TECHNICAL MISSION IN UZBEKISTAN

ACTIVITIES:
ASSESSMENT OF THE NEW NATIONAL VACCINE STORE IN TASHKENT (UZBEKISTAN)
ASSESSMENT OF THE CONDENSING UNITS IN TASHKENT WAREHOUSE
EVALUATION OF THE VACCINE LOGISTICS MANAGEMENT INFORMATION SYSTEM

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Reference: 1900824591
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The Republic of Uzbekistan is a landlocked country located in central Asia. It is bordered by Kazakhstan in the north and north-east, Turkmenistan in the west and south-west, Afghanistan in the south, and Kyrgyzstan and Tajikistan in the east. The country has a surface area of 447,400 km². Its terrain comprises a combination of sandy deserts, intensely irrigated river valleys and mountains. The climate is continental, with long, hot summers and short, mild winters.

Uzbekistan has an arid continental climate in the vast steppe plains of the central west, but its mountainous eastern regions receive a moderate amount of rainfall (and snow in the winter).

Winters are cold in Uzbekistan, especially in the north: the average January temperature is about -5°C in the northernmost areas (the Aral Sea and the northern part of the Kyzylkum Desert), while it is slightly above zero in the central cities of the old Silk Road (such as Bukhara, Samarkand and Tashkent), and rises to 5°C in the far south (for example, in Termez). Summers in the country are very warm: the average July temperature is 26–27°C in the north and 30°C in the far south. In the mountains, of course, the temperature decreases with altitude. Uzbekistan is subject to cold air masses from Siberia, especially in the north-west, but also in the south-central region, where they alternate with warm air masses from the south. The clash of different air masses can lead to strong winds – for example, the warm wind from the south-west, which can cause dust storms.

In the capital, Tashkent, located 400 metres above sea level in the east, the average temperature ranges from 2.5°C in January to 27.5°C in July. Throughout the year, a dry foehn-like wind can blow from the southern mountains and can raise the temperature by several degrees. Much like many other countries of the former Soviet Union, in recent decades, both winter and summer temperatures have risen in Uzbekistan: the winter temperature has increased by 4–5°C, and the summer temperature by a few degrees. Therefore, bouts of snow and frost are quite frequent in the winter, but are less intense than in the past (in January 1969, the temperature reached -29°C, while in January 2008, it reached -18°C).

In spring, from March to early May, clashes between air masses produce frequent winds, rain, and temperature changes.

The north-west and centre of Uzbekistan comprises desert and semi-desert areas that have very hot summers and very cold winters with below-zero temperatures.

The central-western part of the country is occupied by the vast Kyzylkum Desert, where the temperature can drop to -30°C in the winter and reach 50°C in the summer. Another desert area in the country is the Ust-Yurt plateau, located in the far west, that has an average altitude of about 200 metres. The country’s main river, the Amu Darya, flows westward towards the Aral Sea, a large salt lake that over the decades has partially dried due to exploitation for agriculture. Today, the river opens onto a large delta that is lost in the desert. In the south-west of the country, a small lake, the Sarygamysh Lake (or Sary-Kamysh) was born from a branch of this river.
2. PURPOSE OF THE MISSION

The terms of reference for this mission in Uzbekistan have been defined by UNICEF Uzbekistan and include the following tasks:

1. Assessment of the new national vaccine store situated in Tashkent. This activity includes:
   a. Analysis of infrastructure, storage equipment (cold chain equipment, ventilation, power supplies, etc.).
   b. Review of temperature mapping report prepared by the cold chain equipment supplier. Provision of feedback on correctness of steps.
   c. Assessment of temperature monitoring devices/systems. Provision of recommendations for improvement, if necessary.
   d. Review of warehouse equipment (forklifts, trolleys, personal protective equipment for staff, etc.). Provision of recommendations for any additional equipment required.
   e. Analysis of staffing schedule and provision of feedback on the suitability of positions.
   f. Review of vaccine storage and handling operational processes. Provision of recommendations for improvement, if necessary.

2. Provision of technical advice on the current plans to move the walk-in cold room split condensers from outside to inside the Tashkent Warehouse and in the regional vaccine store – a visit has been planned to complete this step.

