



Cairo Air Improvement Project
Vehicle Emissions Testing Component

Technical Center Implementation Plan

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Acronyms and Abbreviations

CAIP	Cairo Air Improvement Project
CD-ROM	Compressed disk-read only memory
CNG	Compressed natural gas
CO	Carbon monoxide
EEAA	Egyptian Environmental Affairs Agency
GOE	Government of Egypt
HC	Hydrocarbon
LAN	Local area (computer) network
MOI	Ministry of Interior
MOSEA	Ministry of State for Environmental Affairs
O&M	Operation and maintenance
OEP	Organization for Energy Planning
OSHA	US Occupational Safety and Health Administration
OST	Observational study tour
QA/QC	Quality assurance/quality control
RFP	Request For Proposal
rpm	Revolutions per minute
USAID	United States Agency for International Development (USAID)
VET	Vehicle Emissions Testing

Executive Summary

The flexibility to adapt to changing circumstances is a characteristic of well-planned donor-funded projects. The time lapse between project design and execution inevitably introduces changes in stakeholder priorities and personnel, available technology, and relationships among host country organizations.

Since 1997, the Cairo Air Improvement Project (CAIP), the Egyptian Environmental Affairs Agency (EEAA), and the Organization for Energy Planning have worked to initiate and implement measures to reduce air pollutants that have the most serious impacts on human health in Greater Cairo. One main objective is to reduce exhaust emissions from gasoline-fueled vehicles in Greater Cairo through vehicle emissions testing.

CAIP constructed and equipped a model emissions testing station in Shoubra el-Kheima, Qualubeya Governorate, capable of testing emissions for light and medium-duty gasoline and diesel powered vehicles. It was furnished with equipment designed for extremely high volume and accuracy.

It became apparent, however, that the original project vision was not capable of implementation and that the best alternative use for the model emissions testing station should be agreed with all stakeholders to accommodate the requirements of the revised Government of Egypt program. The decision was made to convert the Shoubra station into a technical center that will support the process of emission testing currently conducted by traffic licensing centers through training staff and calibrating emission analyzers.

A team from CAIP visited the station several times and evaluated its current status. The building is in good condition and the installed infrastructure works well and needs only routine maintenance, not further modification. All the analyzers are functional; however, they need standard maintenance and to be calibrated before use. The input and output data stations (computers) also need routine maintenance. The calibration facility is valid and operational and could be adapted to any type of emission gas analyzer if appropriate calibration gases were available.

There are 19 people employed at the station—6 through a service company for cleaning and security purposes. CAIP tested the rest and recommended keeping four of them, one engineer and three technicians.

The Ministry of State for Environmental Affairs and Ministry of Interior agreed that EEAA would be responsible for training and calibration as related to the new vehicle emissions testing program. In addition, EEAA will conduct emissions research and gather data in order to fulfill its mandate regarding mobile source emissions. EEAA's role regarding the new vehicle emissions testing program will have three main functions: training, calibrating the traffic department's emissions analyzers, and monitoring and researching mobile source emissions and diagnostics.

The new technical center will house a standard five-gas analyzer with engine diagnostic capabilities. The ability to measure all five regulated gases will provide a tool to conduct emissions tests and research. It will also give EEAA the tool necessary to provide motorists with information about the reasons for high emission levels and guidance on how to lower those emissions.

The center will require emissions analyzers similar to those of the emissions testing program for conducting hands-on training. Simple, rugged equipment capable of measuring the two regulated gases for gasoline powered vehicles will be purchased for the center. Procurement for all required equipment is underway.

Qualified staff should be selected and properly trained. Following an evaluation of the current staff at the Shoubra station, the capability gap was identified. EEAA is ready to employ the successful candidates from the current staff and hire new staff to fulfill the requirements required to operate the center. An organization structure has been agreed, and job descriptions for all staff prepared.

The report expands on the following points:

- Adapting the model emissions testing center to a technical center to be administered by EEAA is both desirable and feasible.
- Qualified staff should be hired as soon as possible so that staff training may be completed by 30 June 2003.
- The physical facility, its infrastructure, and equipment already purchased by CAIP/USAID are appropriate and need only routine maintenance. CAIP/USAID will procure new equipment required to upgrade the facility's capabilities, ensuring that it can genuinely provide technical support to the Government of Egypt's vehicle emission testing program.
- The CAIP team will develop manuals to assist in operations and ensure financial and institutional sustainability of the technical center.

1. Introduction

The Cairo Air Improvement Project (CAIP) is funded by the United States Agency for International Development (USAID) and implemented in partnership with the Egyptian Environmental Affairs Agency (EEAA) and the Organization for Energy Planning (OEP). Its goal is to initiate and implement measures to reduce air pollutants that have the most serious impacts on human health in Greater Cairo.

One of CAIP's main objectives is to improve the fuel efficiency and reduce exhaust emissions from gasoline-fueled vehicles in Greater Cairo through Vehicle Emissions Testing (VET) and enhancing tune-up capabilities. This report describes the implementation plan for the Technical Center at Shoubra el-Kheima, and is a road map to convert the existing testing facility to the desired Technical Center. CAIP will produce a manual of standard operating procedures for the center as the next step.

1.1 BACKGROUND

The original design of the VET program included a centralized program where all emissions testing would be conducted at multi-lane stations strategically located throughout Greater Cairo. The VET network was to be initiated by building and equipping three model stations and a technical center. The model stations were to be built in each of the three governorates that make up Greater Cairo: Cairo, Giza, and Qualubeya. The technical center was to be built in Cairo for EEAA to manage and operate.

Sustainability of the VET program was tied to its eventual operation by the private sector and it was designed to be a viable profit-generating business. The technical center was intended for monitoring and performing quality assurance/quality control (QA/QC) for the program, as well for conducting research related to mobile source emissions.

CAIP has constructed and equipped a Model Station in Shoubra, Qualubeya Governorate, capable of testing emissions for light and medium-duty gasoline and diesel powered vehicles. The Center was equipped to suit the original objective, a privately owned and operated VET network, and thus used equipment designed for extremely high throughput while maintaining the high accuracy characteristic of established programs in the United States and Europe.

