32-36-83.

At the washing station, courses in labour protection are conducted for training new employees with the purpose of studying labour protection courses and matters of ensuring labour safety under local conditions, as a rule with persons without having any qualification and taking professional training

Professional training of newly employed workers is carried out during theoretical studies of the industrial training.

Industrial training is carried out by the engineering staff, a qualified worker- the manager of the industrial training with the work service in his profession at least 3 years.

The thematic plan for the standard programme for conducting technical studies and improvement courses include:

	Subject	number of hours Training	improvement courses
1.	Legislation in labour safety	6	3
2.	Basis of industrial sanitation and labour hygiene	6	3
3.	Prevention of industrial traumatism and occupational diseases	4	2
4.	Electrical safety	6	4
5.	Fire safety prevention	4	2
6.	Occupational Instruction in labour safety	12	6
	Total:	**38**	**20**

If needed, depending on the industrial peculiarities of the occupation, the number of hours for study of The Occupational Instruction may be increased.

Training, taking place at the wash station is aimed at getting the practical habits of safety in performing labour operations on the working place, and is conducted under supervision of the leader of the training. It may be a foreman, team leader, or qualified worker having work

service in this profession at least 3 years; training of engineering personnel is carried out by the heads of industrial sectors, workshops, and other subdivisions of the washing station .

Training is carried out after primary testing of knowledge. Duration is from 2 days up to one month depending on the position.

Training is conducted for workers and engineering staff connected with the jobs of increased danger.

Workers and engineering personnel of the washing station, engaged in technological process for treatment and preparation of tanks, must regularly be medically examined by entering the job and periodically as per the order established by the Health Ministry of Azerbaijan Republic (The Order of the Health Minister of Azerbaijan Republic N 300 of January 1998).

The staff, having undergone a special training for operating the devices for tank treatment and examination of knowledge, are issued with special certificates for the operating facilities of the technological process.

Persons dealing with the technological equipment such as electrical-technological personnel, must have at least the II group in electrical safety training. Persons engaged in repair and start up of electrical equipment, must have the group in electrical safety training in accordance with the requirements of the Rules for technical operation of the electrical equipment. For the persons mentioned, periodical, at least once a year, examination of knowledge in safe performance of work is arranged, conducted by the commission, approved by the Director of the washing station.

11 CONTROL AND RESPONSIBILITY FOR COMPLIANCE WITH LABOUR SAFETY REQUIREMENTS

The washing station as an enterprise with continuous process of work is the object of increased danger.

The control of safety requirements of relevant services /departments/ and organizations is established for undertaking the technological process of tank treatment, with uninterrupted and stable production process for fulfillment of the set up,

Control of labour safety is carried out by:

- the department for labour protection of the Azerbaijan State Railway;
- fire supervision department of the Railway;
- sanitation supervision department and medical and sanitation department of the Railway;
- boiler supervision of the Railway;
- energy supervision department of the Railway; technical labour inspection of the trade union committee of the Railway;
- environmental inspector of the Railway

The controlling bodies indicated, exercise departmental control of condition for safe performance of work at the washing station. In line with the departmental control, control is carried out on the part of relevant bodies of territorial, city and republican administration.

The safety requirements control must be carried out:
- at the stage of design and reconstruction – by estimation of all rated safety parameters;
- at the stage of commissioning – by measuring on the part of the relevant competent bodies by making measurements by controlling devices and visual survey;
- in process of operation – periodical certification of working places, with data conformity requirements of the technical passport data of the enterprise;

- control for the electrical safety conditions – annually, as per the Technical operation Rules at the electrical devices;
- control of fire safety – annually as per the instruction requirements.

At the Azerbaijan State Railway, a three-step control system for the condition of the labour safety, keeping of technical safety rules and other normative acts at the enterprises, including the Balajari Washing station, acts, declared by the Order of the Chief of the Railway N 200 of 11.11.92. is valid.

The first step is carried out by foremen, workshops managers, or other heads of subdivisions of the washing station once in a year.

The second step is conducted by the management and a person in charge for the labour safety of the Washing Station, taking monthly control of the execution of the first step.

The third step is executed by the management and the person in charge for the labour safety of the "Wagon Service" Production Union, as well as by the workers of the higher controlling bodies once a quarter. They make control for the first and second steps. All remarks on carrying out of third step labour safety control system are registered in relevant log.

The immediate control for implementation of all requirements for labour safety must be carried out by a labour protection engineer, who must fulfill only his occupational obligations.

The control of the general state of performance of the labour protection is carried out systematically by the chief engineer of the washing station. He also makes control for the activities of the labour safety engineer.

The control for keeping labour safety norm requirements is also conducted by the deputy head of the Washing station, in charge of certain industrial sectors, workshops and other objects.

Keeping of labour safety Rules is an integral part of performance of the technological process of the enterprise.

Therefore the control for execution of technological process is the responsibility of the technologist of the washing station.

The responsibility for execution of all requirements, norms and labour safety rules established at the Wash station as per the requirements of the adopted "Law on Labour safety " of September 29, is laid on the Manager, labour safety engineer of the Wash station.

The responsibility of the management and the person in charge for the state of labour safety at the wash station is also regulated within the scope of commitments for fulfillment of personal participation normatives in the work for observance of labour protection norms, declared by the Order of the Azerbaijan State Railways, N 76-H dated 07.04.93.

Drawn up by:

Deputy Head of the technical department
for labour protection of the Railway — Ibragimov T.T.

Engineer of the technical department
for labour protection of the Railway — Nadjaf-zade D.K.

General Technical Information

APPENDIX 5

23/11/98

Architecture-Project-Production Co-operative "Kontur"

Order 98009

BALAJARI : RECONSTRUCTION OF WAGON WASHING STATION

Technical proposals

(see file lyubacom.doc)

General Technical Information

APPENDIX 5

23/11/98

Architecture-Project-Production Co-operative "Kontur"

Order 98009

BALAJARI : RECONSTRUCTION OF WAGON WASHING STATION

Technical proposals

General explanatory note

1998

Architecture-Project-Production Co-operative "Kontur

Order 98009

BALAJARI : RECONSTRUCTION OF WAGON WASHING STATION

Technical proposals

General explanatory note

Chairman of APPC "Kontur" _____ L. A. Lavrenchuc

Chief engineer of the project _____ N. V. Lavrenchuc

1998

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PROJECT COMPOSITION

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2. Report on topographic and geological calculations, carried out by the staff of the co-operative.
3. Topographic photo on a list of paper.

4. Measuring Drawing

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COMPLIANCE OF PROJECT PROPOSALS WITH VALID NORMS AND REGULATIONS

All the technical proposals in this working project were worked out in full compliance with the actual rules and norms, including fire and explosion safety rules.

Implementation of this project is entirely safe, if fire and explosion safety rules are followed.

The project has been worked out on the basis of the use of approved typical construction and equipment in serial production, containing defensible technical solutions.

The project was worked out on the basis of traditional technical solutions and contains new scientific achievements.

The project would be constructed in one stage.

Chief engineer of the project_____N.V. Lavrenchuc.

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EXPLANATORY NOTES

1. GENERAL

This project has been developed on the basis of instructions of Azerbaijan State Railways, and also by the railway rehabilitation and reconstruction development plan prepared by TACIS.
Reconstruction of equipment and structures for steaming and washing of tank wagons with an increase of the number of wagons to be cleaned will take place on existing plant at Balajari station.
Construction of additional structures and facilities will take place to provide the operation of new facilities compatible with the existing equipment at the plant, and not to interrupt the main process of preparation of wagons for use.

After reconstruction the capacity of the plant will be as follows:

Steaming and washing of wagons for the transportation of light oil products	250 wagons per day,
Steaming and washing of bitumen wagons	5 wagons per day
External washing of wagons	24 wagons per day.

The project includes:

The extension of the boiler room, installation of two additional boilers, proposed by TACIS.

Construction of a new plant for external washing of wagons.

Installation of two sets of equipment for purification of effluents from the steaming and internal wash of tank wagons, and wagons for bitumen.

Repair and partial reconstruction of existing water treatment equipment.

Installation of new water treatment equipment for external wagon wash.

Reconstruction of overhead platforms for wagon steaming;

Reconstruction of track work.

Repair and partial reconstruction of subsidiary buildings and ancillary facilities.

Reconstruction of communication system, installation of additional equipment for dispatching link to the station, and installation of loudspeakers at site.

Reconstruction of electricity supplies system, augmentation of transformer substation at the plant.

(contd)

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Extensive repair and reconstruction of the in-site drainage / water supply and heating systems.

Installation of a new gas supply pipeline of medium pressure, as per the instruction of "Bakgas" Gas Company.

Relaying of external electricity cables and communication lines, as per the instructions of "Avglavenergo" and the Ministry of Communications.

The project has been developed in accordance with the topographical and geological surveys, carried out by APPC "Kontur" in 1998;

Climatic region of the works is IVB, seismicity - 8 degrees, the category of the soil at works 33b and 34b, water is observed at depth up to one meter, water flow out of the soil at works is 30-40 cub. m per hour.

The rated relative resistance of soil on embankments is 1.0 kg per sq sm. and for sub soil 1.8 kg. per sq. cm.

Snow cover is steady, depth of freezing of soil in winter is 0.4 - 0.5 meters.

Rated temperature is -4C;

Civil defence measures are not envisaged.

(Russ-page 7)

2. FEASIBILITY SECTION

Reconstruction of the washing station is envisaged by the approved TACIS programme /Annex ** / and after implementation will ensure complete preparation of tanks for loading or repair.

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Delivery of equipment for extension of the boiler-room, purifying facilities, over-head platforms for interior washing out of bitumen from tanks and wagons, the plant for the exterior washing of tanks – all these have been considered in the resolution for implementation by the TACIS programme.

General construction works, designing, obtaining approvals from different authorities, settlement of issues as regards the linking of communications to the enterprise and their construction, are to be implemented using Railway funds.

Detailed description of works is reflected in respective chapters of the Explanatory Note for each section.

*

Complete specific consumption of material and power resources and their comparison with the analogue are reflected in Table 1.

(Russ- page 8)

3. TECHNICAL SECTION

(nothing received from ADDY by 28th November 1998)

4. TRACK DEVELOPMENT

(Exterior Wash)
Due to the installation of equipment for external washing of wagons prior to steaming and subsequent washing of interiors, is necessary to reconstruct the trackwork at the external wash to replace the existing siding.

An additional siding is required to be provided for marshalling and holding wagons, by-passing the wash plant.

All the alterations to the trackwork will be within the confines of the washing station.

(Interior Wash)
In order to improve working conditions at the platforms, new drainage channels for wash effluent from the wagons will be constructed along the centre line of the tracks under the platforms, together with the reconstruction of the tracks.

Track laying under the platforms will be done on half sleepers. Rails on the sleepers are located on the straight profile on the site.

Sub-grade will consist of drainage soil. Excavated soil and ballast will be removed from the site to the area designated by the city authorities for waste disposal.

Drainage of water from the tracks is dealt with in the chapter - " Organisation of public services and amenities".

Rails of R-65 s/g type are long welded from 25 m. lengths. Sleepers are concrete with spacing of 1840 / 1600 per km. Crossovers are 1/9 type P 50.

Ballast is from a quarry from the Shamkhor region, laid to a depth of 20 cm. below the rails.

To prevent any slippage, a support wall will be installed along the length of the wash line.

Quantities : Length of track to be relayed - 2970 linear metres
Points m 1/9 13 items.

Out of which:

1) <u>For exterior wash plant</u> :

1.	Dismantle track (R-5- rails)	- 270 linear metres
2.	Slewing of track	- 160 linear metres
3.	Lay new track	- 700 linear metres
4.	Points of the 1/9 type with R-50-6	

2) <u>Over-head platform for bitumen wagons</u> :

1.	Dismantle track with R-50 rails, spacing 1600 sleepers/km	- 200 linear metres
2.	Relay track	- 200 linear metres

3) <u>Over-head platform for interior tank cleaning</u>:

1.	Dismantle track with R-50 rails, spacing 1600 sleepers/km	-1670 linear metres
2.	Track relay with new additions	-2040 linear metres
3.	Switches 1/9 type, new	- 4 sets
4.	Switches 1/9 type, dismantle and relay	- 3 sets

(Russ-page 9)

8.3 Sewerage networks on site

Discharge of domestic waste waters from the site section is done into the existing collector of diameter –1400 mm., going to the pump-station N4.
Existing inter-site sewage accepts drains from administration and ancillary buildings of the station. Discharge of water excess from the recirculation water supply for tank washing is intended into existing sewage. Before discharge into sewage the waste water must undergo additional cleaning. Two flotators by the capacity of per 5 cu. m/hour (120 cu. m/day) are envisaged. Degree of purification for residual oil-products from these units must be less than 0.2 mg / l.

On the site area two separate sewerage systems must be laid : household sewage system and industrial effluent system.

Discharge of drainage from administration buildings is envisaged into the household sewage system. Estimated consumption of house-hold drains of the station make up: Q = 5.35 l/sec.

Drains from the wagon-washing plant, the unit for mazut heating, boiler-room, compressor-room, platforms for tanks steaming and bitumen wagons emptying are all industrial effluent. Besides, effluent from discharges of recirculation system due to repair and cleaning are also industrial effluent.

Total discharge of effluent after recirculation makes up Q_2 = 2.4 l / sec. (8.62 m^3 / hour). Discharges of industrial effluent to the domestic sewage system are subject to additional chemical treatment with capacity of 10 $m.^3$ / hour.

High degree of purification at these plants (0.2 -2.0 mg/l for residuals of oil-products) allows the industrial effluent to be discharged into the city sewerage system on the basis of the " Rules for acceptance of industrial waste waters into the sewerage system of the residential areas".

The design envisages laying of new inter -section lines with the diameter of 200 mm, total length – 150 m. Detailed characteristics of industrial effluents is shown in Table N 4.

8. 4. Recirculating water supply

In order to conserve fresh water consumption, the project envisages recirculating water supply facility. The system for recirculation water supply is intended for the compressor house for cooling of compressors, for washing and steaming of tanks and bitumen wagons emptying, and for exterior washing of wagons.

Supply of purified water from recirculation water reservoirs to the tank interior washing platforms is performed by two pumps of type ЦНСТ 60 –231 with technical specifications:
Q = 60 $m.^3$ / hour, H = 231 m, N = 75 kVt. Installation of these pumps is intended instead of old ones, of type ЦНСТ 60 -198.

Estimated consumption of recirculation water in the interior wash system is :
Q = 250 x 3.0 = 750 $m.^3$ / day, and in the exterior wash system Q = 24 x 12.0 = 288 $m.^3$ / day.