3. Review of the process flow in the vaccine logistics management information system (VLMIS). Provision of recommendations for improvement, if necessary.
# 3. MISSION PROCEDURE

The mission was carried out as follows:

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACTIVITIES</th>
</tr>
</thead>
</table>
| 25 October 2021    | • Meeting at the Service for Sanitary and Epidemiological Wellbeing and Public Health under the auspices of the Ministry of Health (SSEWPH)  
                    • Visit to the warehouse with the different consultants (overview)  
                    • Collection of documents                                                                                                                  |
| 26 October 2021    | • Visit to the warehouse and analysis of the construction and equipment, in the presence of the contractors and consultants                                                                                      |
| 27 October 2021    | • Meeting with the Director of the Expanded Programme on Immunization (EPI)  
                    • Examination of the warehouse equipment (forklifts, trolleys, staff personal protective equipment, etc.)  
                    • First test run of the entire facility and test of the automatic operation of the generator  
                    • Analysis of the staffing schedule and feedback on the suitability of positions                                                                 |
| 28 October 2021    | • PCR test  
                    • Visit to the EPI warehouse in the city of Tashkent  
                    • Meeting with the consultant in charge of the VLMIS tool                                                                                     |
| 29 October 2021    | • Debriefing  
                    • Preparation of the return trip                                                                                                                                                                         |

Persons we met:

- Ms Dilorom Tursunova, National EPI Manager, SSEWPH
- Mr Kahramon Karimov, Chief Engineer, SSEWPH
- Mr Alisher Aliev, Health Supply Officer, UNICEF Uzbekistan
- Mr Yuriy Pak, National Consultant on Cold Chain, Logistics and Vaccine Management and Digital Health Solutions, UNICEF Uzbekistan
- Mr Otabek Murodov, Construction Engineer
- Mr Sergey Babalaryants, Cold Chain Consultant (Refrigerating Engineer)
- Mr Muzaffar Durdiyev, National VLMIS Consultant

We would like to thank everyone we met for their assistance on this project.

During the implementation of this programme, we were able to familiarize ourselves with the national vaccine store that is currently under construction, including its cold rooms, ultrafreezer equipment and dry storage.

This report presents the findings from the visits made or the documents received. It then presents an evaluation of the warehouse, temperature mapping and the remote temperature control, as well as the status of the cold room condensing units in the city of Tashkent and other regions. Lastly, the report discusses the VLMIS that is currently being developed.
4. DESCRIPTION OF THE NEW NATIONAL VACCINE STORE

The Expanded Programme on Immunization warehouse in Uzbekistan is located in Tashkent, at 46 Bunyodkor Avenue, behind the building that houses the Service for Sanitary and Epidemiological Wellbeing and Public Health under the auspices of the Ministry of Health.

Photo 1. Location of the new national vaccine store

The new national vaccine store is a building of 30 m x 36 m (1,080 m²), with two levels.

The cold rooms are on the ground floor and the first floor is reserved for dry storage.

4.1 COLD STORAGE

The cold storage section of the warehouse (with a temperature range of +2°C to +8°C) contains three separate rooms:

- room N1: 275 m²
- room N2: 203 m²
- room N3: 307 m², with space reserved for two walk-in freezer rooms
- room for packing (unpacking) of goods: 144 m².

The total area of the three sections is 785 m². The height of the cold warehouse is 5.75 m. Its total volume is 5341.75 m³.

At least 720.0 m³ of vaccines in their primary packaging (500 pallets) are stored at a time in the cold warehouse.

Rooms N1 and N3 are each served by five refrigeration units. Each group is composed of an outdoor unit (the condensing unit) and an indoor unit (the evaporator), linked by the copper piping through which the refrigerant circulates.

Room N2 contains three refrigeration units, as well as the airlock for receiving and distributing vaccines.
4.2 GROUND-FLOOR AIR COOLING SYSTEM

4.2.1 REFRIGERATION UNITS

To keep the cold storage within the required temperature parameters, split medium-temperature refrigeration units are provided, with an automatic control system for constant maintenance of the set temperature.

In room N1, with a total area of 275 m² and a ceiling height of 5.7 m, five air coolers are installed.

In room N2, with a total area of 203 m² and a ceiling height of 5.7 m, three air coolers are installed.