The Government of Egypt (GOE) has decided to change the proposed program, establishing a vehicle emissions testing program affiliated with existing licensing centers of the Traffic Department. Accordingly, the function of the Shoubra VET station should be changed to accommodate the requirements of the revised GOE program. As a first step, the Popular Council of Qualubeya Governorate designated the land where the VET Center was built for EEAA so that the center may be converted to a technical center.

1.2 SHOUBRA STATION STATUS

According to the modified VET program, it was decided to convert Shoubra station into a Technical Center that will support the process of emission testing currently conducted by governorate licensing centers through training staff and calibrating emission analyzers. It was essential to check the current status of the Shoubra station as a first step in the transformation process.

A team from CAIP visited the station several times and evaluated its current status. The following is taken from the evaluation report that was issued by CAIP in September 2002. A copy of the report is attached as Appendix A.

1.2.1 Building and Facility

The Shoubra building consists of two main areas, a 1-storey office building containing nine rooms and a high steel roof over a three-lane test area. The building is in good condition and has the following infrastructure that works well and needs only routine maintenance, not further modification:

- Ventilation system
- Carbon monoxide (CO) detection system
- Electrical supply and connections
- Air supply network
- Water supply.

The building may be used with minor modifications to fulfill its new role. The office space could be redesigned to include a suitable place for training traffic staff as well as a room dedicated to calibrating emission gas analyzers. EEAA could also keep the building as it is and utilize other owned or leased space outside the station for classroom training.

1.2.2 Equipment

The Shoubra station has three vehicle lanes with identical equipment. Each has three computer stations, an opacity meter, and a device that measures brake efficiency and vehicle side slip. The first and the third computer stations are used to enter and print the tested vehicle's data and test results, while the mid-station is a BAR 97 emission analyzer connected to a computer network that holds the vehicle's data and its corresponding measured emission values on a server. For vehicles operating with diesel fuel, the opacity meter is attached to the mid-station computer station and a reading is sent to the server.

All the analyzers are functional; however, they need standard maintenance and to be calibrated before using them since they have been idle for months. The input and output data stations (computers) also need routine maintenance.

1.2.3 Calibration Facility

The station is equipped to calibrate emission gas analyzers. It has a stock of calibration gases that were necessary for operating the BAR 97 analyzers. There is also a zero air generation and distribution pipe

network. The calibration facility is valid and operational and could be adapted to any type of emission gas analyzer if appropriate calibration gases are available.

1.2.4 Staffing

There are 19 people employed at the station. Six of them are employed through a service company for cleaning and security purposes. The CAIP VET team tested the rest and reported their evaluation to EEAA to consider keeping four staff members (one engineer and three technicians). EEAA may second staff from among those already employed for future center operation, or may hire additional staff depending on qualifications needed.

2. Technical Center

Recent meetings between the Ministry of State for Environmental Affairs (MOSEA), USAID, and the Governorate of Qualubeya led to agreement regarding EEAA's need for a technical center for mobile source emissions. Discussions focused on modifying the existing Shoubra el-Kheima VET Center for this purpose.

Negotiations between the ministry and the governorate resulted in concurrence to convert the Shoubra center into a technical center that would be administrated by EEAA. The Qualubeya Governorate's Popular Council approved designation of the land where the Shoubra VET Station stands to EEAA.

2.1 OBJECTIVES

The MOSEA and Ministry of Interior (MOI) agreed that EEAA would be responsible for training and calibration as related to the new VET program. In addition, EEAA will conduct emissions research and gather data in order to fulfill its mandate regarding mobile source emissions.

2.2 ROLES AND RESPONSIBILITIES

EEAA's role regarding the new VET program will have three main functions:

2.2.1 Training

EEAA will take responsibility for training the governorates' traffic department staff regarding:

- Operation and maintenance of the VET equipment
- Testing procedures
- Public relations.

2.2.2 Calibration

All emission analyzers need periodic calibration. EEAA will ensure that the traffic department's analyzers are properly calibrated.

2.2.3 Mobile Source Emissions and Diagnostics

EEAA will:

- Monitor emissions from mobile sources by gathering test results from the VET program
- Establish and maintain an emissions inventory from mobile sources
- Determine emissions limits compliance profiles
- Conduct mobile source signature sampling for source attribution studies
- Examine the impact of fuel alternatives on various mobile sources
- Determine major causes for high emissions through engine diagnostics.

2.3 EQUIPMENT

Each traffic lane at the existing VET Center houses 3-position testing equipment meeting BAR 97 specifications for measuring emissions concentrations (not mass emissions) from gasoline vehicles in addition to a Wager 6500 unit for measuring smoke opacity from diesel powered vehicles. Each lane includes a Hunter Brake Tester designed to measure brake efficiency and vehicle side-slip.

2.3.1 Plans for Existing Equipment

EEAA will hold on to the BAR-97 test equipment, including the smoke meters, as well as the three brake testers. The CAIP VET team will bring the equipment, which has been idle for a long time, to an operational state. Emission testing equipment will go through a complete maintenance and calibration process. All ancillary equipment and brake testing equipment will also be maintained and checked.

2.3.2 Additional Equipment

The Technical Center will house one standard five-gas analyzer with engine diagnostic capabilities. The ability to measure all five regulated gases will enhance EEAA's capabilities and provide a tool to conduct emissions tests as well as emissions research. EEAA will be able to conduct emission studies such as comparing emissions from gasoline powered vehicles with those from compressed natural gas (CNG) powered vehicles.

Although engine diagnosis is not strictly a Technical Center requirement, it will give EEAA the tool necessary to provide motorists with information about the reasons for high emission levels and guidance on how to lower those emissions. In addition, engine diagnostics are a real value-added service that EEAA could provide to its clients if the center's role changes in the future to allow for profit generation.

The center will require emissions analyzers similar to those of the VET program for conducting hands-on training. Simple, rugged equipment capable of measuring the two regulated gases for gasoline powered vehicles, resembling those expected for the GOE VET program, will be purchased for the center.

3. Implementation Methodology

This chapter explains the work needed to establish a Technical Center for EEAA at the Shoubra el-Kheima VET Station and suggests a process to accomplish the changes required. The upgrade presented is based on the preliminary consent of EEAA and USAID, EEAA's current roles and responsibilities, and the existing capabilities at the Shoubra station.