Recirculated water is supplied by gravity feed after tank washing to the purifying facilities and then to the recirculation water reservoirs. Water in the reservoirs is heated up to 75 ° C by steam coils.

8.5. Cleaning of effluent from steaming and interior washing of tanks

The Balajari Washing station carries out at present the washing out of 200 four-axle tanks of oil-products per day. After reconstruction this figure will be increased to 255 tanks.

As per time rates for water consumption, consumption of water for interior treatment of one tank is 3.0 m.^{3} Existing purifying facilities for cleaning and preparation for subsequent reuse produce up to 360 cu. m/day.

The principle of operation of the existing washing station is as follows :
Effluent after tank washing flows into troughs, located under the platforms, and then goes to sand catchers, and from there goes by gravity feed through the collector, diameter 300 mm , into the acceptance well in front of the treatment facilities.
From the acceptance well the effluent is pumped over to the 60 cu. m accumulating tanks, and from there, by another pump, with capacity of 8 cu. m/hour to the purifying facilities of German production, with capacity of 120 cu. m/day, installed in containers on the site.
Primary and secondary cleaning from oil-products takes place at these facilities.
Purified water goes to reservoirs (7 tanks each 60 cu. m) of recirculation water.
Excess water for discharge to sewerage goes through additional secondary cleaning:

The balance of the effluent, amounting to 240 m^3 / day, flows from the reception well by gravity feed to the oil trap building, where mechanical cleaning takes place. Effluent goes to the first sludge section, from there oil products that have come to the surface go to the overflow compartment, and from there to the collector compartment for mazut.
Mazut is pumped over to two 300 cu. m mazut collection reservoirs, located on the site.

Partly cleaned effluent goes from the first compartment to the old type flotator, where additional cleaning takes place. Cleaning efficiency of the flotator is very low, therefore it is subject to replacement.
After that supposedly clean effluent goes into two acceptance reservoirs (tanks of 60 cu. m) on the site.
From here the effluent is pumped over an oil skimmer, from where mazut goes back to the collector compartment in the oil-trap building and purified water – into an intermediate reservoir on the site (tank of 60 cu. m).
From the intermediate reservoir, water is fed by pump to the recirculation water reservoirs, where heating takes place.
In these reservoirs mixing of water after purification with water from old oil catchers takes place in German reservoirs.
Recirculating water with an oil products content from 400 to 800 mg/l is fed by a pump for tank washing.

For purifying of such amount of effluent, modern cleaning facilities with a high degree of purification will be required. Existing cleaning facilities of German production, located in containers on the site with capacity Q=120 cu. m/day, having high degree of purification – 10-70 mg/l of oil products.
Existing mechanical cleaning facilities of FSU production with capacity of 240 cu. m/day do not meet the modern cleaning requirements. Their degree of purification is rather low. –400-800 mg / l of oil products. Therefore additional installation of modern compact cleaning facilities is required for circulation water supply with capacity of 600 cu. m/day.

The accepted cleaning facility of German production with total capacity of 600 cu. m/day or 25 cu. m / hour gives a high degree of purification (10-70 mg/l of oil products). These plants are compact and simple by adjustment. The cleaning facilities are composed of the following units:

• Container	12 x 2.4 x 2.4 m size,	by segmenting – 40 cu. m	-2 pieces
• Container	6 x 2.4 x 2.4 m size,	acceptance capacity - 28 cu. m	-2 pieces
• Container	6 x 2.4 x 2.4 m size,	flotator – Q= 12,5 cu. m/hour	-2 pieces
• Container	6 x 2.4 x 2.4 m,	KST –Q= 5 cu.m/hour	-1 piece.

The last container is designated for secondary cleaning of recirculation water before discharge into external sewage. The degree of purification at this plant is very high – 0,2 mg/l of residual oil products.

For tank washing, the water containing some hundreds mg/l of oil products may be used., therefore only the excess of water from the recirculation system must be removed from it. A new adopted cleaning facility, with the capacity of 600 cu. m/day (25 cu. m/hour), consists of two groups and as per capacity is equal 300 cu. m/day (12,5 cu. m/hour), that will be operating parallel for cleaning.

Effluent will be pumped over from acceptance well of the oil trap building by pump SD25/14, with capacity of Q = 25 cu. m / hour, H = 14m.

After being cleaned at these plants, the water goes to reservoirs for recirculation water (7 tanks per 60 cu. m). In these reservoirs water is heated by steam up to 75 ° C. Then the recirculation water is fed by pump 60-231 to over-head platform for interior washing of tanks by pipe-line, by diameter of 200 mm.

After putting the new cleaning facilities into operation, the old oil traps must be temporarily stopped for capital repair. All equipment must be cleaned from the accumulated mud and sand. After complete repair, the existing oil trap building will operate as reserve ones in case of delay of new cleaning facilities. Due to insufficient degree of purifying, repaired cleaning facilities will operate only for recirculating water supply, without discharge of effluent to sewers.

Discharge of excess effluent to sewerage will be carried out after treatment at the cleaning plants. For this purpose two flotators in containers with capacity per 5 cu. m/hour are installed, where secondary cleaning takes place.

Residual content of oil products and suspended substances after secondary purification is taken:
0.2 –2.0 mg. / l. .BPK (Biological demand for oxygen) - 20-30 mgO_2 / l,
XPK (Chemical demand for oxygen) – 50-100 mgO2/l.

After installation of new purifying facilities, with capacity of 600 cu. m/day for interior tank washing, reconstruction of old [FSU] cleaning facilities is required for further joint operation.

For this is required :

1. Replacement of two recirculation water pumps of type ЦНСГ 60-198 at the pump house by pumps of type ЦНСГ 60 – 231, N = 75 kVt
2. Replacement of suction and pressure pipeline. Diameter 150 mm for pipe-line, diameter 200 mm, total length 500m.
3. Laying of pipe, diameter 125 mm along the over-head platform, length 600 m, for washing.
4. Installation of reservoir for mazut (tank of 60 cu. m).
5. Installation of two oil pumps of НК 65/35 – 70 type, N= 22 kVt.
6. Laying of pipes, diameter 80 mm, for supply mazut to new treatment / cleaning facilities at the reception reservoir.
7. Installation of two sewage pumps of СД 25/14 type for delivery of effluent to new treatment facilities at the reception reservoir.
8. Laying of sewage, diameter of 200 mm, length 80 m from new purifying facilities.
9. Cleaning from mud and sand all reservoirs in the oil catcher building.
10. Installation of two pumps in the oil trap building, in place of one non-operational, reserve - of ФГ 144/10,5 type.
11. Replacement of one non-operational, reserve piston pump for mazut for two new aggregates of НК 65/35-70 type, N=22 kVt.
12. Installation of a new floatator ЛОНИИ, with the capacity of 10 cu. m/hour (2400 cu. m/day), in the oil trap building, in place of the old one.

8.6. Cleaning of effluent from the exterior washing of tanks

Water consumption for exterior tank washing as per the norms is Q = 24 x 12 = 382.5 cu. m/day.

Exterior washing of tanks is carried out with effluent which is repeatedly recycled.
Effluent treatment after exterior washing is the following :
Water from mains is fed to recirculation water supply reservoirs (tank with capacity of 60 cu. m), where it is heated up to 75 ° C.
From the reservoir it is fed to the washing machine nozzles by a pump, with technical specification Q = 30 cu. m / hour p = 20 atm.
After washing, the effluent goes to a trough, and from there by gravity feed to the sand catcher facility, where 85-90 % of heavy suspension falls out.
The effluent then goes to treatment plants with capacity 10 l. / sec, as per the standard design 902-2-410.86.
After the flotator, the purified water with residual oil products content of 30 - 70 mg. / l. goes to the recirculation water reservoir and the process is repeated again.
For further purification of excess effluent for discharge into the sewage installation, a floatator with the capacity of 1 $m.^3$ / hour (24 $m.^3$ / day) is envisaged.
Installation of one tank of 60 cu. m for mazut collection is included into the complex of cleaning facilities.
For pumping over mazut into the existing 300 cu. m capacity reservoirs, two pumps of HK 65/35 – 70 type, N = 22 kVt are installed.

Main indicators of the performance of effluent treatment facilities

Table N

N	Reconstruction stage	Concentration of contaminants (mg/l)							
		Suspended substances		Oil products		pH		BPK complete	
		Before reconstruction	After reconstruction	Before reconstruction	After reconstruction	Before reconstruction	After reconstruction	Before reconstruction	After reconstruction
1.	Treatment facilities for recirculating water supply	500	20	800	70	7 / 13	≈ 7	150	30
2.	Treatment facilities for additional chemical treatment before discharge into sewers	20	5 / 8 {375 ?}	70	5 / 8 {2.0 ?}	≈ 7	≈ 7 {6.5-8.5 ?}	30	15 {375 ?}

9. ELECTRICAL SECTION

The present section of the project reconstruction of the existing power distribution network of the plant, augmentation of the transformer substation, feeding the object. The whole section is solved in line with the technological part by tanks treatment, as well as in line with the solutions by effluent treatment after steaming and washing of tanks.

At present the specific consumption of power supply at the washing station makes up 10 kVt per tank by the programme of 200 tanks/day. Total power supply consumption of the enterprise at the moment is 300 kVt, the yearly power supply consumption is: 300 x 5870 =1761000 kVt/h/year/

By reconstruction of the object, systems of power supply for all buildings and structures of the Washing Station.

Reconstruction of the following structures is envisaged in the project:

- Over-head platforms for steaming of tanks out of light oil-products, out of bitumen;
- Washing facility for exterior washing of tanks;
- Compressor-room;
- Purification facilities;
- Pumping stations for pumping over of oil-products;
- Ancillary structures;
- Amenity premises

As a result of the reconstruction of the Washing station, the output increases up to 255 tanks per day. Therefore, the specific consumption of power supply will increase up to 16,89 kVt/h/tank for main shops.

$W_{1=} R_p K_1 A_p \tau + 1/n (K_2 A_2 \tau_2 + A_3 \tau_3 + A_4 \tau_4)$

$W_1 = 1 \times 1 \times 280 \times 0{,}003 + 1/225 (1 \times 46 \times 8{,}4) = 16{,}89$ kVth/tank

For ancillary divisions:
$W_2 = Kp \quad K_1 \; A1 + 1/n (K_2 \; A_2 \; \tau_2 + A_3 \; \tau_3)$

$W_2 = 0{,}59 \times 1 \times 280 \times 0{,}003 + 1/255 \; (1 \times 46 \times 8{,}4) = 3{,}47$ kVt h/tank

Total: $W = W_1 + W_2 = 16{,}89 + 3{,}47 = 20{,}36$ kVth/tank

Consumption of power supply for external lighting:
$W_{no} = 30 \times 0{,}9 \times 7{,}2 \times 4{,}0 = 1360{,}8$ kith/month

Yearly/annual power supply consumption makes up:
$W = 255 \times 20{,}36 \times 360 + 1360{,}8 = 18700408{,}8$ kVth

Rated load, kVt
$P_p = W/T = 1870408{,}8/5870 = 350$ kVt

The main source of power supply is the existing substation, situated within the Washing Station.

One more transformer of 630 kVt capacity is installed at the substation. Taking into account, that power receivers of the Washing Station belong to the 1-st category as far as the power supply, then installation one more transformer of the same capacity, i.e. 630 kVa is needed.

Old switch-boards are dismantled and the switch-boards of the SHO-70 type are installed; low-voltage shields are sectioned with the installation of the shield of the ABP type.

Existing low-voltage shields are subject to partial replacement, cables of the AAB-1 are taken for laying between the structures. By reconstruction within the Washing Station projector lighting, security, repair lighting are subject to reconstruction.

All power supply networks inside the buildings and structures are subject to reconstruction in line with technological and constructural part tasks.

Power receivers and automatic switch-boards on the overhead platforms for tanks steaming, will be fed from the switch-board transformer substation in line with the passport data of the equipment being installed.

10. GAS and FUEL SUPPLY

Gas supply

Due to the reconstruction of the washing station and increased steam consumption for industrial needs, the demand for gas is increasing. Demand for gas after reconstruction of the existing boiler-room will make up 1700 Hcu.m / hour.

At present the gas supply of the boiler-room is intended from the gas mains (Baku-Sumgait) of medium pressure 0.2 kg/sq. cm by diameter of 700 mm, total length nearly 4000m. As per technical conditions, issued by Bakgas N ÝA-848/5-10 dated 19 June, it is necessary to provide in the project replacement of gas –pipe from the connection point up to Gas distribution point (existing one) for 250 mm diameter, furthermore, from the Gas distribution point up to the boiler-house of the Washing station.

Up to boiler-room of the Washing station laying of new gas –pipe is envisaged by diameter of 150 mm. In front of the boiler-room the Gas distribution Point is arranged for maintaining of the necessary gas parameters.

Laying of gas-pipe is intended as over-ground on low and high supports according to the relief of the location and conditions for laying.

Pipes are taken of steel, electrically welded, GOST 10704 –76, anti-corrosive covering – lacquer BT-177, by priming GF –021 two times.

Indicators of the gas-pipe under design:

Beyond-the-site gas pipe:
Pipes, electrically-welded GOST 10704 –76, diameter 150 mm .....3500 m
Pipes, electrically welded GOST 10704 – 76, diameter 250 mm ..... 500 m

Free standing at the boiler-house building Gas distribution point (of the box type) – RD BK1-100 with two RG-1000 gas meters.

Reconstruction of the existing Gas distribution Point.

Dismantling of the existing gas-pipe from the point connection up to Gas Distribution Point (existing one) and inside the Washing station:
Pipes, electrically-welded, GOST 10704 – 76, diameter 150 mm .....450 m
Pipes, electrically welded, GOST 10704 – 76, diameter 200 mm..... 160 m

Fuel Supply

Reserve fuel supply for the boiler is mazut (heavy fuel oil).
Mazut supply to the boiler-room is from the existing reservoirs on the area with mazut from processing of the residuals wastes after tank steaming. Through the pipe-line by means of pumps, located in the boiler-room, mazut comes to the header tank, and then to the burners.

11. TELEPHONE COMMUNICATION, MASTER CLOCK, LOUDSPEAKER COMMUNICATION

As per time rates for water consumption, consumption of water for interior treatment of one tank is 3.0 m.^{3} Existing purifying facilities for cleaning and preparation for subsequent reuse produce up to 360 cu. m/day.