In room N3, with a total area of 307 m² and a ceiling height of 5.7 m, five air coolers are installed.

In the packing/unpacking room, with a total area of 144 m² and a ceiling height of 5.7 m, three air coolers are installed. The total number of cold chain units in the cold storage warehouse is 16.

Each individual room has its own closed-loop cooling system. There is a designated reserve (backup) unit in each room that remains on standby until it is required. To avoid the oil and refrigerant mixture in the reserve unit thickening, at a specified period, it should perform the role of each unit in the group of air coolers in each individual room.

Based on the abovementioned conditions, as well as in the event of the failure of any unit, the power (cooling capacity) of each air cooler is increased by 25 per cent of its intended power and must meet the parameters shown in Table 1.

Table 1. Technical specification for the air coolers

<table>
<thead>
<tr>
<th>Unit type</th>
<th>Voltage</th>
<th>Power (cooling capacity)</th>
<th>Range of evaporator jet</th>
<th>Volume of air produced by the evaporator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-temperature horizontal bi-block with separate and split cubic air cooler</td>
<td>400/3N~/50</td>
<td>9,200–10,000 W</td>
<td>11–12 m</td>
<td>More than 6,000m³/hour</td>
</tr>
</tbody>
</table>
### 4.2.2 CONTROL SYSTEM

An automatic system regulates the temperature and controls the air cooling systems to ensure controlled and uninterrupted observance of the temperature parameters in the cold storage.

The control system should consist of specialized software that allows remote monitoring and control of cooling systems, data collection, analysis, and evaluation of the operations of the KAM devices.

This system includes the following main elements:

- temperature controller
- network switch
- personal computer (PC).

**The controllers** monitor and control the operation of the refrigeration units. There is one controller per refrigeration unit. The controller must be equipped with an Ethernet port.

Temperature controllers must have contacts for connecting **two** main and three additional temperature sensors. The main temperature sensors are installed in the air inflow/outflow zone of the air cooler, and additional ones in the control zones. The sensor loops should be installed within a 20-metre radius of each other, at different heights, both horizontally and vertically.

**The network switch (Switch)** is designed to collect information from 16 temperature controllers and transmit this information to a PC in real time.

The switch must meet the following parameters:

- 24 10/100/1,000 Mbps auto-negotiation ports with RJ45 (auto-MDI/MDIX) slots
- supports redundant power supply
- internal backbone network performance of 35.7Mpps (48 Gbps)
- power supply of 100–240V AC, 50/60 Hz.

**A PC manages**, controls and collects information on all cold units, through a specialized program, such as the Complex Data Acquisition System.

The technical configuration of the PC must meet the following parameters:

- 24-inch touch-screen monitor
- Dual Core E5700 processor or higher
- 500 GB hard drive or higher
- 2 GB DDR RAM memory or higher
- power supply of 500 W or higher
- 1 GB and 128-bit graphics card or higher.

### 4.2.3 HARDWARE FEATURES

**Condensing units**

The warehouse contains groups of Danfoss hermetic compressors – condensers with four fans and one liquid tank.
### Table 2. Technical characteristics of the condensing units

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
</tr>
<tr>
<td>Cooling capacity</td>
<td>9 780 W</td>
</tr>
<tr>
<td>Electrical power</td>
<td>4.5 kW</td>
</tr>
<tr>
<td>Compressor</td>
<td>Danfoss, model MTZ 64</td>
</tr>
<tr>
<td>Air condenser</td>
<td>FN61</td>
</tr>
<tr>
<td>Ventilator</td>
<td>MLW 4D 400 (380 V)</td>
</tr>
<tr>
<td>Receiver</td>
<td>L-6 (6 litres; maximum pressure: 2.9 MPa)</td>
</tr>
<tr>
<td>Liquid filter</td>
<td>MGL-084 ODF</td>
</tr>
<tr>
<td>Solenoid valve</td>
<td>SV10-A (1/2)</td>
</tr>
<tr>
<td>Liquid sight glass</td>
<td>SGWW 1/2 (ODF)</td>
</tr>
<tr>
<td>HP manometer</td>
<td>HP 1501</td>
</tr>
<tr>
<td>LP manometer</td>
<td>LP 1503</td>
</tr>
<tr>
<td>High-pressure switch</td>
<td>KP 15</td>
</tr>
<tr>
<td>Pressure switch</td>
<td>KP 5</td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R-404A</td>
</tr>
<tr>
<td>Oil</td>
<td>160 PZ POE</td>
</tr>
<tr>
<td>Air cooler</td>
<td>DD60</td>
</tr>
<tr>
<td>Thermostatic expansion valves</td>
<td>Danfoss TES2</td>
</tr>
</tbody>
</table>