3.1 HARDWARE

In addition to the existing equipment, the technical center will house stand-alone engine diagnostic equipment with emissions analysis capability.

3.1.1 Equipment Specifications

The diagnostic equipment will have the following general specifications:

1. Designed and manufactured for commercial use on gasoline vehicles with 4, 6, and 8 cylinders, including all types of ignition systems.
2. Includes all attachments and accessories to diagnose all types and models of engines available in Egypt.
3. Built on a PC platform and includes a color monitor, floppy disk drive, CD-ROM drive, and printer.
4. Includes a digital scope, on-board diagnostic, multi-meter, strobe and magnetic timing, oil temperature, rpm, vacuum, printer, and all leads for connecting the unit to all types and models of engines in the Egyptian vehicle fleet.
5. Includes a five-gas analyzer with OIML R99 accuracy or higher, and all attachments and adapters for sampling exhaust emissions from light-duty vehicles.
6. Includes, as pre-installed software, vehicle specifications and limits for all makes and models of vehicles operating in Egypt.
7. Unit shall be mounted on casters and otherwise designed to allow relatively free movement in a large space.

The VET program equipment will have the following general specifications:

1. A portable two-gas—hydrocarbon (HC) and CO—emission analyzer meeting OIML R 99 accuracy or higher.
2. Designed and manufactured for heavy-duty, high throughput applications in a harsh environment.
3. Unit shall include a rechargeable battery and printer.

4. Printer shall be portable either by being integrated into the unit or by being connected through cable or infrared link, and shall be capable of printing on 2-ply paper.
5. Includes all attachments and accessories for measuring emissions from all makes and models of vehicles operating in Egypt.

3.1.2 Procurement

The procurement effort has started. A market survey of diagnostic equipment manufacturers in the US and their local dealers in Egypt was conducted. The results indicated that sending the Request for Proposal (RFP) to manufacturers in the US and to their local Egyptian dealers would expedite the procurement process and still ensure competitive bidding.

The RFP’s evaluation criteria allocates significant weight to local dealer’s technical support capabilities in order to guarantee sustainable operation of the equipment and, consequently, the center.

A technical evaluation committee will be formed to evaluate the offers when they are received. An award to the most advantageous offer is expected by the end of January 2003.

The specified equipment does not require any site modifications. As per the RFP, it is the equipment supplier’s responsibility to install and commission the equipment before CAIP/EEAA makes final acceptance. Upon equipment acceptance, the supplier will conduct training courses as provided in a subcontract.

As part of the procurement effort for the equipment necessary for the GOE VET program, the CAIP will purchase three additional units that will be used for hands-on training at the technical center.

3.1.3 Operating Cost

Table 1 shows estimated operating cost for one piece of equipment or one vehicle lane.

Table 1 Testing Center Operating Cost (One Vehicle Lane)

	BAR 97	Upgraded Equipment	Brake Tester
Consumables	4 filters every 30–60 tests and attachments	2 filters every 50–60 tests and attachments	Accessories
Clean Air	Once before each test	N/A	N/A
Calibration Gas	2 types every 20 tests or 1 month	1 type every 6 months	Mechanical calibration every 2–3 years
Estimated cost for 1,000 tests	L.E.2,200	L.E.400	L.E.100

3.2 INSTITUTIONAL NEEDS

In order to guarantee proper and full use of the Technical Center, qualified staff should be selected and properly trained. As a first step towards suitable staffing, a comprehensive technical evaluation was made of the current staff at the Shoubra station. Then a comparison was made between required and existing staff expertise. The capability gap was identified and a complete list of staff expertise requirements

developed by CAIP, reviewed by EEAA, and finalized. EEAA is ready now to employ the successful candidates from the current staff as well to hire new staff to fulfill the requirements required to operate the Technical Center. EEAA will hire staff according to its regulations, but this step must be complete before proceeding to the training section, which also requires purchase of new equipment. CAIP will provide assistance to EEAA in the final staff selection, if needed.

3.2.1 Organizational Needs

The Technical Center will come into the EEAA organization chart within a General Department steered by a high-level manager. EEAA has the option of locating the Technical Center in the proper general department following discussions with the GOE authorities responsible for administration and management.

The Technical Center will assume two major responsibilities in addition to other subsidiary roles. They are training traffic inspectors and calibrating traffic station emission analyzers. Other functions, such as demonstrating the lane concept of emission measurements and diagnosing emission faults, will also be performed by the Technical Center staff.

The organization chart in Appendix B is designed to help the center perform its functions and fulfill its responsibilities efficiently and professionally.

A professional technical manager will supervise all center staff. The manager will be responsible for operating the center as well as representing EEAA in all related issues with other governmental authorities such as traffic stations.

The center will consist of two main sections: training and calibration and diagnostics.

- The **training and calibration section** will be responsible for training traffic inspectors about how to inspect vehicle emissions efficiently and for calibrating the emission testing analyzers operating at traffic stations. To fulfill this responsibly, there will be one qualified senior engineer and one assistant engineer to follow up with section responsibilities. There will also be two technicians to perform the calibration process and one technician to do training. The senior engineer will supervise the assistant engineer who will supervise the three other technicians. The senior engineer will report directly to the general (technical) manager of the center.
- The **diagnostics section** will be operated by a junior automotive engineer who will, together with a diagnostic technician, perform emission faults diagnoses through vehicle testing using engine analyzers newly purchased by CAIP. The diagnostic technician reports to the junior diagnostic engineer, who in turn reports to the technical center general manager.

Administrative staff needed for the center include a secretary, security officers, and office boys. These people will report to the general technical manager. Since EEAA already has qualified staff for these positions, they may be seconded from among current employees.

3.2.2 Human Resources Requirements

Human resources needs arise directly from the job descriptions and job responsibilities that are found in detail in Appendix C.

The staff necessary to operate the technical center include:

Technical Center Manager

S/he will be an automotive or mechanical engineer with minimum experience of 14 years and will be employed on the first level degree. S/he must have a strong technical background related to automotive emissions, diagnosis, and repairs. S/he must also have an adequate managerial experience to be capable of managing the Technical Center efficiently. High communication, computer, and language skills are required for this position. One person is needed for this job.