The principle of operation of the existing washing station is as follows :
Effluent after tank washing flows into troughs, located under the platforms, and then goes to sand catchers, and from there goes by gravity feed through the collector, diameter 300 mm , into the acceptance well in front of the treatment facilities.
From the acceptance well the effluent is pumped over to the 60 cu. m accumulating tanks, and from there, by another pump, with capacity of 8 cu. m/hour to the purifying facilities of German production, with capacity of 120 cu. m/day, installed in containers on the site.
Primary and secondary cleaning from oil-products takes place at these facilities.
Purified water goes to reservoirs (7 tanks each 60 cu. m) of recirculation water.
Excess water for discharge to sewerage goes through additional secondary cleaning:

The balance of the effluent, amounting to 240 m^3 / day, flows from the reception well by gravity feed to the oil trap building, where mechanical cleaning takes place. Effluent goes to the first sludge section, from there oil products that have come to the surface go to the overflow compartment, and from there to the collector compartment for mazut.
Mazut is pumped over to two 300 cu. m mazut collection reservoirs, located on the site.

Partly cleaned effluent goes from the first compartment to the old type flotator, where additional cleaning takes place. Cleaning efficiency of the flotator is very low, therefore it is subject to replacement.
After that supposedly clean effluent goes into two acceptance reservoirs (tanks of 60 cu. m) on the site.
From here the effluent is pumped over an oil skimmer, from where mazut goes back to the collector compartment in the oil-trap building and purified water – into an intermediate reservoir on the site (tank of 60 cu. m).
From the intermediate reservoir, water is fed by pump to the recirculation water reservoirs, where heating takes place.
In these reservoirs mixing of water after purification with water from old oil catchers takes place in German reservoirs.
Recirculating water with an oil products content from 400 to 800 mg/l is fed by a pump for tank washing.

For purifying of such amount of effluent, modern cleaning facilities with a high degree of purification will be required. Existing cleaning facilities of German production, located in containers on the site with capacity Q=120 cu. m/day, having high degree of purification – 10-70 mg/l of oil products.
Existing mechanical cleaning facilities of FSU production with capacity of 240 cu. m/day do not meet the modern cleaning requirements. Their degree of purification is rather low. –400-800 mg / l of oil products. Therefore additional installation of modern compact cleaning facilities is required for circulation water supply with capacity of 600 cu. m/day.

The accepted cleaning facility of German production with total capacity of 600 cu. m/day or 25 cu. m / hour gives a high degree of purification (10-70 mg/l of oil products). These plants are compact and simple by adjustment. The cleaning facilities are composed of the following units:

• Container	12 x 2.4 x 2.4 m size,	by segmenting – 40 cu. m	-2 pieces
• Container	6 x 2.4 x 2.4 m size,	acceptance capacity - 28 cu. m	-2 pieces
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• Container	6 x 2.4 x 2.4 m,	KST –Q= 5 cu.m/hour	-1 piece.

The last container is designated for secondary cleaning of recirculation water before discharge into external sewage. The degree of purification at this plant is very high – 0,2 mg/l of residual oil products.

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Effluent will be pumped over from acceptance well of the oil trap building by pump SD25/14, with capacity of Q = 25 cu. m / hour, H = 14m.

After being cleaned at these plants, the water goes to reservoirs for recirculation water (7 tanks per 60 cu. m). In these reservoirs water is heated by steam up to 75 ° C. Then the recirculation water is fed by pump 60-231 to over-head platform for interior washing of tanks by pipe-line, by diameter of 200 mm.

After putting the new cleaning facilities into operation, the old oil traps must be temporarily stopped for capital repair. All equipment must be cleaned from the accumulated mud and sand. After complete repair, the existing oil trap building will operate as reserve ones in case of delay of new cleaning facilities. Due to insufficient degree of purifying, repaired cleaning facilities will operate only for recirculating water supply, without discharge of effluent to sewers.

Discharge of excess effluent to sewerage will be carried out after treatment at the cleaning plants. For this purpose two flotators in containers with capacity per 5 cu. m/hour are installed, where secondary cleaning takes place.

Residual content of oil products and suspended substances after secondary purification is taken: 0.2 –2.0 mg. / l. .BPK (Biological demand for oxygen) - 20-30 mgO_2 / l,
XPK (Chemical demand for oxygen) – 50-100 mgO2/l.

After installation of new purifying facilities, with capacity of 600 cu. m/day for interior tank washing, reconstruction of old [FSU] cleaning facilities is required for further joint operation.

For this is required :

1. Replacement of two recirculation water pumps of type ЦНСГ 60-198 at the pump house by pumps of type ЦНСГ 60 – 231, N = 75 kVt
2. Replacement of suction and pressure pipeline. Diameter 150 mm for pipe-line, diameter 200 mm, total length 500m.
3. Laying of pipe, diameter 125 mm along the over-head platform, length 600 m, for washing.
4. Installation of reservoir for mazut (tank of 60 cu. m).
5. Installation of two oil pumps of НК 65/35 – 70 type, N= 22 kVt.
6. Laying of pipes, diameter 80 mm, for supply mazut to new treatment / cleaning facilities at the reception reservoir.
7. Installation of two sewage pumps of СД 25/14 type for delivery of effluent to new treatment facilities at the reception reservoir.
8. Laying of sewage, diameter of 200 mm, length 80 m from new purifying facilities.
9. Cleaning from mud and sand all reservoirs in the oil catcher building.
10. Installation of two pumps in the oil trap building, in place of one non-operational, reserve - of ФГ 144/10,5 type.
11. Replacement of one non-operational, reserve piston pump for mazut for two new aggregates of НК 65/35-70 type, N=22 kVt.
12. Installation of a new floatator ЛОНИИ, with the capacity of 10 cu. m/hour (2400 cu. m/day), in the oil trap building, in place of the old one.

8.6. Cleaning of effluent from the exterior washing of tanks

Water consumption for exterior tank washing as per the norms is Q = 24 x 12 = 382.5 cu. m/day.

Exterior washing of tanks is carried out with effluent which is repeatedly recycled.
Effluent treatment after exterior washing is the following :
Water from mains is fed to recirculation water supply reservoirs (tank with capacity of 60 cu. m), where it is heated up to 75 ° C.
From the reservoir it is fed to the washing machine nozzles by a pump, with technical specification Q = 30 cu. m / hour p = 20 atm.
After washing, the effluent goes to a trough, and from there by gravity feed to the sand catcher facility, where 85-90 % of heavy suspension falls out.
The effluent then goes to treatment plants with capacity 10 l. / sec, as per the standard design 902-2-410.86.
After the flotator, the purified water with residual oil products content of 30 - 70 mg. / l. goes to the recirculation water reservoir and the process is repeated again.
For further purification of excess effluent for discharge into the sewage installation, a floatator with the capacity of 1 $m.^3$ / hour (24 $m.^3$ / day) is envisaged.
Installation of one tank of 60 cu. m for mazut collection is included into the complex of cleaning facilities.
For pumping over mazut into the existing 300 cu. m capacity reservoirs, two pumps of HK 65/35 – 70 type, N = 22 kVt are installed.

Main indicators of the performance of effluent treatment facilities

Table N

N	Reconstruction stage	Concentration of contaminants (mg/l)							
		Suspended substances		Oil products		pH		BPK complete	
		Before reconstruction	After reconstruction	Before reconstruction	After reconstruction	Before reconstruction	After reconstruction	Before reconstruction	After reconstruction
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2.	Treatment facilities for additional chemical treatment before discharge into sewers	20	5 / 8 {375 ?}	70	5 / 8 {2.0 ?}	≈ 7	≈ 7 {6.5-8.5 ?}	30	15 {375 ?}

9. ELECTRICAL SECTION

The present section of the project reconstruction of the existing power distribution network of the plant, augmentation of the transformer substation, feeding the object. The whole section is solved in line with the technological part by tanks treatment, as well as in line with the solutions by effluent treatment after steaming and washing of tanks.

At present the specific consumption of power supply at the washing station makes up 10 kVt per tank by the programme of 200 tanks/day. Total power supply consumption of the enterprise at the moment is 300 kVt, the yearly power supply consumption is: 300 x 5870 =1761000 kVt/h/year/

By reconstruction of the object, systems of power supply for all buildings and structures of the Washing Station.

Reconstruction of the following structures is envisaged in the project:

- Over-head platforms for steaming of tanks out of light oil-products, out of bitumen;
- Washing facility for exterior washing of tanks;
- Compressor-room;
- Purification facilities;
- Pumping stations for pumping over of oil-products;
- Ancillary structures;
- Amenity premises

As a result of the reconstruction of the Washing station, the output increases up to 255 tanks per day. Therefore, the specific consumption of power supply will increase up to 16,89 kVt/h/tank for main shops.

$W_{1=} R_p K_1 A_p \tau + 1/n (K_2 A_2 \tau_2 + A_3 \tau_3 + A_4 \tau_4)$

$W_1 = 1 \times 1 \times 280 \times 0{,}003 + 1/225 (1 \times 46 \times 8{,}4) = 16{,}89$ kVth/tank

For ancillary divisions:
$W_2 = Kp \ K_1 \ A1 + 1/n (K_2 \ A_2 \ \tau_2 + A_3 \ \tau_3)$

$W_2 = 0{,}59 \times 1 \times 280 \times 0{,}003 + 1/255 \ (1 \times 46 \times 8{,}4) = 3{,}47$ kVt h/tank

Total: $W = W_1 + W_2 = 16{,}89 + 3{,}47 = 20{,}36$ kVth/tank

Consumption of power supply for external lighting:
$W_{no} = 30 \times 0{,}9 \times 7{,}2 \times 4{,}0 = 1360{,}8$ kith/month

Yearly/annual power supply consumption makes up:
$W = 255 \times 20{,}36 \times 360 + 1360{,}8 = 18700408{,}8$ kVth

Rated load, kVt
$P_p = W/T = 1870408{,}8/5870 = 350$ kVt

The main source of power supply is the existing substation, situated within the Washing Station.

One more transformer of 630 kVt capacity is installed at the substation. Taking into account, that power receivers of the Washing Station belong to the 1-st category as far as the power supply, then installation one more transformer of the same capacity, i.e. 630 kVa is needed.

Old switch-boards are dismantled and the switch-boards of the SHO-70 type are installed; low-voltage shields are sectioned with the installation of the shield of the ABP type.

Existing low-voltage shields are subject to partial replacement, cables of the AAB-1 are taken for laying between the structures. By reconstruction within the Washing Station projector lighting, security, repair lighting are subject to reconstruction.

All power supply networks inside the buildings and structures are subject to reconstruction in line with technological and constructural part tasks.

Power receivers and automatic switch-boards on the overhead platforms for tanks steaming, will be fed from the switch-board transformer substation in line with the passport data of the equipment being installed.

10. GAS and FUEL SUPPLY

Gas supply

Due to the reconstruction of the washing station and increased steam consumption for industrial needs, the demand for gas is increasing. Demand for gas after reconstruction of the existing boiler-room will make up 1700 Hcu.m / hour.

At present the gas supply of the boiler-room is intended from the gas mains (Baku-Sumgait) of medium pressure 0.2 kg/sq. cm by diameter of 700 mm, total length nearly 4000m. As per technical conditions, issued by Bakgas N ÝA-848/5-10 dated 19 June, it is necessary to provide in the project replacement of gas –pipe from the connection point up to Gas distribution point (existing one) for 250 mm diameter, furthermore, from the Gas distribution point up to the boiler-house of the Washing station.

Up to boiler-room of the Washing station laying of new gas –pipe is envisaged by diameter of 150 mm. In front of the boiler-room the Gas distribution Point is arranged for maintaining of the necessary gas parameters.

Laying of gas-pipe is intended as over-ground on low and high supports according to the relief of the location and conditions for laying.

Pipes are taken of steel, electrically welded, GOST 10704 –76, anti-corrosive covering – lacquer BT-177, by priming GF –021 two times.

Indicators of the gas-pipe under design:

Beyond-the-site gas pipe:
Pipes, electrically-welded GOST 10704 –76, diameter 150 mm .....3500 m
Pipes, electrically welded GOST 10704 – 76, diameter 250 mm ..... 500 m

Free standing at the boiler-house building Gas distribution point (of the box type) – RD BK1-100 with two RG-1000 gas meters.

Reconstruction of the existing Gas distribution Point.

Dismantling of the existing gas-pipe from the point connection up to Gas Distribution Point (existing one) and inside the Washing station:
Pipes, electrically-welded, GOST 10704 – 76, diameter 150 mm .....450 m
Pipes, electrically welded, GOST 10704 – 76, diameter 200 mm..... 160 m

Fuel Supply

Reserve fuel supply for the boiler is mazut (heavy fuel oil).
Mazut supply to the boiler-room is from the existing reservoirs on the area with mazut from processing of the residuals wastes after tank steaming. Through the pipe-line by means of pumps, located in the boiler-room, mazut comes to the header tank, and then to the burners.

11. TELEPHONE COMMUNICATION, MASTER CLOCK, LOUDSPEAKER COMMUNICATION

11.1 General

Installation of telephone operative communication and two-line of loudspeaking notification communication is envisaged at the Washing station. Telephone communication is

11.2. Telephone operative communication

For organisation of the telephone operative communication of the dispatcher on-duty of the Washing station, the switchboard of station communication for small stations KSM-2 is installed at the post, that is designated for switching of 16 lines of the station communication, one line of selective communication, one line of ATS (Automatic Exchange Station), two feeders of two-side park communication.

One line of telephone communication is led to the central post, to the station master (the length of the cable is 2 km). The length of the whole cable network within the Washing station will make up 1800 m.

Electrical supply of the KSM-2 switchboard is performed from the AC network with the frequency of 50 Hz and voltage of 220 V.

11.3. Two- side park communication of loud-speaker communication

Along the over-head platforms the system of park communication for loud-speaker communication is envisaged to be installed. With the view, that the capacity of the loud-speakers to be installed does not exceed 200 V, the facility for park communication as per the PSGO system on the amplifiers of the UM – 100 type is being designed. Signal lights masts by 8 m high (5 pieces), on which 10 GR-35 megaphone loud-speakers (7 pieces) and simplified UNPP outer telephone box (5 pieces). Near the office by the over-head platform the UNPP box on wooden mast is also installed.
Cable network of the park communication is performed by SBB .. 3x1 cable in the ground, the length is 1,5 km.

11.4. External telephone communication

To connect the washing station with the railway telephone exchange the facility of telephone ducts from asbestos-cement pipes, diameter 100 mm, length 3 km is needed.
It is necessary to lay cables in telephone ducts as follows:

1. for telephone communication - twin
2. for selective communication - four-fold

For city telephone communication the system for telephone canalisation in one canal, length 700 m, is needed.