### Table 3. Technical characteristics of the evaporator

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air cooler model</td>
<td>UDD-60-E2C</td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R-404A</td>
</tr>
<tr>
<td>Air flow (m³/h)</td>
<td>2 x 6570</td>
</tr>
<tr>
<td>Air pressure (Pa)</td>
<td>90</td>
</tr>
<tr>
<td>Heat exchange area (m²)</td>
<td>60</td>
</tr>
<tr>
<td>PARAMETER</td>
<td>CHARACTERISTICS</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Air jet length (m)</td>
<td>18</td>
</tr>
<tr>
<td>Number of fans (pcs/mm)</td>
<td>2 x 500</td>
</tr>
<tr>
<td>Fan power (W)</td>
<td>2 x 450</td>
</tr>
<tr>
<td>Electric heater (pcs/W)</td>
<td>5 x 1.5</td>
</tr>
<tr>
<td>Voltage (V)</td>
<td>380</td>
</tr>
<tr>
<td>Total power (Kw)</td>
<td>6.1</td>
</tr>
<tr>
<td>Heating voltages (W)</td>
<td>220</td>
</tr>
<tr>
<td>Cooling capacity (W)</td>
<td>11,400</td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>1,680 x 395 x 670</td>
</tr>
</tbody>
</table>

Vaccines are delivered to the warehouse in refrigerated trucks that pull into the loading and unloading bay. The bay is equipped with an opening sealant to keep the warehouse within its required temperature range during unloading. The opening of the "dock" is located around the side of the cold warehouse, at around +1,200 m, from which the scissor lift table rises. Vaccines are unloaded in phases with the help of a manual hydraulic stacker and a mechanical ramp, which ensures there are no gaps for the pallets to fall into. In each phase of unloading, four to six pallets containing the vaccines are placed onto the scissor lift table. The table is lowered to the cold storage warehouse, after which the pallets are loaded onto an electric forklift to be transported to the racks. The racks are laid out to ensure there is room for manoeuvring the forklifts.

Vaccines in their primary packaging (500 pallets) are placed on three-tiered racks. A volume of 280 m³ (200 pallets) of extra deliveries can be stored in their primary packaging on pallets on the floor between the racks in one tier with two rows.

The vaccines destined for the region and the city of Tashkent are distributed using the same dock.

4.3 DRY WAREHOUSE

The dry warehouse is on the first floor. It is accessed via a metal staircase. Space has been reserved in the dry warehouse for a hoist that will transport the products.

The first floor contains the following rooms:

- dry warehouse (with a temperature range of +50°C to +250°C and no special humidity requirements), divided into two compartments by a fire partition and fire gates: 1,011.7 m²
- warehouse manager’s office: 15.1 m²
- technical room (air/ventilation intake chamber): 76.4 m².

The height of the first floor (dry warehouse) from the ground to the bottom of the truss structures on the cornice is 4.0 m.

Medical consumables are stored in the dry storage area on three-tiered racks. Unpacked cargo is stored on the racks. Bulky goods are transported and placed into the warehouse using manual hydraulic stackers. Rotating platforms and room for manoeuvre are available to ensure the stackers are able to circulate freely. The height of the dry warehouse premises is 6.45 m.