Senior Training and Calibration Engineer

S/he is required to plan and supervise the training and calibration functions of the center and should have not less than 8 years experience in the automotive field. At least 2 years should have been specifically in the field of emission measurements. S/he should have good communication skills as well as computer and language capabilities. S/he will be employed on the second level degree. One person is needed for this job.

Diagnostics Engineer

S/he is required to perform emissions faults diagnosis, so s/he will be an automotive or a mechanical engineer. S/he should have not less than 8 years experience in the automotive field. At least 2 of them should be in the field of computerized fault diagnosis. S/he should have good communication skills as well as computer and language capabilities. S/he will be employed on the second level degree. One person is needed for this job.

Junior Training and Calibration Engineer

S/he will be an automotive or mechanical engineer. S/he will assist in both the training and calibration processes and should have 4 years experience in the automotive field. At least 2 years should have been in the field of automotive emissions. S/he should have good communication skills as well as computer and language capabilities. S/he will be employed on the third level degree. One person is needed for this job.

Training Technician

S/he will conduct hands-on training for traffic department staff and should have a minimum of 8 years of general experience, of which at least 2 years should be in emissions measurements. S/he will have a general certificate education at a minimum and technical education is preferable. S/he should have good communication skills and fair English language skills are preferable. S/he will be employed on the third level degree (technical). One person is needed for this job.

Calibration Technician

S/he will perform the calibration process for the traffic emissions gas analyzers. S/he should have not less than 8 years total experience and at least 2 years in emission measurements and analyzer handling. S/he will have a general certificate education as a minimum and technical education is preferable. S/he should have some language knowledge. S/he will be employed on the third level degree (technical). Two people are needed for this job.

Diagnostics Technician

S/he will perform emission faults diagnosis using sophisticated equipment. S/he should have not less than 8 years total experience in the automotive field, with at least 2 years in emission measurements and related repairs. S/he will have a general certificate education as a minimum and technical education is preferable. S/he should have some language knowledge. S/he will be employed on the third level degree (technical). One person is needed for this job.

Secretary

S/he will handle all paperwork for the center and should have previous experience of not less than 2 years in the same field. S/he will have a general certificate education; secretarial education/training is preferable. One person is needed for this job.

Security Officer

S/he will be responsible for the center's security and discipline. S/he should have previous experience of not less than 2 years in the same field. S/he will have a general certificate education. At least four people are needed for this job: two per day and two per night.

Office Person

S/he will be responsible for the center cleaning and service. S/he should have previous experience of not less than 2 years in the same field. S/he will have preparatory education and should be capable of reading and writing. At least two people are needed for this job.

3.3 TRAINING AND CAPACITY BUILDING

The training strategy applied by CAIP—in accordance with that of USAID—is results-oriented and performance-based. In the case of the Shoubra Technical Center, the training plan will start with a general orientation for all staff, which will explain the functions of the center, its roles and responsibilities, the equipment, and relationships with partner institutions and government agencies.

For the Shoubra Technical Center to function effectively, both technical and non-technical training are required for its staff. The technical training involves providing the staff with the necessary skills to operate, maintain, and troubleshoot existing and new equipment. The non-technical training includes management and communications courses, which will be offered to the management staff of the center as relevant to

their jobs. This training will also provide the staff with the necessary communication skills for dealing with the public. Non-technical training also includes a “Training of Trainers” course that will be offered to the technical staff expected to be responsible for training the Traffic Department staff from the Ministry of Interior, who ultimately will handle emissions-testing duties. After their training is completed, key member of the center staff will be sent on an observational study tour (OST) to the US to visit similar emission-testing facilities.

There are two target groups to be addressed in this training plan. The first group includes the center staff, who will be provided with in-depth technical training. This training will be offered to the engineers and technicians. Center staff will either be Qualubeya Governorate staff—selected from among the current staff—who will be affiliated to EEAA or new EEAA staff. Qualubeya Governorate staff has received training before but will join the planned training to refresh their memories and further enhance their skills. The second group is the EEAA staff who will be responsible for running the center (CAIP’s counterpart department heads, for example). This group will receive informal training that will mainly focus on technology transfer. They will be expected to attend the formal training offered to the technical staff as observers to ensure smooth transfer of information and skills.

Appendix D outlines details of the training plan. It is expected that a number of meetings and workshops will be organized by CAIP and attended by EEAA and counterpart governorate staff to coordinate the technical and training activities for the center.

3.3.1 Operation and Maintenance of Existing Equipment

The current equipment consists of the opacity meters. Operation and maintenance (O&M) trainers will be Misr Lab engineers who have already been trained in the operation, maintenance of, and troubleshooting for the equipment. The trainers have also received a “Training of Trainers” course and have previous experience in providing this training to the Qualubeya Governorate staff at the Shoubra center.

3.3.2 O&M for New Equipment

New equipment at the center will include the gasoline engine diagnostic and emission test devices, for which vendor training will be offered. Training courses will cover operation and maintenance of, and troubleshooting for this equipment. Gasoline engine diagnostic training will be offered in separate courses to engineers and operators. In the case of emission testing equipment, trainees will be expected to be able to calibrate the equipment as well as train others in calibration.

3.3.3 Safety Training

All center staff will be trained in using safety equipment and applying safety procedures. Training will also include handling emergency situations.

3.3.4 Training of Trainers

Training is among the main functions of the Shoubra center. The technical staff at the center will be responsible for providing training courses for several agencies (e.g. training the Ministry of Interior officials in operating and maintaining the emission testing equipment). An off-the-shelf 'Training of Trainers' course will be customized to suit the activities of the center and its responsibilities.

3.3.5 Standard Operating Procedures

The VET team at CAIP will develop a SOP manual for the center. After this manual is developed, training will be provided to the center staff, as relevant to their jobs, in using and applying the steps in this manual.

3.3.6 Emission Testing OST

After receiving adequate technical and non-technical training, key center staff will be sent on an OST to see similar emission testing facilities in the US. The aim of this OST is to introduce the target group to various methods of overall management and day-to-day running of such facilities.

4. Conclusions

During the implementation phase of these tasks, the CAIP team will be developing a number of manuals designed to guide EEAA in the operation and management of the center. In addition to assisting EEAA in operations, these manuals will ensure financial and institutional sustainability of the Technical Center. These manuals will be finalized after integrating EEAA’s input.