12. ENVIRONMENTAL PROTECTION, LABOUR SAFETY, FIRE SAFETY MEASURES

12.1. Labour safety

For the benefit of the staff of the Washing station there are amenities, canteen, leisure sites available.
Sanitation and amenities are provided according to the staff number of the Washing station and the type of their contamination.

Lighting of the area is provided with the rated lighting of 20 lux. All connections of metallic constructions of depot equipment are earthed by shunting /shunted/ cross-pieces to ensure electrical safety of the operating personnel.
Sites free of constructions will be planted by trees and shrubs. Access roads are designed to all buildings and facilities of the Washing station.

12.2. Environmental Protection

General

Measures for environmental protection are made up in order to exclude negative impact of the productions of the Washing station on water reservoirs/ponds/ and soil of adjacent areas with the account of acting/existing/ norms for designing.

Measures for environmental protection

Technological process of production are accompanied with the emission of toxic substances by washing and steaming of tanks, local purifying receivers are foreseen for that purpose.

12.3. Fire-safety measures

Degree of fire-resistance of buildings П. As per their explosion-safety, the buildings refer to categories Д, В.
For evacuation of people and valuable material inside the buildings two exits are foreseen.
The doors on the evacuation ways are opened to the direction of the building exit.
A fire water-pipe is foreseen within the area / site.
The buildings are equipped by fire-alarm system.

`12.4 Arrangement of sanitation & protection area.

The main kind of industrial damages are discharge of industrial drains, subject to cleaning and discharge into city sewage system.

13. DESIGN / CONSTRUCTION ARRANGEMENTS

(No text received from ADDY by 28th November 1998)

(Preliminary drawings received are attached)

Annexes

ANNEX

Calculation of heat demand at the Washing Station

Washing station in Balajari

The rate for heat consumption per one tank for the work:

In the summer time:
Q l= t (w) • q (w) + t (m) • q (m) Gcal/tank
Where q (winter) , q (steam.), q (wash.) - initial rates for heat consumption for steaming and washing
T (steam.) , t (wash.) – time period, necessary for steaming and washing, in min.

In winter time
Q (winter) = t (steam).x q (steam.) + t (wash.)x q (wash.) + q (winter) .... Gcal/tank
Where q (w) - additional heat consumption for tanks heating in winter time.

Initial rate of heat consumption for tanks steaming:

q (steam.)=q steam. x α g cal/min.

By results of control testing:

Q (steam.) = 0,0085 gcal/min. By pressure p= 5 kg. / sq.cm.

α - ratio, introduced by decrease of steam pressure.

By p <4 atm α=0,8
Q (steam.) 0,0085x0,8 = 0,0068 gcal/min

The rate of heat consumption for tanks washing is identified by the formula:

$$Qm = 50 \cdot 10^{-6} \beta(t \text{ outlet} - t \text{ inlet}) \text{ gcal/min}$$

Where 250 kg/min –average water consumption by the work of mechanical device

β - correction factor, taking into account changes in water consumption in front of the over-head platform

by p = 8 kg./ sq. cm β=1,07

t (outlet), t (inlet) - temperature of water at the inlet and outlet of the boiler, ° C;

Parameters of the washing water:

T (inlet)=15 °C, t outlet = 75 °C, p (outlet) = 8 kg./cm

Average temperature of the air outside t (av.)=5,1°C

Q (wash.) = 250x10 $^{-6}$ x1,07 (75-15) = 0,016 gcal/min

By the technology approved and dependent on the character of tanks treatment steaming t (steam.) and washing t (wash.) take up the following time:

a) out of the light oil-products for light ones "GS"

t (steam.) = 12 min., t (wash.) =15 min.

b) out of the heavy oil-products for light and repair "GTS"
t (steam.) = 22 min., t (wash.) = 35 min.

Additional consumption of heat in winter for heating of tank q (winter):
Q (winter)=20 – t(winter) aver.[1150+3,5(t (steam.)+ t(wash.)x10 $^{-6}$]

a) for treatment of tanks out of the light oil-products
q (winter)=(20-5,1)[1150+3,5(12+15)x10 $^{-6}$] = 0,02 gcal/tank

b) for treatment of tanks out of the heavy oil-products for light ones and repair:
q (winter)=(20-5,1)[1150+3,5(22+35)x10
] =0,02 gcal/tank

1. The rate for heat consumption per one tank in summer and winter periods by treatment of out of the light oil-products for light ones:

Q (summer) = q (steam.) x t (steam.) + q (wash.) x t (wash.)
Q (summer) = 0,0068 x 12 + 0,016 x 15 = 0,322 g cal/tank
Q (winter)= q (steam.) x t (steam.) + q (wash.) x t (wash.) + q (winter)
Q (winter) = 0,0068 x 12 +0,016 x 15 +0,02 = 0,342 g cal/tank

2. The rate of heat consumption per one tank:

Q (summer) = q (steam.) x t (steam.) + q (wash.) x t (wash.)
Q (summer) = 0,0068 x 22 + 0,016 x 35=0,71 g cal/tank
Q (winter) = q (steam.)xt(steam.) + q (wash.)x t(wash.) + q (winter)
Q (winter) = 0,0068 x 2 22 + 0,016 x 35 +0,02 =0,73 g cal./tank

Calculation N 1

(consumption of heat power for tank treatment per quarters)

Table N

Quarter	Type of treatment	Number of tanks, treated by hot way		Rate of heat energy consumption per one tank	Consumption of heat energy G cal.	
		200	255		200	255
I quarter	Light fuel	6066	7735	0.34	2062	2630
91 days	Heavy fuel	121134	15470	0.73	8857	11293
Total		18200	23205		10919	13923
II quarter	Light fuel	1000	1275	0.34	340	434
15 winter days	Heavy fuel	2000	2550	0.73	1460	1862
76 summer days	Light fuel	5067	6460	0.32	1621	2067
	Heavy fuel	10133	12920	0.71	7194	9173
Total for II quarter	Light fuel Heavy fuel	6067 12133	7735 15470		1961 8654	2501 11035
Total II quarter		18200	23205		10615	13536
III quarter	Light fuel	6133	7820	0.32	3925	2502
92 days	Heavy fuel	12267	15640	0.71	8710	11104
Total III quarter		18400	23460		12635	13606
IV quarter	Light fuel	3133	3995	0.34	1065	1358
47 winter days	Heavy fuel	6267	7990	0.73	4574	5833
45 summer days	Light fuel Heavy fuel	3000 6000	3825 7650	0.32 0.71	960 4260	1224 5432
Total	Light fuel Heavy fuel	6133 12267	7820 15640		2025 8835	2582 11265
Total for IV quarter		18400	23460		10860	13847
Total for a year		73200	93330		45029	54912

(Specification of equipment)

Pos.	Name & technical characteristics of equipment & materials, manufacturer works (for import equipment: country, company)	Type, model of equip., name of docum. , No. of form	Unit of measur.	Code	Code of the manuf. works	Code of equip. material	Unit price, 1000 roubles	Quantity	Mass of equip. unit, kg
1	2	3	4	5	6	7	8	9	10
Section 1. Equipment and materials supplied by the Contractor									
1.	Pipes- steel, electrically straight welded, dia. 20-377mm with removed flat of steel types BST 2 KP, BST 4ÊP, BST4PS. Exterior dia. In mm DN, thickness of walls in mm DN 159 T 4.5		m.	006				3278.00	17.200
2.	Pipes- steel, electrically straight welded, dia 20-377 mm with removed flat of steel types BST2KP, BST4KP, BST2PS-BST4PS. External dia. In mm DN, thickness of the walls in mm-T.DN 273 T 6.		m.	006				241.00	39.500
3.	Pipes-steel, electrically straight welded, dia. 20-377 mm with removed flat of steel types BST 2KP, BST4KP, BST 2PS-BST4PS. External dia. In mm DN, thickness of walls in mm T DN 76: T 4,0 for supports		m.	006				704.00	7,01
4.	Pipes-steel, electrically straight welded, dia. 20-377 mm with removed flat of the steel types BST 2KP BST 4KP, BST 2PS-BST 4PS. External dia. In mm DN, thickness of walls in mm T DN 108 T 4.5 for supports		m.	006				47.00	11.500

5.	Support parts, saddles, brackets & yokes(ferrules 4 (devices for fixing gas pipe-line to the supports)		T	168				2.28	1000
6.	Pipes-steel, electrically welded, water-gas-supply with threading. GOST 3262 75 with dimension 1, black, usual/not galvanized/dia. of conventional passage in mm DU, thickness of walls in mm. T DU 15 T 2.8			006				10.00	1.280
7.	Control pipe with colour		pieces	796				1.00	
8.	Earth electrode, vertical, of round steel, dia.12 mm, weight 2.75 kg , 1 piece		10 pieces	000				2.40	
9.	Earth connector, horizontal, of strap steel 40x4		100 m.	000				1.56	
10.	Box for fencing slide-valves (metallic construction)		T	168				0.25	1000
Section 2. equipment & materials, supplied by Customer									
11.	Slide-valve, wedge, flanged, of steel 10x18 N9 TP 3 KL2 16 DU 150;RU 16		pieces	796					
12.	The same, dia. 250 mm 3 KL 16		pieces	796					
13.	Straight cocks, gland, coupling, brass, 11 B6BK for liquid media, pressure 1 MPA, dia. In mm: 15		pieces	796					
14.	Condensate collectors, dia. Of conventional passage 150 mm . UG 2.00 05		pieces	796					
15.	Cost of gas-regulator point with gas pressure regulator PDBM1-100		pieces	796					

DRAFT 30/11/98

Azerbaijan State Railways
Azerbaijan Dovlet Demir Yolu - ADDY

Reconstruction of Interior Wash Plants for Railway Tank Wagons (Design and Build)

TECHNICAL SPECIFICATION

ATTACHMENTS

Location of Balajari
Site Layout - Balajari Washing Station

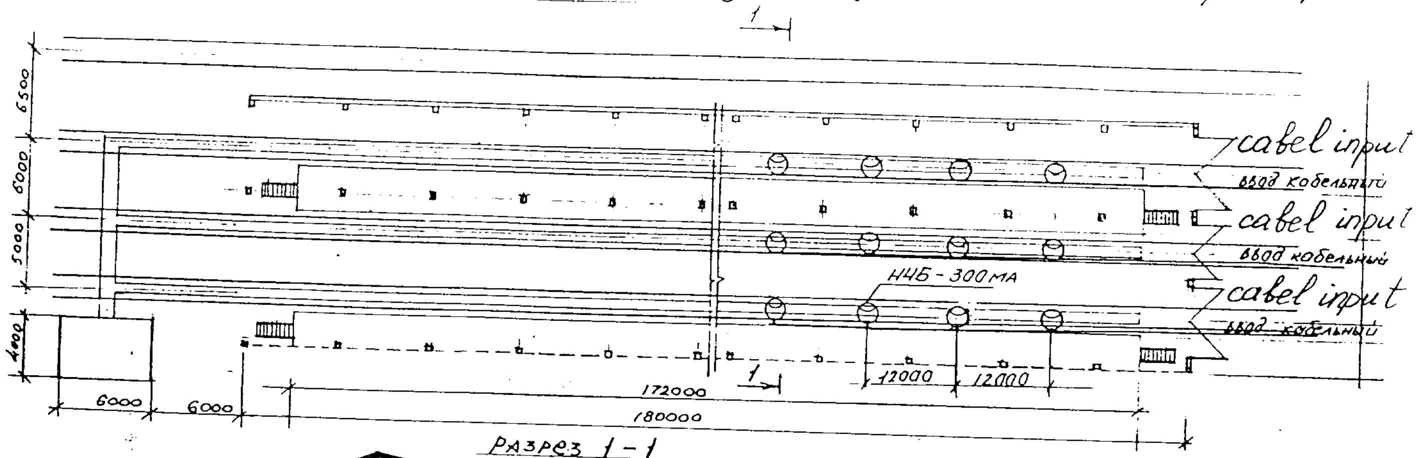
Wagon Dimensions
- Type 62 (1972)
- Type 62 (1984)
- Type 71
- Type 73

Trackwork Layout - Interior Wash and Bitumen Plants
Proposed Interior Wash Platform Layout - Plan
Proposed Interior Wash Platform Layout - Cross Section
Proposed Interior Wash Layout - Effluent Channels
Proposed Bitumen Platform Layout
Lighting - Interior Wash Platforms
Lighting - Bitumen Platform
Route of Gas Main

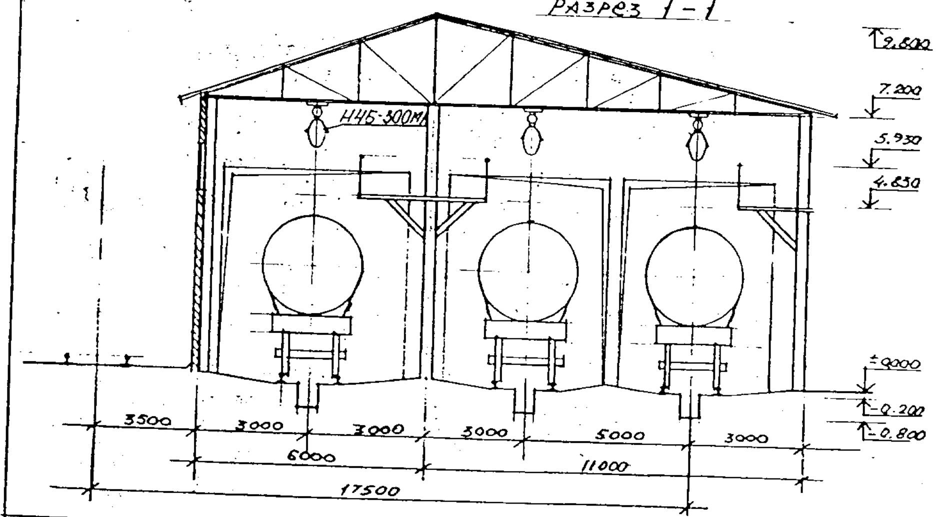
(To follow by post)

ПЛАН ЭСТАКАДЫ

Layout of the over-head platform



РАЗРЕЗ 1-1



Основные показатели

Светильники типа Н4Б-300МА – 48шт
Ответвительные коробки тройниковые КТДУ-25У1 – 48шт
Протяженность проектируемого кабеля АВ... в стальной водогазопроводной трубе ф25-700м
Провод АПВ ответвляющий к светильникам. 200м также в трубе.

Освещенность эстакады должна быть не ниже – 2лк, а проходы между эстакадами не менее – 0,5лк

Заказ 98009

Баладжары-реконструкция промывочной станции

План расположения электроосветительного оборудования

Исполнила: [signature] Мамедова И.