4.4 DRY STORAGE AIR-CONDITIONING SYSTEM

To assess the performance of the first-floor supply systems, a dynamic calculation of the power was made and, in the end, two groups of condensers were installed. These condensers supply the air handling units. The air handling units contain air ducts that deliver the conditioned air to the rooms in the warehouse. Centralized air ventilation allows air to be sent to the room in which the batteries for the scissor lift tables are charged.
Table 4. Technical characteristics of the Air conditioning condensing unit

<table>
<thead>
<tr>
<th>Brand</th>
<th>MDV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>MDCCU-16CN1</td>
</tr>
<tr>
<td>Cooling capacity</td>
<td>16.0 kW</td>
</tr>
<tr>
<td>Power source</td>
<td>380-415 V/3 Ph/50 Hz</td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R410A</td>
</tr>
<tr>
<td>Rated input</td>
<td>8,500 W</td>
</tr>
</tbody>
</table>

This set-up ensures equal and homogeneous distribution of cooled air throughout the premises, ensuring that dry products are stored under optimal conditions.

4.5 ELECTRICAL INSTALLATION

The current is distributed via two independent transformers, to compensate for any disturbance in the supply, and an automatic-start backup generator to ensure the safe operation of the various equipment in the national vaccine store. The power of the generator has been calculated to exceed the power required to meet the needs of the warehouse.

4.6 FIRE SAFETY

A fire sprinkler system has been installed above all areas in the warehouse to protect the vaccine store from fires. This system automatically activates when it detects excessive heat on the premises. It consists of a network of pipes with sprinkler heads screwed into them, all of which are connected to a control station that regulates the flow of water. The pressurized water pipes feed the heads a continuous stream of water to mist the area on fire. The circulation of water in the pipes activates a hydraulically operated bell, sounding the alarm at the control station (and sending an alert to the security station through the pressure switch). Pressurized water from the sprinklers is supplied by high-pressure pumps that pressurize water from two public water pipe power sources, securing the pumping station.

The next section includes the findings, observations and recommendations for the warehouse.
5. TEMPERATURE MAPPING OF THE COLD ROOMS

5.1 ABOUT TEMPERATURE MAPPING

Temperature mapping and temperature monitoring are integral to the efficacy of vaccine storage and to ensuring the appropriate storage conditions for the vaccines. It is recommended that the temperature of the cold rooms designated as vaccine stores is regularly mapped. The first mapping must be carried out at the commissioning. A provider has been assigned to carry out temperature mapping at the new national vaccine store, but we did not meet them, nor did we receive the protocol from them.

5.2 RECOMMENDATIONS FOR TEMPERATURE MAPPING

We strongly recommend that the temperature mapping is carried out as recommended by the World Health Organization (WHO). As each cold room is very large, 40 sensors are required for effective mapping of this space. For more information, please refer to the WHO scientific brief on cold room temperature mapping\(^1\). In any case, cold room commissioning cannot be carried out unless and until the temperature mapping of the cold rooms is carried out.

\(^1\) Available at [https://www.who.int/publications/i/item/WHO-IVB-18.05](https://www.who.int/publications/i/item/WHO-IVB-18.05).
6. TRANSFER OF CONDENSING UNITS IN THE CITY VACCINE STORE AND REGIONAL VACCINE STORE

6.1 SITUATION IN THE CITY AND REGIONAL VACCINE STORES

We visited the Tashkent city vaccine store. It has two new walk-in cold rooms, each 30 m² in size. Each of them has two split condensing unit groups that are plugged in using a stabilizer. The condensing units are installed outside. We noticed that the condensing units are very dirty.

We noticed two inverters that are not connected near the two condenser unit groups. They were provided to ensure the continuity of operation of the condensing units by regulating the current between the generator and the power grid and vice versa.

The condensing unit groups available are unsuitable for the extreme climatic conditions of the country. Indeed, in the summer, the temperature can reach +50°C, which triggers untimely high pressure. In the winter, the temperature can drop to -15°C, which freezes the compressor oil and causes disturbances.

Under such conditions, if the condensing units remain in the same place, their service life is compromised.

This situation in the city of Tashkent and in the regions must be resolved as soon as possible, to ensure the optimal functioning of the cold rooms.

6.2 RECOMMENDATIONS

It is imperative that the condensing units be transferred inside the buildings that house the cold rooms. The consultant, a Refrigeration Engineer at UNICEF Uzbekistan, carried out all the calculations to ensure the proper functioning of the condensing units. This is a great solution to ensure the reliable and sustainable operation of the condenser unit groups.
7. THE VACCINE LOGISTICS MANAGEMENT INFORMATION SYSTEM

7.1 THE VACCINE LOGISTICS MANAGEMENT INFORMATION SYSTEM PLATFORM

The Ministry of Health of Uzbekistan decided to establish a modern electronic database for vaccine stock inventory at the national, regional and district levels. This database materialized in the form of a vaccine logistics management information system (VLMIS) that aims to resolve the information issues in the Expanded Programme on Immunization (EPI) programme.