Upon completion of all tasks described in this plan and of the sustainability plan, CAIP will hand over the center with all documentation to EEAA.

Table 2 outlines the expected time to complete major tasks:

Table 2 Time Required to Complete Major Tasks

Task	Date
Equipment delivered	March 30, 2003
Training complete	May 30, 2003
Sustainability plan complete	June 15, 2003
Center hand-over	June 30, 2003

Appendix A

Shoubra Station Status Report

1. INTRODUCTION

The Shoubra VET Station was designed as an emissions testing station for passenger and light-duty vehicles. It was officially inaugurated in April 2000 to start measuring vehicle emissions as a preliminary step in preparation for the enforcement of Law No. 4/Year 1994, known as “the environmental law.” The station is situated on a 1,000 m² site in Shoubra Al-Kheima that belongs to the Governorate of Qualubeya. According to changes in the operations policy of the station, it will be transferred to EEAA, which intends to use it as a technical center. For this reason, CAIP was requested to evaluate the current status of the station as the initial step in defining the necessary modifications to be performed in order to convert the station into a test center.

This report covers the evaluation of the station as performed by the CAIP VET team. The required modifications to the station will be formulated later, upon defining the specifications and details of the technical center.

2. BUILDING AND FACILITIES

The Shoubra VET Station building is a 1-storey structure consisting of two main sections, as shown in Figure 1.

The administrative area contains nine rooms: four offices, one reception area, one conference room, two storage rooms, and one kitchen. There are also two bathrooms.

The test area contains three lanes for vehicle testing with clear areas between the lanes for inspectors and equipment.

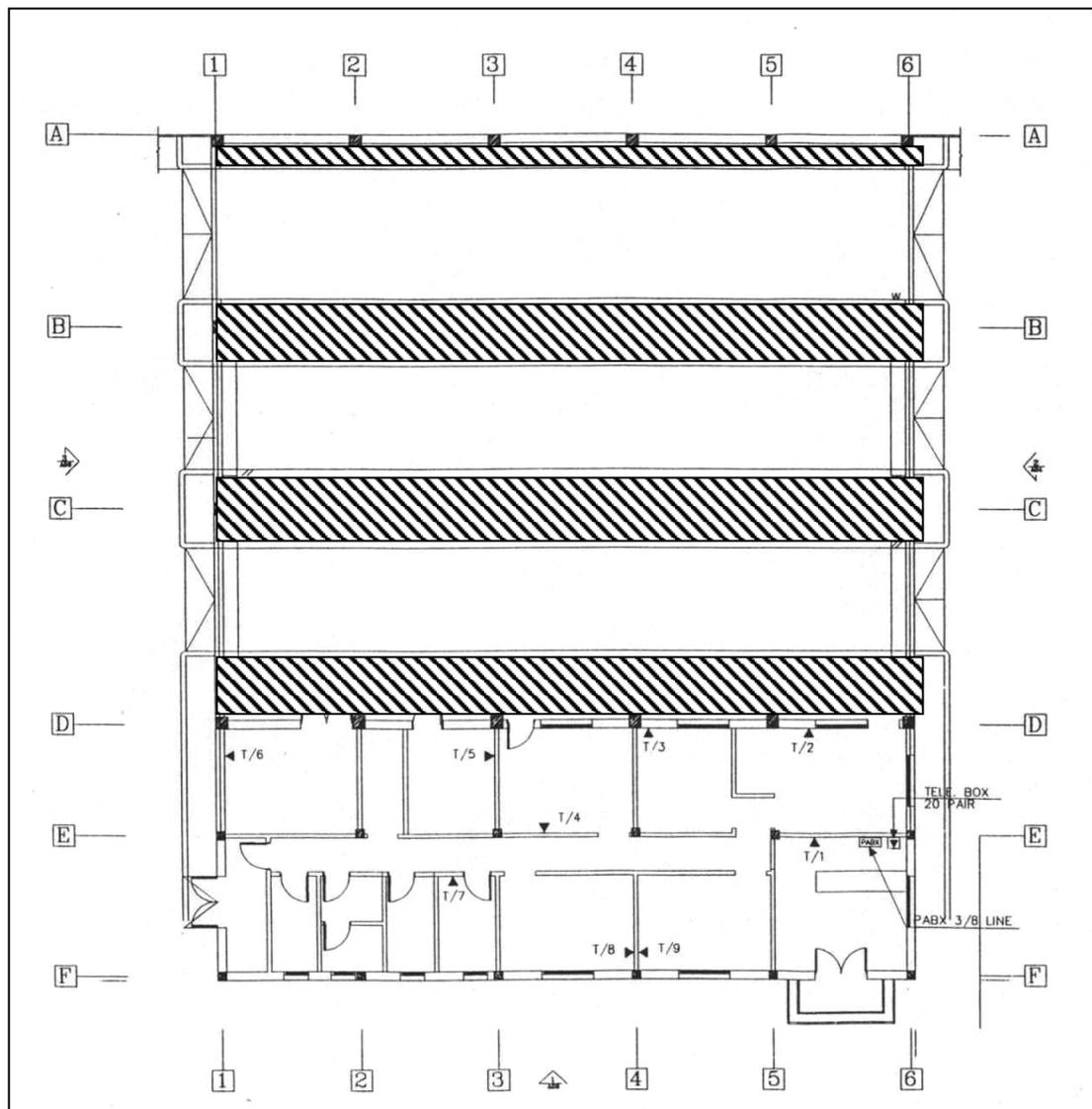
2.1 Administrative Area

The building is apparently in a good condition regarding the civil works, but may require some interior repainting—painting should be part of any renovations. The building configuration is appropriate to the current functional role and tasks assigned to the station as a VET center. However, minor modifications to the administrative area should be considered to fulfill the new functions of the center. These could include the addition of two wide rooms, one for training and another as a calibration laboratory.