Baladjari - reconstruction of the Wash Station
Layout of location of el.-lighting equipment

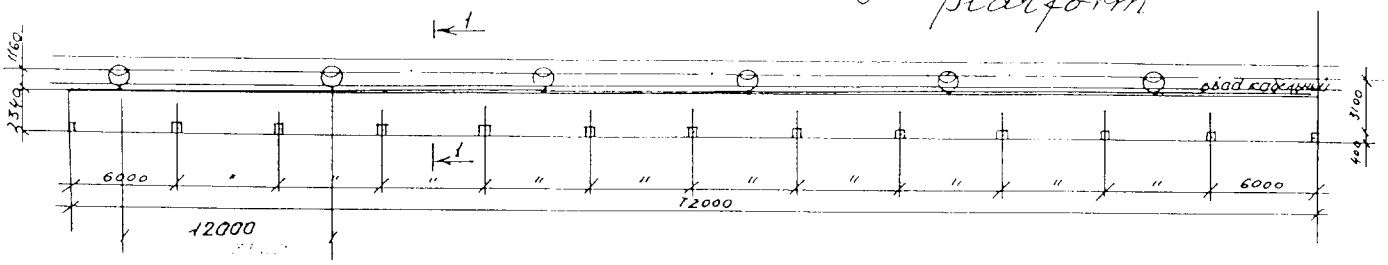
Main indicators:

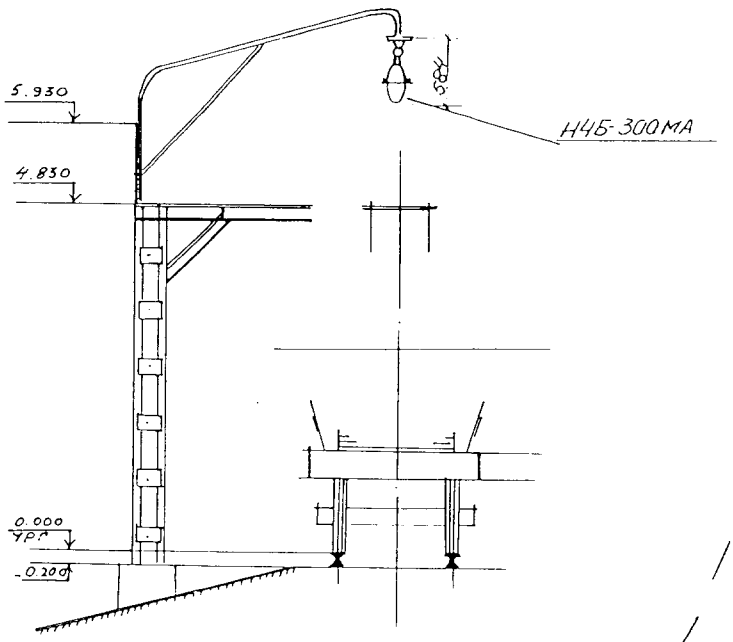
Lamps of Н4Б-300 МА type - 48 pieces
Branching boxes, Siamese connection(?), tee. KTDU-25U1 - 48 piece.
The length of the АВБГ cable in steel water-gas-pipe-line tube ф25-700 м.
The wire АПВ, branching to ~~lightin~~ lamps - 200 м, the same in the tube

Lighting rate ~~between the~~ of the over-head platform must be minimum - 2 lk and gangways between overhead platforms minimum - 0,5 lk.

План эстакады

Layout of the overhead platform





Основные показатели:

Светильник типа Н45-300МА — 6 шт
Ответвительные коробки тройниковые КТДУ-2541 — 6 шт
Протяженность проектируемого кабеля АВВГ в стальной водогазопроводной трубе ф25 — 80
Провод АПВ ответвляющий к светильникам в водогазопроводной трубе ф25 —

Освещенность эстакады должна быть не менее - 2лк, а проходы между эстакадами не менее - 0,5 лк.

Заказ 98009

Баладжары - реконструкция пропарочной станции

План расположения электросветительного оборудования для эстакады битумных контейнеров.

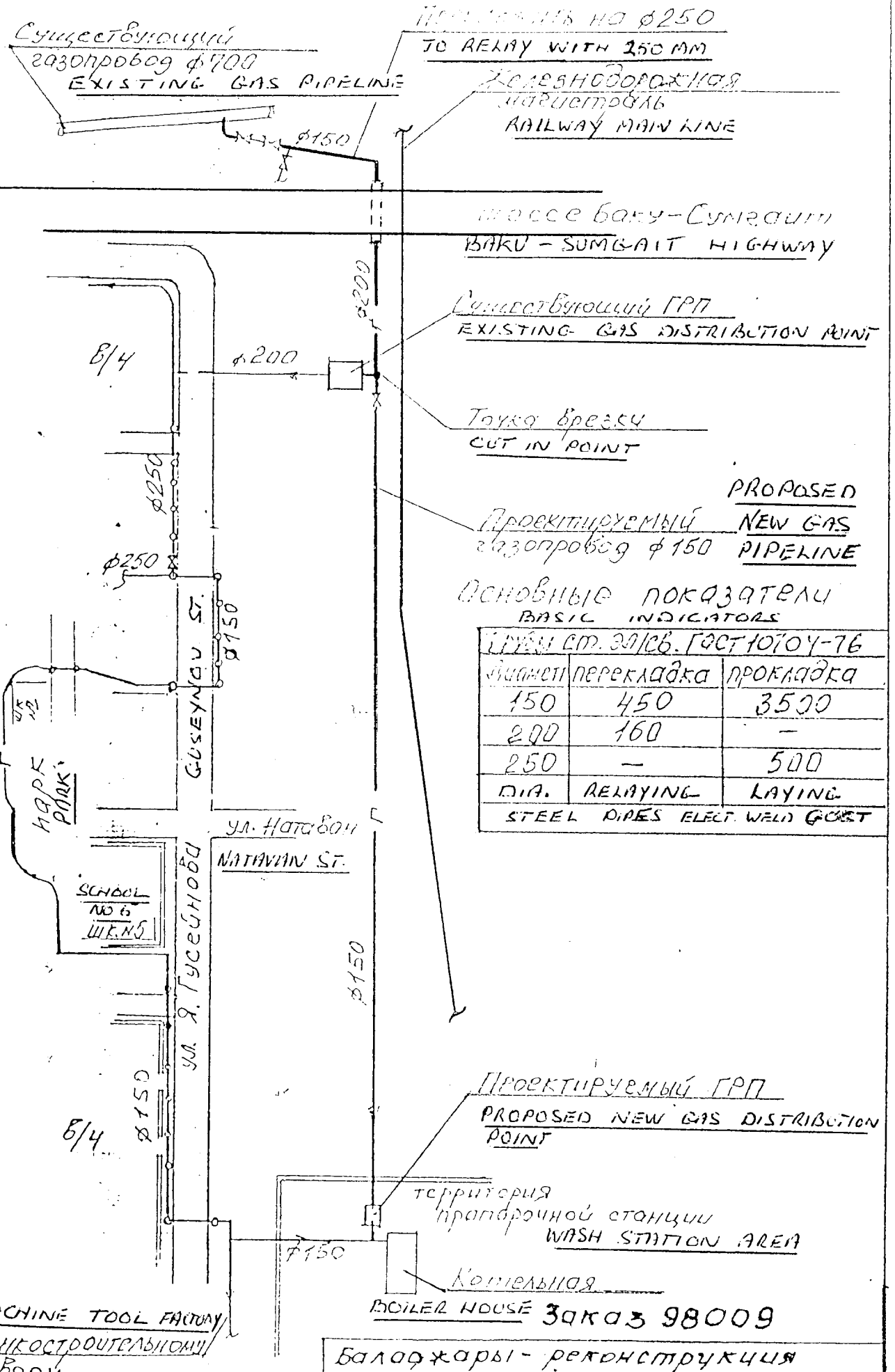
исполнила Мамедова Н. И.

Main indicators:

The lamp of the H45-300 MA type - 6 pieces
Branching boxes, Siamese connection(?), tee, KTDU-2541-6p.
The length of the cable ABBG, being designed in steel water-gas-pipe-line tube (pipe) ϕ 25-80
The wire APB, branching to lamps in water-gas-pipeline tube ϕ25-50
Lighting rate of the over-head platform must be at least - 2 lk, and gangways between overhead platforms at least - 0,5 lk.

Balajari - reconstruction of the Washing Station.

Layout of location of el. lighting equipment for the over-head platform for bitumen containers.



Основные показатели
BASIC INDICATORS

Трубы ст. 20/сб. ГОСТ 10704-76		
диаметр	перекладка	прокладка
150	450	3500
200	160	—
250	—	500
DIA.	RELAYING	LAYING
STEEL PIPES ELECT. WELD GOST		

Заказ 98009

Баладжары - реконструкция пропарочной станции	
BALAJARI RECONSTRUCTION OF WASH STATION	Ситуационный план газоснабжения
PROPOSED NEW GAS SUPPLY	

SECTION C WATER/OIL EFFLUENT TREATMENT PLANT

FINAL DRAFT 12/11/98

Item**: Water/Oil Effluent Treatment Plant

Table of Contents

1. General Description

The Specification describes the requirements for equipment, which will be purchased on behalf of the Beneficiary as mentioned in the Bill of Quantities, for the treatment of the oil / water effluent mixture from washing the interiors of railway oil tank wagons at the washing station at Balajari, near Baku, Azerbaijan. The oil is to be recovered for reuse, and the water is to be purified in two stages, mostly for recirculation for tank wagon washing, but also for discharge to the municipal sewage system.

The plant may also be used for the purification of water from exterior washing of tank wagons before discharge to the municipal sewage system.

2. Operational Characteristics

2.1 General Characteristics

To be able to treat the emulsified oil / water effluent mixture from the washing out of the interiors of 4-axle and 8-axle oil rail tank wagons that have contained light or heavy fuel oils, liquid bitumen, or crude oil.

The system shall be designed to :

Recover the mixtures of oil, known as "Sno", for use as a boiler fuel or for resale.
Purify the water for re-use in the cleaning process to acceptable health and safety standards.
Purify a proportion of the water for discharge to the standard required by the Baku City Sewage Authority "Bakkanalizatcia".

The system shall be designed for ease of use, maintenance and repair.

The system operation shall be totally automatic, except for de-sludging of the primary units.

2.2 Capacity Requirements

The additional plant shall have the capacity to process 600 cu. m per 24 hour day, of which 120 cu. m. shall be purified to a standard acceptable to the Baku City Sewage Authority.

2.3 Maximum Dimensions

The space available for the installation of the equipment is shown on the attached site plan.
It is envisaged that all the equipment shall be installed on one concrete plinth near the existing chemical water treatment plant.

2.4 Existing Situation and Future Working Pattern

The Tank Wagon Washing Plant at Balajari, 10 km from Baku, Azerbaijan, washes the interior of all tank wagons used for the transportation of crude, heavy refined, and light refined oils. The oil / water mix is mechanically and chemically separated and the oil is recovered, and the water is recycled.

The equipment to be installed is to replace the existing mechanical only treatment plant, and to supplement the existing mechanical / chemical treatment plant of 120 cu / m day maximum capacity.

The plant operates 24 hours per day throughout the year.

The operating cycle is 24 hour working. The Tenderer shall state if his equipment can comply with this criteria. The pattern of anticipated downtime for servicing should be given.

2.5 Power Supply

The Beneficiary will make available a power supply to a main lockable isolation switch panel, to be supplied by the Contractor, as follows:

Voltage	3 x 380 / N / PE volts (4 wire)
Voltage fluctuation max.	+/ - 10 %
Frequency	50 Hz
Frequency fluctuation max.	+ / - 1 %

Direct switching up to 15 kW, control voltage 220 v, signal voltage 220 v.

2.6 Steam Supply

The Beneficiary shall make available to the site a steam supply in the range 2 -8 BAR

2.7 Water Supply

The Beneficiary shall make available to the site a water supply

Raw water source : Town supply of river water from Kura river.
Properties : Appendix 1.

2.8 Discharges

Permissible level of discharges are attached as Appendices 2 and 3.

Approval of the equipment to be selected must be obtained from the State Committee for Ecology and Nature Use by the Azjeldorproject department of the Beneficiary.

2.9 Site Data

Destination	Balajari, near Baku, Azerbaijan
Location	Outdoors
Erection altitude asl	375 m.
Ambient temperature	minus 20 C to plus 40 C.

2.10 Scope of Supply

Supply, delivery CIF to Balajari Tank Washing Station, Azerbaijan, supervision of installation, testing and commissioning to the satisfaction of the Beneficiary and the relevant Azeri Authorities, mechanical / chemical wash water treatment plant and associated equipment and parts, as outlined below.

The water treatment plant shall consist of the following system components:

Sedimentation plant.
Separation plant.
Flotation plant - primary.
Flotation plant -secondary.
System electric panels and controls.
Air conditioning units for operating and control rooms.
All pipework, cables, fittings, and other connections between the separate units supplied.
Design and provision of suitable working drawings to enable the Beneficiary to provide suitable bases and services for the plant.

Training of the Beneficiary's staff in the operation and maintenance of the equipment.

The appointed Contractor will be solely responsible for ensuring that the total plant will operate in a satisfactory manner and in compliance with all regulations.

The Beneficiary shall arrange the unloading and placing into position of the equipment on site at Balajari, under the supervision of a representative of the manufacturer.

3. Main Technical and Design Demands

3.1 Sedimentation Plant

The sedimentation plant shall be supplied as self contained pre-assembled units as follows:

3.1.1 Sedimentation Tanks

2 Sedimentation tanks, open-top steel framed 40 ft. containers

Dimensions of each sedimentation tank shall be approximately: 12.0 m x 2.4 m x 2.4 m

Each tank shall be equipped with:
A surface suction scraper, a bottom chain scraper, oil coat thickness measurement system, with automatic cleaning, 2 de-sludging valves, 1 heating hose, and all the connecting pipes and connections required for operation. The bottom sludge may be removed manually.
A suitable skip type container shall be provided for the sludge.

3.1.2 Preparation and Dosing Plant

Each tank shall have a preparation and dosing plant for flocculation aids, in compact design, for preparing the dosing solution, complete with all the components required for operation. The original solution may be prepared manually.

3.1.3 Electric Agitators

Each tank shall have electric agitators for installation in the reaction stages in the sedimentation tank, for stirring in the flocculation aid.

Motor power:	0.55 kW minimum
Driving speed:	65 rpm approx.