A vendor has been contracted to develop and operationalize an information and communications technology platform for the Ministry of Health of Uzbekistan. This platform is designed to further improve the organization of the procurement process, ensuring access to real-time information about vaccine stocks at all levels (regional, district and local) in Uzbekistan. We did not have the opportunity to see how the platform works while on our mission, because it is still in development.

According to the information we received, the features of the platform are limited to information on vaccines and do not include data on vaccine stock management at the global level, cold chain inventory and gaps in cold-chain equipment and vehicle maintenance, or transport.

7.2 OUR RECOMMENDATIONS

While real-time information is useful, we strongly recommend using tools to better manage the vaccine supply chain. WHO has developed several tools of this description that are easy to use if staff are shown how to use them effectively. Below are some examples:

The Stock Management Tool (SMT) is designed to help countries better manage their stocks of vaccines and other immunization supplies. The Microsoft Excel-based SMT contains information on various vaccine management areas. The tool is mainly used in national vaccine stores by store managers and EPI teams. The SMT is a very comprehensive tool and allows the user to carry out their responsibilities within the following supply chain areas: stock management, cold chain inventory, temperature monitoring, storage capacity management, distribution management, forecasting and demand planning.

The Cold Chain Equipment Inventory and Gap Analysis Tool enables an exhaustive inventory and gap analysis to be carried out. This tool provides a full overview of the cold-chain equipment situation in the country and allows a rehabilitation plan to be built for the coming years.
The opening of the national vaccine store in Uzbekistan is timely and will allow the country to solve vaccine supply chain issues and ensure dry inputs for routine vaccination, as well as additional activities, for many years to come. All aspects of this warehouse must be brought up to EPI quality standards.

For this reason, all the observations expressed in the present report should be acted upon, following the recommendations that have been made.

We are remain available to make further contributions, particularly capacity-building, on any of the tools cited in this report.

We would like to solemnly thank:

- Ms Dilorom Tursunova, National EPI Manager (SSEWPH), who spared no effort in ensuring the success of the mission.

- All the staff of UNICEF Uzbekistan, particularly Mr Alisher Aliev, Health Supply Officer and Mr Yuriy Pak, National Consultant on Cold Chain, Logistics and Vaccine Management and Digital Health Solutions; as well as Mr Otabek Murodov, Construction Engineer; Mr Sergey Babalaryants, Cold Chain Consultant (Refrigerating Engineer); and Mr Muzaffar Durdiyev, National VLMIS Consultant. They supported us throughout the mission.

- The representatives of the vendors.

We are very grateful.

And, of course, it would be a pleasure to make ourselves available to provide support regarding vaccine management, the development of the cold chain inventory and the cold chain rehabilitation plan, the Effective Vaccine Management Assessment and improvement plan or standard operating procedures, among other tasks.
9. PHOTOGRAPHIC DOCUMENTATION

Photo 2. View of the warehouse from the street

Photo 3. Dock for vaccine receipt and delivery

Photo 4. Main external door to the cold room

Photo 5. View of the external door, the dock and three condensing units

Photo 6. View inside the cold room (a)

Photo 7. View inside the cold room (b)
Photo 8. Vestfrost VT 408 ultra-low temperature freezer

Photo 9. Device that controls the carbon dioxide content of the ultra-low temperature freezer room

Photo 10. Condensing unit for the dry storage air-conditioning system

Photo 11. Air treatment and mixing chamber where air is treated before being distributed around the premises

Photo 12. Starting point from which the treated air is distributed to the different premises

Photo 13. Air distribution points
Photo 14. Second transformer and generator

Photo 15. Cold room in the city vaccine store

Photo 16. Tension stabilizer for cold rooms

Photo 17. Condensing units outside

Photo 18. The inverters to ensure continuity of operation of the units are yet to be installed

Photo 19. The location we recommend for the construction of the changing rooms and toilets for the staff of the national vaccine store
Technical mission in Uzbekistan