2.2 Test Area

The test area is a high roofed steel structure with six large doors. It is well equipped with electrical power and pressurized air outlets, which will facilitate future expansion or modifications. The following infrastructure exists in the test area:

Figure 1 Shoubra Station Layout



- **Ventilation System**—Ventilation of the test area is necessary to keep the entrained air valid for breathing and is achieved through two individual systems: a positive pressure system and a negative pressure system. The negative pressure system is designed to exhaust vehicle emissions outside the building through inlets at a low level from the floor. The positive pressure system is designed to keep exhaust gases near the floor and eventually outside the building through the overhead doors. Both systems operate simultaneously and have been tested to be fair for the center especially after the expected reduction in vehicle flow rate inside the test area.
- **Carbon Monoxide Monitoring System**—The station is equipped with a CO monitoring system, which is capable of alarming the center manager and employees of any excess levels of CO. The system can be set to give an alarm at a preset CO level (currently it is set at the US Occupational Safety and Health Administration [OSHA] recommended level). The system is composed of a central unit and eight sensors; five of them are distributed in the test lanes and the other three are located inside the administrative building in areas where CO could seep in. The sensors are well distributed in

the test area and may not need further position modifications. The system is in need of routine maintenance and sensor calibration. It failed to operate when tested.

- **Electrical Supply and Connections**—Electric power supply, 220 Volts and 110 Volts, are available all through the test lanes through overhead cable channels. Step-down transformers are located in areas where 110 Volts is required and electric stabilizers are used for all equipment. No modification to the electric power supply system is needed for any expected new equipment.
- **Air Supply Network**—Air is generated through a heavy-duty, 2-stage, up-right compressor with an 80-gallon storage tank. Compressed air flows through commercial grade air filters to a refrigerated dryer for extracting moisture, contaminants, and oil. The final filtration step is a Zero Air Generator capable of producing 6 liters per minute of air with zero contaminants. A plumbing system of copper lines and valves is used to supply the emission analyzers with the zero air generated. This high quality air is used to zero the analyzer before each test.

Compressed air is also plumbed to the test area to supply compressed air to use in case of a flat tire or to blow dust off the equipment.
- **Water Supply**—There is a single point for the water supply in the test area, situated beside the offices. Depending upon future construction, some plumbing work may be required.

3. EQUIPMENT

Each lane houses three-position testing equipment meeting BAR 97 specifications for measuring emissions concentrations from gasoline vehicles in addition to a Wager 6500 unit for measuring smoke opacity from diesel powered vehicles. A main server is utilized to link the three positions of each lane and the three lanes together, forming a local area network (LAN) system. The server is capable of compiling data from all testing equipment and transferring the information to any remote location.

The center was equipped to suit a privately owned and operated VET network, and thus used equipment designed for extremely high throughput while maintaining high accuracy characteristic of established programs in the US and Europe. Such accurate equipment requires high maintenance, i.e. frequent and complex calibration carried out by skilled operators.

- **Emissions Equipment**—Emissions equipment is made by ESP and utilizes standard component such as Horiba analyzers. The units were originally manufactured to meet BAR 97 specifications; however, some modifications were made to simplify operation in Egypt. Each unit is capable of measuring CO and HC in addition to engine speed expressed in rpm. There are three installed emission analyzers, one in each lane. These were tested and found to be operating, but the fourth analyzer, kept in the storage room for stand-by situations, is not assembled, and so was not tested.
- **Opacity Meters**—The three opacity meters (Wager Model 6500) are designed to measure percentage opacity from diesel powered vehicles as per SAE J1667 specifications. Each unit is mounted on a cart and connected to the PC in position 2. Each has a rechargeable battery, allowing the unit to be detached from the cart and the PC and used as mobile unit for measuring opacity from heavy-duty vehicles that are too large to fit inside the test lanes. Accessories for measuring opacity from heavy-duty vehicles with upright exhaust stacks are also available. The unit can store up to 100 opacity readings and then transfer them to a standard PC.

- **Brake Testers**—There are three brake-testing units manufactured by Hunter Engineering Company. The units measure brake efficiency, vehicle side slip and suspension stability of passenger and light-duty vehicles. The brake testing units are new, and were generally not needed for the pilot testing. One system has tested approximately 250 vehicles, while the other two testing units are still brand new.
- **Computers**—As required, there are 12 PCs in the station of which four are dedicated to the gas analyzers. The other eight units are usable in any PC application since the input data stations, as well as the report printing stations, may not be needed anymore due to the change in function of the station. The PCs are connected to a server, which is situated in a separate room, and handles all the data for the test center.

The local area network operates using a hub and connects to the workstations through underground cables. The network is adequate to operate the same PCs with the existing hardware, though some modifications may be needed for cabling new positions for the PCs, depending on new office arrangements. While the PCs are slightly outdated, they are adequate for light and medium office work such as word-processing and worksheet operations. The server and the network can be utilized efficiently after performing a thorough service and maintenance to all of them.

4. STAFFING

There are currently 19 people employed at the station, as follows:

1. Administrative Officer
2. Technical Officer
3. Seven Inspectors
4. Receptionist
5. Computer Specialist
6. Equipment Service Specialist
7. Office Boy
8. Four Security Officers (contracted through a service company)
9. Two Cleaning Workers (contracted through a service company)

Considering the future transfer of operations of the station to EEAA, CAIP held two interviews and reviewed personnel reports prepared by management to evaluate the staff. Details of staff interviews are being kept at CAIP for future reference, if needed. The results of the evaluation are as follows:

The Technical Manager is a mechanical engineer. He is qualified to run the station technically, and his qualifications meet the job description for the current position. The Administrative Manager is a position that may be filled either by an EEAA professional, if available, or by the current employee, who has already obtained adequate experience. One inspector is highly competent and two other inspectors are adequate, while the rest are fair despite the training they received from the VET team. Of the five security personnel, two have been working at the site since its construction. They are highly qualified and extremely familiar with the station, and CAIP recommends that EEAA offer them permanent positions as EEAA staff in order to develop a security team. The security team would be responsible for station security following the transfer to EEAA.