3.1.4 Intermediate Tanks

2 Intermediate tanks, 20 ft open-top steel framed containers.

Dimensions of each intermediate tank shall be approximately: 6.0 m x 2.4 m x 2.4 m
Useful volume per tank : approx. 28.0 m^3.

3.1.5 Oil Separation System

Each intermediate tank shall be equipped with an oil separation system for separating the emulsified oil in the intermediate tank.

Output:	0.5 m^3 / h
Motor power:	approx. 1.0 kW.

The system shall be complete with all necessary connections, valves, connecting pipes, and pressure gauges required for operation.

3.1.6 Electrical Equipment

Each sedimentation unit shall be supplied with a control cabinet, wired ready for connection, with lead-in section, FI switch, emergency isolation switch, cabinet lighting socket, 24 V control transformer, 220 V control transformer, wiring diagram, with all associated switches and LED's, ISO control switch, horn and flashing light, and control system for all electric drives, including electrical installation work and material, cable conduits, protective conduits, cables and all fixings in the container.
Each cabinet shall be fully functionally tested in the Contractor's Works before dispatch.

3.2. Flotation Plant - Primary

The primary flotation plant shall be capable of treating 25 cu. m per hour of water / oil mixture from the washing of the interiors of oil tanks with a concentration of up to 25 % oil.

The separated mixtures of oil (Sno) must be capable of being used as a proportion of boiler fuel.
The Tenderer shall state the minimum percentage of residual water in the separated oil which his plant will achieve.

The water after treatment will be recycled, should comply with all health and safety requirements , and have not more than 100 mg / litre suspended solids.

The plant shall be supplied as self contained pre-assembled units as follows:

3.2.1 Reaction Stages

2 Reaction stages, each comprising:
2 Reaction containers, circular, material - PP, with volume of approximately 3.5 m^3, equipped with agitator traverse and all connections and connecting pipes required for operation.
2 Electric agitators, of at least 1.5 kW
1 Filling level measuring system, designed as bar electrode.

3.2.2 Flotation Stages

2 Flotation plants, each comprising:
1 Flotation unit, complete with immersion walls, flotation collection tank, flotation pump, feed and discharge connections, and chain scraper. Material : PP
1 Dispersion flow unit, complete with dispersion flow pump, contact pressure gauge, air flow meter, relief valve and all connecting pipes.

3.2.3 Control Units

2 pH measuring and control units for actuating the dosing pumps for acid, each comprising:
1 pH measuring transformer, with proportional pulse frequency control.
1 Industrial immersion fittings for receiving the pH single rod measuring chain.
1 pH single rod measuring chain with sealed gel filling.
1 Set of all cables and plugs per unit.

3.2.4. Cleaning Systems

2 Automatic cleaning systems for the pH electrodes, in the reaction tanks, consisting of spray head for mounting on the immersion fittings, injector unit for supplying the spray heads and program transducer for automatic starting of the cleaning program.

3.2.5. Dosing Stations

2 Dosing stations for acid, each comprising:
1 Dosing pump suitable for external actuation
1 Suction fitting for dosing directly from a delivery barrel
1 Wall tank for the dosing pump.
1 Dosing jet
1 Set of control cables and plugs

3.2.6 Refilling and Diluting stations

2 Refilling and diluting stations for the organic separator, in compact design, for preparing the dosing solution, complete with all components required for operation.

3.2.7 Equipment Housing

All the above equipment for the flotation plant - both reaction stages, the dosing barrels, and the switch cabinet. shall be supplied housed in two 40 ft plywood containers
Dimensions: approximately (l x w x h) 12,192 x 2,438 x 2,438 mm

Each container shall be complete with insulation, waterproof plywood floor, with two doors, a window, inlet and extract ventilation, together with lighting. The control room shall be separated by an internal partition.

.2.8. Electrical Equipment

2 Control cabinets, wired ready for connection, with lead-in section, FI switch, emergency isolation switch, cabinet lighting socket, 24 V control transformer, 220 V control transformer, wiring diagram, with all associated switches and LED's, ISO control switch, horn and flashing light, and control system for all electric drives, including electrical installation work and material, cable conduits, protective conduits, cables and all fixings in the container.

3.3. Flotation Plant - Secondary (KST Device)

The secondary flotation plant shall be capable of treating 5 cu. m. / hour to the standards required by the Baku City Sewage Authority "Bakkanalizatcia" for discharge to the municipal sewerage system.

The plant must be capable of reducing the level of suspended solids after treatment to not exceeding 2.0 mg. / litre

The plant shall be supplied as self contained pre-assembled units as follows:

3.3.1 Reaction Stage

1 Reaction stage, comprising:
- 1 Reaction container, circular, material - PP, equipped with agitator traverse and all connections and connecting pipes required for operation.
- 2 Electric agitators, of at least 1.5 kW
- 1 Filling level measuring system, designed as bar electrode.

3.3.2 Flotation Stages

2 Flotation plants, each comprising:
- 1 Flotation unit, complete with immersion walls, flotation collection tank, flotation pump, feed and discharge connections, and chain scraper. Material : PP
- 1 Dispersion flow unit, complete with dispersion flow pump, contact pressure gauge, air flow meter, relief valve and all connecting pipes.

3.3.3 pH Control Unit

1 pH measuring and control unit for actuating the dosing pump for caustic soda comprising:

1 pH measuring transformer, with proportional pulse frequency control.
1 Industrial immersion fitting for receiving the pH single rod measuring chain.
1 pH single rod measuring chain with sealed gel filling.
1 Set of all cables and plugs per unit.

3.3.4 Dosing Station for Alkali

1 Dosing station for alkali, comprising:
1 Dosing pump suitable for external actuation.
1 Suction fitting for dosing directly from a delivery barrel.
1 Wall tank for the dosing pump.
1 Dosing jet.
1 Set of control cables and plugs.

3.3.5 Dosing Station for Flocculant

1 Dosing station for flocculant, comprising:
1 Dosing pump
1 Suction fitting for dosing directly from a delivery barrel
1 Wall tank for the dosing pump.
1 Dosing jet
1 Set of control cables and plugs

3.3.6 Equipment Housing

All the above equipment for the flotation plant - reaction stage, the dosing barrels, and the switch cabinet. shall be supplied housed in a 40 ft plywood container.
Dimensions: approximately (l x w x h) 12,192 x 2,438 x 2,438 mm.

The container shall be complete with insulation, waterproof plywood floor, with two doors, a window, ventilation and de-aeration, together with lighting. The control room shall be separated by an internal partition.

3.3.7. Electrical Equipment

2 Control cabinets, wired ready for connection, with lead-in section, FI switch, emergency isolation switch, cabinet lighting socket, 24 V control transformer, 220 V control transformer, wiring diagram, with all associated switches and LED's, ISO control switch, horn and flashing light, and control system for all electric drives, including electrical installation work and material, cable conduits, protective conduits, cables and all fixings in the container.

3.3.8. Sludge De-watering Unit

1 Sludge de-watering unit, comprising:
1 De-watering container, capacity = 5.0 m^3:
1 Filtrate water return unit with storage container and immersed motor pump with float switch.

3.4 Air Conditioning Units for Containers

The container units shall be fitted with wall mounted air conditioning units as follows:

Flotation control rooms	1 per room	3
Flotation operating rooms	2 per room	6
Sedimentation operating rooms	1 per room	2
	Total	11

The air conditioning units shall comply with the following :

Air-cooled room air-conditioning unit for wall mounting, ready installed, internally wired, filled with oil and R 22 refrigerant, pressure tested and functionally tested.

Housing with retractable chassis, weatherproof, manufactured from galvanised sheet steel, chemically cleaned, phosphated and stove enamelled on both sides with polyester synthetic resin paint, in beige, inner partition lined with soundproofing foam.

Refrigerating compressor, hermetically welded, for direct starting, suction gas cooled, motor insulation class F with over current thermal protection switch (Klixon or similar), installed so that it is double vibration damped.

Condenser and evaporator to be high duty ribbed pipe heat exchanger of Cu/Al.

Refrigeration piping - made from seamless drawn copper pipe, soldered under protective gas, with silencer in the hot gas pipe, capillary tube injection and Schrader or similar valve on the high pressure side.

Evaporator fan - radial fan, statically and dynamically balanced.

Condenser fan.- axial fan with blower for condensate discharge.

Fan motor - lubricated for life, fully enclosed a.c. motor with two shaft ends, 3-stage,
2-stage - flotation operating room only.

Air vent - for control room air extraction, actuated by Bowden cable.

Control panel, with following control elements:
- Slide for air valve adjustment
- Fan step switch for three or two speeds
- Mode selector for OFF-VENT-COOL-HEAT
- Temperature set point control (thermostat)

Air filter - foam filter mat which can be regenerated, quality class EU 2 or equivalent, easily removable for maintenance purposes.

Front lining - made of plastic, aesthetic design, removable, with horizontally and vertically adjustable air guide plates.

Accessories (supplied loose):

- Remote control
- Submersible water pump

Cooling power:	3.0 k W
Heating power:	1.6 kW
Rated voltage:	220, 50 Hz
Total input:	1,300 W

Operating current:	5.8 A
Starting current:	30 A
Length:	590 mm
Width:	400 mm
Height:	400 mm
Acoustic data:	35 - 43 dB (A)

The control cabinet shall be fully functionally tested at the Works.
Provision shall be made for a full set of " as installed" wiring diagrams to be provided inside the cabinet.

3.5 Interfaces with Existing Equipment

The Beneficiary shall provide the supply of all materials to the interface with the proposed equipment of wash water, fresh water and steam feed lines, and water and oil discharge lines, and electricity supply.
The Tenderer will supply suitable flanged connections and loose flanges at the interfaces, and also a suitable main isolation switch.

The Tenderer shall state how the equipment to be supplied will operate in conjunction with the existing chemical treatment plant on site.

3.6 Surface Protection

All parts shall be primed and painted according to the Tenderer's standard, preferably it shall be a solvent and heavy-metal-free paint (acrylic water-based paint).

Paint specifications shall be attached to the tender.

3.7 Design Criteria

3.7.1 Specifications

The equipment shall be constructed to ISO or equivalent standards, but must meet the requirements of the Baku Municipal Committee and any statutory GOST (Gosgortechnadzor) standards.

3.7.2 Maintainability Design Factors

To reduce maintenance down time and cost, maintainability factors shall be incorporated in the equipment's design, whenever practical.

3.7.3 Diagnostics

Diagnostic ("trouble-shooting") techniques, procedures and test-equipment shall be developed for rapid location of a fault in order to achieve an overall reduction of systems down time. The Tenderer shall list in its proposal systems for which such diagnostic procedures will be supplied.

3.7.4 Accessibility

Restricted accessibility of modules, assemblies and other items is a large contributor to the extension of repair time. Configuration of the hardware and its layout in the equipment shall allow free and easy access for maintenance personnel and for tools and equipment which are required to perform the repair task.

3.7.5 Quality Control

Quality control shall be employed to assume a vital role in establishing and maintaining a high quality product. Detailed inspections and controls shall be made and data shall be gathered for analysis and evaluation to ensure that the required quality standards are met.

The Contractor shall be responsible for providing inspection methods, maintaining surveillance and controls over all testing and special processes, checking manufacturing methods, materials and bought-in items, for compliance with applicable specifications, making reports of inspections and tests to be provided to the Purchaser as will be outlined in the final contract agreement. Test and inspection reports shall be furnished.

The Tenderer shall submit a certificate of his quality control system according to ISO 9000 - 9004.

3.8 Assembly and Training

The Beneficiary will provide suitable labour for the installation of the equipment, under the supervision of a technician supplied by the Contractor.

The Contractor shall provide the supervision of the installation during the erection and commissioning period of approximately 4 weeks, as follows:

Delivery and moving into position	1 week
Commissioning and training	3 weeks

During the commissioning period the Contractor shall provide training and instruct, in the Russian language, the Beneficiary's staff on the operation and maintenance of the equipment.

3.9 Final Adjustment and Testing

After the equipment been assembled, adjusted, and otherwise made ready for operation, it shall be tested by the Contractor, to the satisfaction of the Beneficiary, to demonstrate conformance to all requirements defined in these Specifications.

3.10 Safety Arrangements

General assembling and detailed design of the plant shall conform to all safety regulations and codes applicable in Azerbaijan, with the addition of the following:

Sufficient labelling of controls should be provided to ensure the safe operation of the equipment. All labelling must be in the Russian language, as well as in the contractor's own language if different.

The Contractor shall supply such personal safety equipment which he deems necessary for the safety of personnel operating the plant.

3.11 Documentation

The Tenderer shall provide the following "as installed" documentation, in the Russian language, as well as in the contractors own language if different, delivered to site not later than one month after installation :

Operation and Maintenance Manuals	4 copies
Wiring Diagrams	4 copies

In addition the Contractor shall provide one set of Operation and Maintenance Manuals, and Wiring Diagrams, in the contractors own language if different, for use by the contractor's staff during site visits. One set of manuals shall be supplied in the English language.

3.12 General Instructions

The Tenderer shall submit with his proposal detailed specifications of the equipment to be supplied, together with all associated fixtures, fittings and connections to existing plant.

The Tenderer shall submit with his proposal detailed specifications for all listed items, a list of all standard equipment and a price list of all available options which were not included in the basic prices.

The Tenderer shall offer a standard product as close as possible to the given technical specifications. Special design and prototypes will not be accepted. The Tenderers shall draw attention to any aspect of his tender where his standard product differs in detail from the specification shown above.

The offered type of product must have been manufactured for at least one year.

3.13 Warranty Period and Defects during Warranty Period

The Tenderer will be expected to demonstrate his faith in his product by offering a warranty period of at least three years.

The Tenderer shall outline his proposals for dealing with defects during the warranty period.

The provision of remote monitoring and fault diagnosis from the Tenderer's base should be considered.

The Tenderer shall outline how he proposes to ensure that the plant continues to operate in optimum condition during the warranty period. Provision of an inspection visit after 6 months operation, and then annually, should at least be considered.

4 Spare Parts and Consumables

4.1 Recommended Spare Parts

The Tenderer shall submit with his bid a list of required spare parts, including consumables for a period of three years, duly completed and priced, to the value of 5% of the total ex-works price of the equipment.

The spare parts lists should include the following data elements:

- Sequence number
- Tenderer's part number
- Item description
- Figure and item number in the illustrated parts breakdown drawing if applicable
- Quantity
- Unit price
- Total price

Price basis on the spare parts schedule shall be "Ex Works".

4.2 Chemicals

The Tenderer shall include in his tender for the supply of sufficient chemicals for three years operation. Phasing of delivery can be considered.

5. Bill of Quantities

Beneficiary : Azerbaijan Dovlet Demir Yolu (ADDY) - Azerbaijan State Railways

5.1 Tender

Item	Description	Unit	Qty	Total Cost
1	Mechanical/Chemical Water treatment plant capacity 600 cu. m. day, complete with spare parts.	No	1	
2	Chemical supplies for three years operation.			
Total FOB				
Freight to Balajari, Azerbaijan.				
Insurance to Balajari, Azerbaijan				
Total, CIF Balajari, Azerbaijan				
3	Supervision of Erection, Commissioning, and Training	Sum	1	
	TOTAL TENDER PRICE			

Delivery Period to Balajari
from date of order confirmation ..... weeks

5.2 List of Spare Parts included in the Tender

The Tenderer shall attach a priced list of spare parts included in the Tender, in the format outlined in Para. 4.1

Balajari Tank Wagon Washing Station

WATER ANALYSIS

Results

Boiler Feed Water Analysis 1998

Selective operation control of the chemical water-preparing unit of the boiler-room has been carried out. The hardness of the feed water after nitric cationite filters, of the Ist and 2nd stages, and the hardness of water in the deaerator, have been measured.

The average results obtained are as follows:

	After stage 1	After stage 2	In deaerator
Hardness mg equiv/l	0,35 - 0,60	0,01 - 0,02	0,01 - 0,03
PH	-	-	7 - 9

Chief Engineer of Balajari Wagon Washing Plant (Signed) Agaev A.A.

Head of the Labaratoty - Balajari Wagon Washing Plant (Signed) Makhmudov C.N.

Water analysis from samples taken for EBRD Enviromnmental Report June 1998:

	Conductivity MicroSiemens / cm	Hardness CaO mg / l
Raw water	925	179
Boiler feed water	1060	4.4

MAIN INDICATORS OF THE PERFORMANCE OF EFFLUENT TREATMENT FACILITIES

N	Name of process	Concentration of contaminations (mg/l)							
		Suspended substances		Oil products		pH		BPK complete	
		Before construction	After construction	Before construction	After construction	Before construction	After construction	Before construction	After construction
1.	Treatment facilities for recirculation water supply	500	20	800	70	7 / 13	≈ 7	150	30
2.	Treatment facilities for additional chemical treatment before discharge into sewers	20	5 / 8 {375 ?}	70	5 / 8 {2.0 ?}	≈ 7	≈ 7 {6.5-8.5 ?}	30	15 {375 ?}

**Subject to revision by ADDY - figures in { } are requirements of Baku City Sewage Authority "Bakkanallizzatcia"

APPENDIX 3

Balajari Tank Wagon Washing Station

Reference

PERMISSIBLE EMISSIONS TO ATMOSPHERE

This reference relating to Azerbaijan Railways has been made according to the basis of first documentation for determination and prediction of air pollution.

In the process used at Balajari Wash Plant, emissions to the atmosphere having a detrimental influence on the environment are mainly : tars, welding fumes, dust, SO_2, CO, NO_2 and light organic compounds.

Characteristics and parameters of waste sources have been made according to the first documentation of Maximum Permitted Pollution (MPP), eco-passport, and statistic references.

The main sources of waste are boiler house, welding area, and collection and purification installations.

Air pollution from the washing plant is less than the maximum permissible levels. The Wagon Washing Plant has a sanitary fence 50 metres wide.

Consequently the Wagon Wash Plant can be considered as a part of third category of risk in categorising plants on risk levels. Therefore all existing pollution must be considered under MPP.

According to the laws of Azerbaijan Republic "Pollution protection" the State Ecology Committee decided that all atmospheric discharges are considered to be under MPP regulations of 29/10/97.

Characteristics of all polluting substances:

	MPP	1996	1997	1998
ALL		74,316	47,465	50,242
Including solids		1,395	3,783	6,468
Gaseous		72,921	43,682	43,774
SO_2		12,559	16,715	9,688
CO	52,000	44,866	20,408	20,373
NO_2	19,448	15,496	5,270	13,713
C	1,270	-	1,270	-
Welding aerosol	0,017	-	0,112	0,011
	0,00078	-	-	0,000075
Oil vapours	0,126	0,100	0,190	0,130

Two new boilers, manufactured in Canada in 1992, which could allow the reduction of atmospheric emissions for 1997-1998, have been installed

Characteristics: Serial numbers 504535, 504536, horizontal flame tube, with a maximum steam pressure of 12 atm, and steam production 8 t/hour. Main fuel is natural gas, reserve fuel -diesel.

I. Equivalence of fuel

$$E = \frac{Q_H}{7000 \text{ k kal}/22}$$

Q_H minimum calorific value of natural gas - 8050 k.kal/kg

for diesel:

$$Eg = \frac{8050}{7000} = 1,15 \qquad Ec = \frac{9,590}{7000} = 1,37$$

2. Annual amount of fuel used

T gas = 650 m^3 / hour x 24 x 365 = 5.694.000 cu.m
T diesel = 560 lit. / hour x 24 =13400 lit. = 11550 m^3/gas

Diesel is considered as a reserve fuel

Average consumption 560 l / hour
560 l / hour 24 hours =13440 l / day = 1550 kg / day

While burning this amount of diesel, discharges to atmosphere are:

Total		10.1 x 11550 =1,165
among them only	solids	2,0 x 11550 =0,231
	gaseous	8,1 x 11550 =0,934
including		
SO_2	3,0 x 11550=0,346	
CO	5,0 x 11550=0,577	
NO_2	0,1 x 11550=0,011	

Annual amount of working hours of the boiler-house is 8760.

Height of discharge is 30 m. Diameter of the pipe orifice is 0,7 m. Parameters of air/gas liquid on the way out of the waste source: speed--9,02 m/s, volume--2,22 m^3/s, temperature--96,5^0.
Here steam is being used in order to clean wagons during the year.

The following report was made according to the recommendation from the office of State Ecology Committee.

CO	0,008 x 5694000 m^3 / gas	= 5,694 kg
NO_2	0,034 x 0,075 x 5694000 m^3 / gas	= 14,519 kg

Therefore in the year of 1998, discharges to atmosphere consists of:

Total		20,213 kg
among them only	solids	none
	gaseous	20,213 kg
including		
SO_2	none	
CO	5,694 kg	
NO_2	14,519 kg	

In a year of 1998 during a period of repairing works (28 days) working with diesel 28 days 24 hours = 672 working hours, discharges to atmosphere:

Total		32,664 kg
among them	solids	6,468
	gaseous	26,196
including		
SO_2	9,702	
CO	16,170	
NO_2	0,324	

Until the end of the year, 8088 hours working on natural gas calculations show:
50 m^3 / hour x 8088 working hours = 5257,200 m^3 would be discharged:

CO	0,008 x 5257200 m3	= 4,217 kg
N02	0,034 x 0,075 x 5257200 m3	= 13,405 kg

which makes:

Total	17,622 kg
Solids	none
Gas, liquid	17,622 kg

including

SO_2	none
CO	4,217 kg
NO_2	13,405 kg

Results: by the end of 1998 discharges to atmosphere will consist of:

	diesel burning	gas burning	All waste
All	32,620	17,622	50,242
Solids	6,468	-	6,468
Gaseous	26,152	17,622	43,774
SO2	9,688	-	9,688
COO	16,156	4,217	20,373
NO2	0,308	13,405	13,713

Water

There are no ponds, sediment, drain systems, reservoirs (except fire reservoirs) and storehouses on the Wagon Washing Plant.

Water use (m^3):

1996	1997	1998
66,260	96,150	118,52

Water source is city water pipe: diameter--100 mm, number of the report D-13, tip of the pipe STV-100.

Daily use of the water is 377,0 m^3/day, for agricultural needs-54,97 m^3 , therefore on industrial needs-323,73 m^3/day.

Waste water is being discharged to the city sewerage system. Water is used in the cleaning process. After the process it can be reused. A special laboratory controls water quality after cleaning.

Quality structure of waste waters in Wagon Washing Plant (daily):

a) Volume of waste 298,28 m^3/day
b) Agricultural 39,97 m^3/day
c) Industrial pollution 258,31 m^3/day
d) From them pure 44,07 m^3/day

Concentration of the basic pollutants in the domestic waste waters of the city sewerage as a norm takes 12,33 m^3 / hour in compositions of N, Cu, chlorides, sulphates and weighted substances.

The Wagon Wash Plant does not use rainwater, as there is no surface water collection system,

Director of Balajari Wagon Wash Plant (Signed) Akhundov T.M.
Head of Environmental Department (Signed) Agadjanli A.A

7.8.98

Balajari Tank Wagon WashingStation

PROPERTIES OF RECOVERED OILS

Recovered Oil

The recovered oil after separation from the oil / water emulsion is known as **"Sno" :**

It is a variable mixture of light,heavy and crude oils , depending on the mix of the wagons being washed.
Typical properties are :

	Average	Range
Viscosity centistokes	24	24-35
Specific gravity.	0.923	0.900-0.940
Flash point c	140	
Water content %	7.5	3-10

May contain up to 10-12 Kg of crude oil in 60 tonnes.
The separated oil will be used as a proportion of the boilers feed, together with mazut.
Above information supplied by Balajari Wash Plant.

Recovered oil analysis from sample taken for EBRD Enviromnmental Report June 1998:

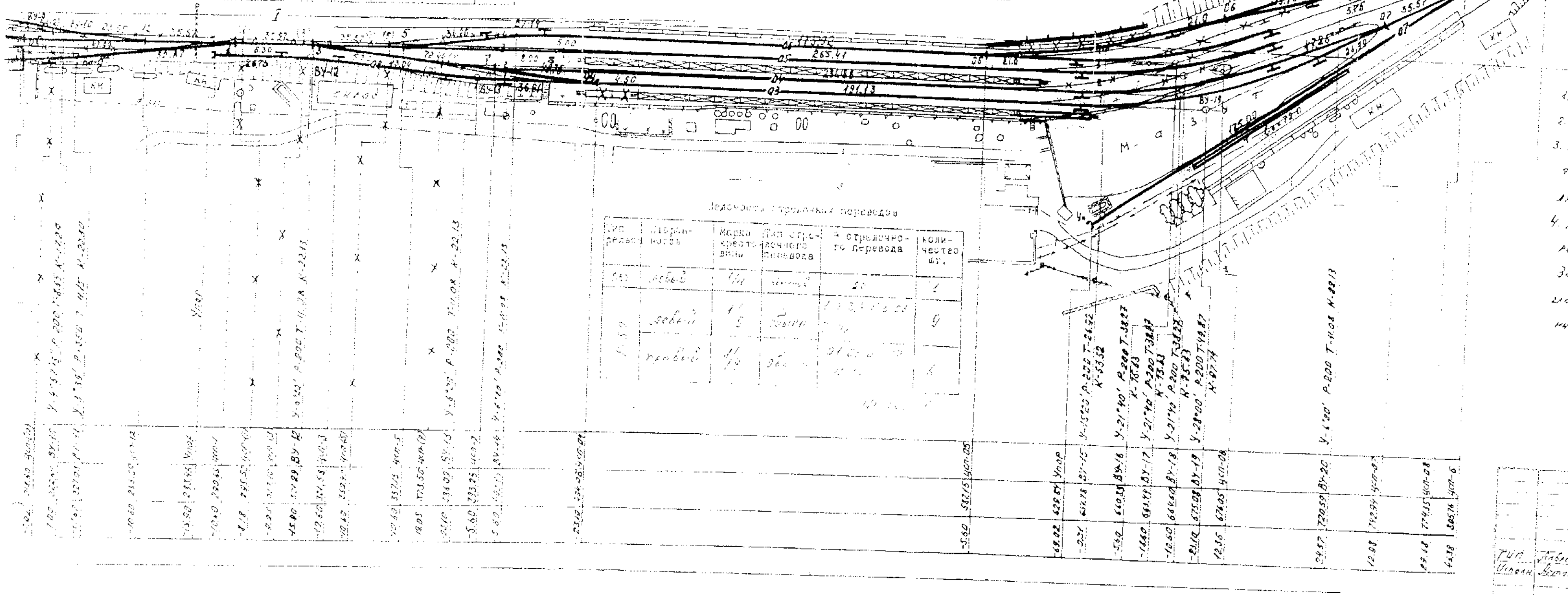
Viscosity	1.453 E which is 5.7 mm2/s
Specific gravity.	0.9007 g/cm2
Marcusson flash point	98 c
Ignition Temperature	118 c
Water content	8-10 %

ВЕДОМОСТЬ ЖЕЛЕЗНОДОРОЖНЫХ ПУТЕЙ

№ пути	Наименование пути	Границы пути: от стрелки, ограждения	Границы пути: через стрелку	Границы пути: до стрелки, упора	Длина пути, м: полная	Длина пути, м: полезная	Тип рельса
01	Путь наружной обмывки	02	—	1	285.07	180	Р-50
02	Выставочный	01	02	03	279.14	400	"
03	Путь промывки цистерн	3	2.04	07	412.10	213.40	"
04	То же	7	07.08	6	451.83	280.00	"

(продолжение)

№ пути	Наименование пути	Границы пути: от стрелки, ограждения	Границы пути: через стрелку	Границы пути: до стрелки, упора	Длина пути, м: полная	Длина пути, м: полезная	Тип рельса
05	То же	5	4	8	485.58	380	Р-50
06	Соединительный	01	03, 12, 1, 5, 05	06	757.35	—	"
07	Путь мойки битум. цистерн	08	—	Уп.	130.46	130	"
08	Путь слива мазута	07	—	Уп.	166.42	110	"



Ведомость стрелочных переводов

Тип рельса	Сторонность	Марка крестовины	Тип стрелочного перевода	№ стрелочного перевода	Количество шт.
[illegible]	левый	1/11	[illegible]	[illegible]	1
Р-50	левый	1/9	[illegible]	[illegible]	9
	правый	1/9	[illegible]	[illegible]	[illegible]

Рабочий базис

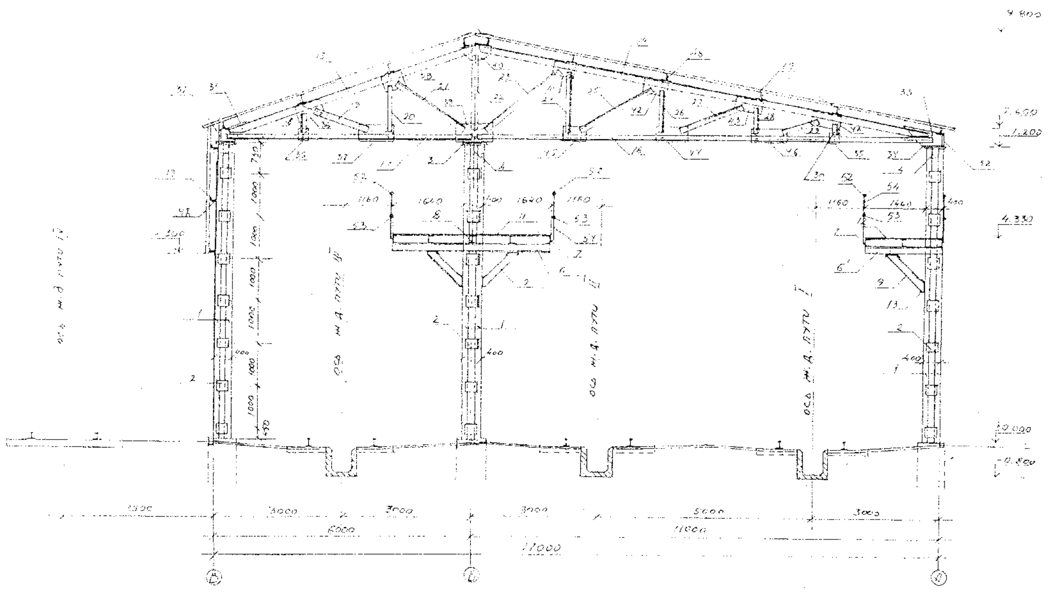
1. План сориентирован по магнитной стрелке.
2. Пикетаж эксплуатационный.
3. Отметки абсолютные. За исходную (+41.61) принята отметка головки рельса верхушки усовая диспетчерской.
4. Координаты условные за 0 принята точка пересечения осей автотоннеля и главного пути. За рабочий базис принята правая нитка главного пути в одних точках и по плану.