5. RECOMMENDATIONS

The station needs some modifications to meet the requirements of a technical center. These modifications are dependent upon the details of the functions of the technical center. As this task is still under development, the modifications stated in this report are those that would serve to create the proper foundation for redesign as a technical center, and do not include in-depth specifications that will be developed soon. The following modifications are recommended:

1. Regarding civil works, CAIP recommends that space be designated within the test area be converted into two large rooms. One room would be used for training purposes and the other would be the calibration laboratory. Under this redesign, the existing offices would be adequate for the rest of the employees of the technical center.
2. EEAA is advised to re-designate the area occupied by the brake testing units and donate the units to any governmental authority that could use them. EEAA could better use these brake testers if they developed a service-for-profit unit inside the technical center through which services for the public may be offered with suitable fees.
3. CAIP recommends either keeping the current server and network as it is, or using PCs that are not embedded with gas analyzers as stand-alone units, distributing them throughout the offices for the administrative purposes of the test center. All of the PCs must be thoroughly checked and maintained and they could be then converted to 220V as the less expensive alternative to purchasing eight matching transformers.
4. EEAA should donate all of the four-gas analyzers, together with their computers, to universities for use in educational and research efforts. For proper operation and utilization, the analyzers must be donated with their 220/110V transformers and current printers. The analyzers should be maintained and calibrated before donation, and the current software should be modified for use without a network.
5. CAIP recommends keeping one engineer, one to three inspectors, and two security officers, as previously mentioned. While the ultimate decision to keep staff is solely EEAA's, CAIP recommends a 6-month transition period be considered between current and future staff. This period would allow for the transfer of operational knowledge and information from old to new staff, as well as provide sufficient time to train incoming employees.

6. SUMMARY

- The Shoubra VET station building is generally in good condition.
- No major modifications are needed for conversion to a testing center.
- Some civil works will be needed, depending on the modifications required to convert the station into a technical center. The main need would be to build two large rooms.
- Some equipment and instruments must be cleared from the station to allow space for the required modifications.
- EEAA should consider transferring some of the current staff to initiate and orient the future permanent staff of the testing center.

- EEAA should complete the staffing for the testing center in the 6 months before the end of CAIP, in order to have sufficient time for training.

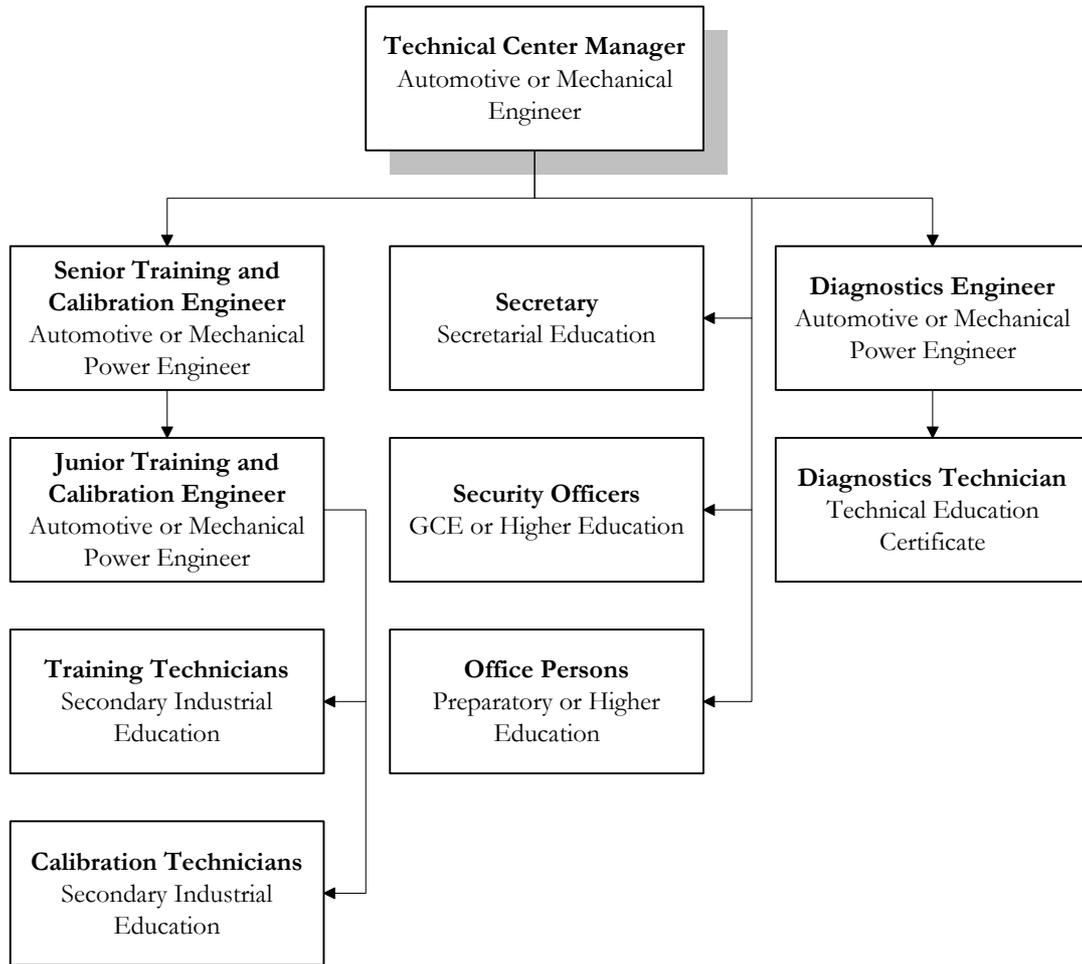
Table 3 Summary of Shoubra el-Kheima VET Station Status

Item	Status	Condition	Keep	Modify
Buildings	Sufficient	Very Good	Yes	Minor
Ventilation System	Working	Acceptable	Yes	No
CO Detection System	Sufficient	Good	Yes	No
Electrical Supply/Connections	Sufficient	Very Good	Yes	As Needed
Compressed Air Source/Network	Sufficient	Very Good	Yes	No
Water Supply	Sufficient	Good	Yes	As Needed
Computers (8) and Server (1)	Working	Acceptable	Yes	Yes
Gas Analyzers (4) and PCs (4)	Working	Acceptable	As Needed	No
Opacity Analyzers (3)	Working	Acceptable	As Needed	No
Brake Testers (3)	New	Very Good	As Needed	No
Staff (12 Primary + 7 Support)		4 Good Technicians 2 Good Security Officers	4 Good Technicians 2 Good Security Officers	

Appendix B

Technical Center Organization Chart

Figure 2 Organization Chart for the Technical Center within a General Department in EEAA



Appendix C

Technical Center Human Resources Needs

1. TECHNICAL CENTER MANAGER

General Description

- This position heads the technical center as a general department within the EEAA organizational structure (under development).
- The candidate shall manage all contacts with traffic stations and organize staff training and emissions analyzer calibration with the appropriate traffic management staff.
- The candidate for this position shall supervise the determination of air quality and pollution rate(s) resulting from vehicle emissions and the assessment of the relevant impacts on the environment, human health, and shall coordinate the relevant research work and monitoring activities.
- The candidate shall supervise the administrative staff, calibration engineers, and training staff at the Technical Center, and shall manage any branch units that may be established within the Technical Center, or added thereto in the future.