9808 - 0 - ПЖС

Баладжары - реконструкция промывочной станции

ГИП	Лабенчук	Путевое развитие	РП / 1
Исполн.	[illegible]	План М 1:1000	[illegible]

Разрез 1-1



Спецификация металла

№ позиции	Наименование элемента	Сечение профиля мм	Длина мм	Кол шт	Масса кг 1 элемента	Масса кг всех элемен	Масса кг общая
1	2	3	4	5	6	7	8
	Металлическая колонна (шт 93)						
1	Ветви колонн	[№22	8600	2	181,0	362	
2	Накладки	-12x250	300	14	6,0	84,0	
3	Опорный лист	-10x260	440	1	9,1	9,1	477т
4	Опорное ребро	-10x250	380	1	7,6	7,6	(на 1 стойку)
5	Подкладка	-14x300	450	1	15,0	15,0	
	Металлическая площадка на отм. 7.84						
6	Консольная балка	[№14	3680	62	45,3	2806	
6'	тоже	[№14	1840	62	22,7	1403	
7	Прогоны	[№14	6000	120	73,8	8856	
8	тоже	I №14	6000	30	82,2	2466	(общ. расход)
9	Раскосы	I №14	1250	93	15,9	1476	57163
10	тоже	I №14	1600	62	19,1	1181	
11	Рифленая сталь	-5x3680	172000	1	-	24894	
12	тоже	-5x1840	172000	1	-	12422	
13	Упоры	[№20	300	310	5,52	1711	
	Стропильная ферма (шт 31)						
14	Верхний пояс	L125x10	10800	2	206,3	412,6	
15	тоже	L125x10	6000	2	114,6	229,2	
16	Нижний пояс	L75x6	10100	2	73,7	147,4	
17	тоже	L75x6	5700	2	39,3	78,6	
18	Стойка	L50x5	450	2	1,7	3,4	
19	Раскос	L75x6	1400	2	9,65	19,3	
20	Стойка	L50x5	1100	2	4,15	8,3	
21	Раскос	L75x6	1980	2	13,64	27,3	
22	Стойка	L50x5	1800	2	6,8	13,6	
23	Раскос	L75x6	2300	2	15,85	31,7	
24	Стойка	L50x5	1400	2	5,3	10,6	
25	Раскос	L75x6	2000	2	13,8	27,6	
26	Стойка	L50x5	1000	2	3,8	7,6	
27	Раскос	L75x6	1600	2	11,0	22,0	
28	Стойка	L50x5	600	2	2,3	4,6	
29	Раскос	L75x6	900	2	6,2	12,4	
30	Стойка	L50x5	300	2	1,1	2,2	
31	Опорный лист	-10x500	560	1	22,0	22,0	
32	Опорное ребро	-10x260	300	2	5,9	11,8	

BALAJARI - TANK WAGON WASHING STATION

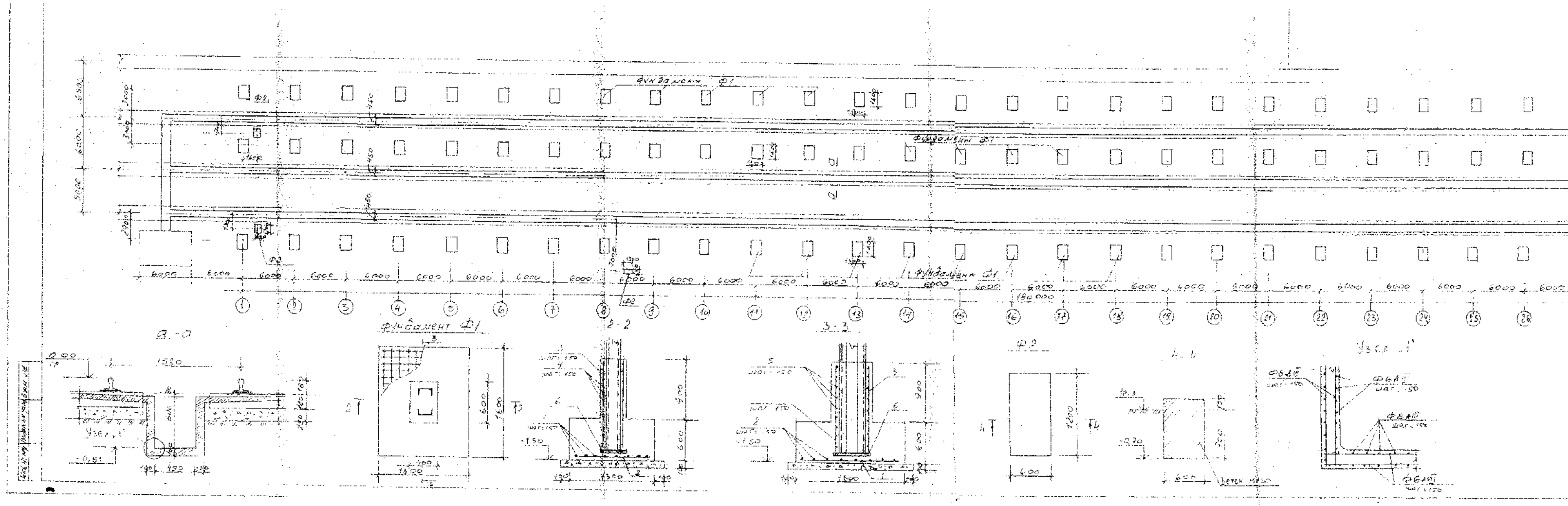
PROPOSED LAYOUT OF INTERIOR WASHING PLATFORMS

Продолжение

1	2	3	4	5	6	7	8
33	Опорный лист	-10x400	900	1	32,0	32,0	
34	Опорная плита	-14x260	440	3	14,4	43,2	
35	Узловой лист	-10x100	200	2	1,6	3,2	
36	тоже	-10x240	600	1	12,0	12,0	
37	"	-10x240	800	1	15,6	15,6	
38	"	-10x240	500	1	9,6	9,6	
39	"	-10x280	900	1	20,1	20,1	
40	"	-10x500	600	1	12,0	12,0	
41	"	-10x240	550	1	10,4	10,4	
42	"	-10x240	600	1	11,3	11,3	
43	"	-10x240	650	1	15,6	15,6	
44	"	-10x240	750	1	18,0	18,0	48304
45	"	-10x240	500	1	9,6	9,6	
46	"	-10x240	800	1	15,5	15,5	
47	"	-10x240	700	1	13,3	13,3	
50	Прокладки	-10x60	160	8	0,8	6,4	
51	тоже	-10x60	100	20	0,5	10,0	
	Скатная кровля и огр. стены						
48	Кронштейны	L100x8	150	396	1,51	598	(общ. расход)
49	Прогоны	[№14	6000	398	73,8	29372	68396
	Профнастил	толщ 0,8мм				38416	
	Ограждение площадок						
	Труба Ф42		690000			1654	
	тоже Ф30		690000			1173	3500
	Стойки Ф30		395000			673	

1. Данный лист рассматривать совм. с листами марки КМ
2. Конструкцию ж.б. лотков смотри лист КМ-4.
3. Лотки устроить до укладки ж.д. пути
4. Отм ±0.000 соответствует отметке головки рельса.
5. Общ. расход металла – 185,8т (без железобетонных лотков и фундаментов под стоек)

98009 - 1 - KM		
Баладжары - реконструкция промывочной станции		
Металлическая эстакада для промывки вагонов	Стадия: РП	Лист: 3
Разрез 1-1	Координатка	
ГИП: Гавриныук		



Ведомость расхода стали на элемент

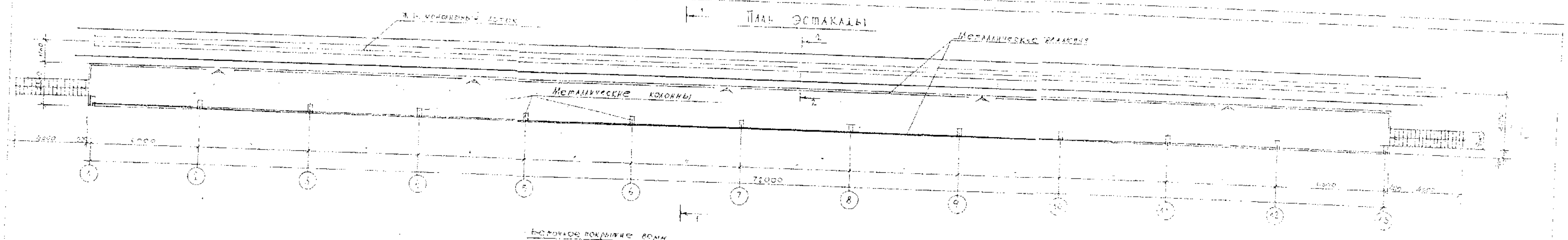
Марка элемента	Изделия арматурные					Закл. изд.	Общий расход кг
	Класс арматуры					Выпуск	
	А III						
	ГОСТ 5781-82					103-76	
	Ф8	Ф16	Ф6		Итого	-350х140	
Ф1	37,72	40	–		77,72	17,30	95,02
Полк.кл	10800	–	2100		12900	–	12900

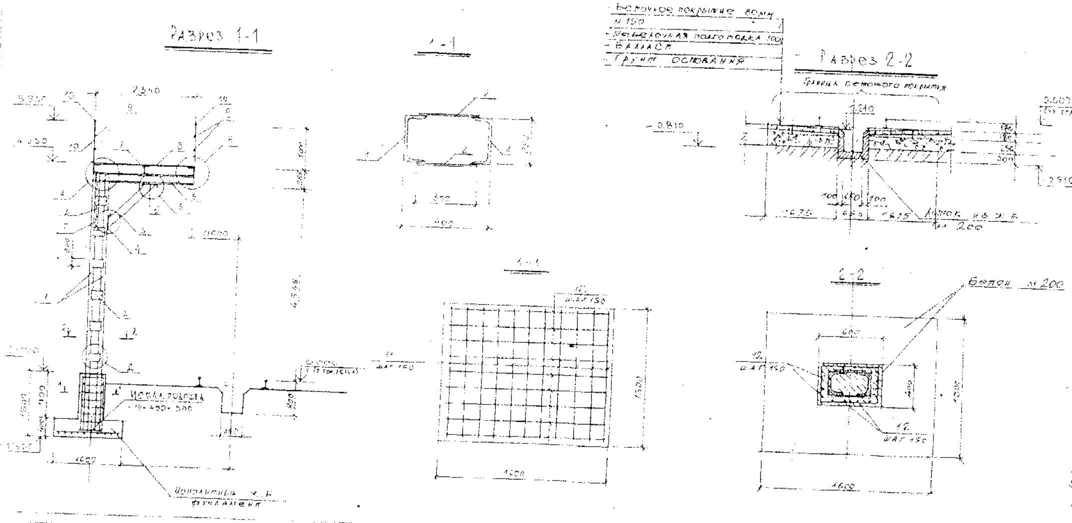
Спецификация

Поз.	Обозначение
1	98009-
2	тоже
3	98009-
	тоже
6	

1. Данные ... листа ... К-4
2. Под фундаменты ... подготовка ...

План эстакады





Примечание

1. Данный лист рассмотреть совместно с листом 3 (план и детали)
2. Отм ±0.000 принят как уровень головки рельса
3. Лотки устроить до укладки железнодорожных путей.
4. Общий расход металла по устройству эстакады с учетом металических лестниц составляют = 20,71 т
5. Верх лотка относительно головки рельса равна -0.210.

Спецификация металла

Спецификация металла на эстакаду

№ поз.	Наименование элементов и профиль	Ø мм	Длина м	Вес 1 м	Кол. шт	Вес кг
	Металлическая колонна					
1	[№22		[illegible]	[illegible]	24,0	[illegible]
2	Накладка 40×200		[illegible]	–	[illegible]	[illegible]
	Площадка					
3	Прогон [№14	–	[illegible]	[illegible]	[illegible]	[illegible]
4	Стол [№20	–	[illegible]	[illegible]	[illegible]	[illegible]
5	То же [№20	–	[illegible]	[illegible]	[illegible]	[illegible]
6	Консоль [№14	–	[illegible]	[illegible]	[illegible]	[illegible]
7	Балка [№16	–	[illegible]	[illegible]	[illegible]	[illegible]
8	Рифленое железо	–	[illegible]	[illegible]	[illegible]	[illegible]
	Металлическое ограждение					
9	Труба	32	[illegible]	–	[illegible]	[illegible]
10	То же	42	[illegible]	–	[illegible]	[illegible]
	Фундаменты					
11	Арматура А I	16	1250		158	[illegible]
12	То же А I	16	1550	–	158	[illegible]
	Расход бетона					
	Бетон м 200		–	–	–	[illegible]

GALAJARI WASH STATION
LAYOUT OF BITUMEN PARKING

73009 – 2 – 1.М		
Баладжары – Реконструкция промывочной станции		
Эстакада	Стадия РП	Лист 2
План, Разрез 1-1, 2-2		