Duties and Responsibilities

1. The candidate shall report to, and receive instructions from, the general manager of the general department established within EEAA.
2. The candidate shall supervise and participate in setting up and monitoring the implementation of the executive policies and plans related to ambient air quality and means to protect it against pollution resulting from vehicle emissions.
3. The candidate shall supervise the activities of an average number of environment affairs researchers grades I, II, and III.
4. The candidate shall supervise planning the processes for determination of permissible pollution rates and developing the criteria/standards for relevant estimates and measurements.
5. The candidate shall supervise and monitor the decisions/decrees related to the hazardous impacts of vehicle emissions to the ambient air.
6. The candidate shall supervise coordination of air testing programs, especially vehicle emission testing and other pollutants resulting therefrom.
7. The candidate shall supervise organization of the documentation of public health bulletins as regards ambient air and the hazardous impacts thereon resulting from vehicle emissions, in addition to the relevant means of protection.
8. The candidate shall supervise and monitor the updating of information and knowledge related to professional development concerning ambient air and the factors affecting its quality, especially those related to vehicle emissions and relevant tools of assessment.
9. The candidate shall supervise establishment, support, and coordination of pilot projects related to ambient air quality and means of protection from pollution, especially concerning the impact of vehicle emissions and relevant tools of assessment.
10. The candidate shall manage and supervise research conducted at the vehicle emission technical center.

11. The candidate shall supervise the databases developed by the center, in which the polluting vehicular emissions rates are monitored and measured, and shall supervise the prediction studies based on these measurements.
12. The candidate shall perform any other similar assignments.

Selection Criteria

- B.Sc. in automotive or mechanical power engineering; a postgraduate degree is highly desirable.
- Preferably 2 years experience in air quality studies and research, and at least 10 years previous experience in a vehicular occupation highly desirable.
- Fluency in English. Knowledge of German and/or French highly desirable. Good knowledge of computer required.
- Completion of an interim period for not less than 6 years in a directly lower degree
- Passes the training courses available at the EEAA designated for the holder of this position.
- Shall be appointed in the First Degree

2. SENIOR CALIBRATION AND TRAINING ENGINEER

General Description

- The candidate shall report to and receive instructions from the technical center general manager.
- This candidate shall, in general, be concerned with supervising the calibration of pollution measurement equipment designed for vehicle emissions and shall coordinate relevant monitoring activities.
- The candidate shall supervise and provide training for the staff members responsible for environmental measurements of vehicle emissions in various dimensions.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the general manager of the technical center.
2. The candidate shall supervise the work and training of an average number of emission measurement technicians and trainers, grade I, II, and III.
3. The candidate shall supervise planning for setting up the equipment calibration programs.
4. The candidate shall supervise and follow up implementation of decisions related to maintenance schedules and calibration of equipment available at the technical center.
5. The candidate shall supervise coordination of the technician training programs at the technical center.
6. The candidate shall develop and supervise the computerized documentation process for data of equipment calibration and training of trainees.
7. The candidate shall perform any other similar assignment.

Selection Criteria

- Automotive, mechanical power, or general mechanical engineer.
- Minimum 2 years experience in the field of operating vehicle emissions measurement/analysis equipment.
- Fluency in English. Knowledge of German and/or French highly desirable. Good knowledge of computers and databases required.
- A minimum of 5 years experience working with motor vehicles. An overall previous experience of 10 years relevant experience is required. Shall be appointed on the second degree cadre
- Shall pass the training courses available at the EEAA designated for the holder of this position.

3. ASSISTANT CALIBRATION AND TRAINING ENGINEER

General Description

- The candidate shall report to and receive instructions from the senior calibration and training engineer.
- This candidate shall be concerned with assisting to perform the calibration of pollution measurement equipment designed for vehicle emissions and shall be involved in relevant monitoring activities.
- The candidate shall provide training for the staff members responsible for environmental measurements of vehicle emissions in various dimensions.
- The candidate shall supervise technical staff assigned to calibration and the training process.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the general manager of the technical center.
2. The candidate shall perform planning for setting up the equipment calibration programs.
3. The candidate shall follow up implementation of decisions related to maintenance schedules and calibration of equipment available at the technical center.
4. The candidate shall design schedules for training programs at the technical center.
5. The candidate shall organize and perform the computerized documentation process for data of equipment calibration and training of trainees.
6. The candidate shall perform any other similar assignments.

Selection Criteria

- Automotive, mechanical power, or general mechanical engineer.
- Minimum 2 years experience in the field of operating vehicle emissions measurement/analysis equipment.

- Fluency in English. Knowledge of German and/or French highly desirable. Good knowledge of computers and databases required.
- A minimum period of 2 years experience with motor vehicles. An overall previous experience of 4 years is required. Shall be appointed on the third degree cadre
- Shall pass the training courses available at the EEAA designated for the holder of this position.

4. DIAGNOSTICS ENGINEER

General Description

- The candidate shall report to and receive instructions from the technical center general manager.
- This candidate shall be concerned with the diagnosis of vehicle emission faults and cases of non-compliance with the law.
- The candidate shall supervise technical staff assigned for faults diagnosis.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the general manager of the technical center.
2. The candidate shall plan for setting up and operating equipment necessary for emission faults diagnosis.
3. The candidate shall follow up implementation of decisions related to maintenance schedules and calibration of diagnosis equipment available at the technical center.
4. The candidate shall organize and carry out a computerized documentation process for data of equipment calibration.
5. The candidate shall organize and carry out a computerized documentation process for tested vehicles and faults diagnosed.
6. The candidate shall organize and carry out database analysis for the relationships between makers, models, and fault types, as well as compliance rate per vehicle type and model.
7. The candidate shall perform any other similar assignment.

Selection Criteria

- Automotive, mechanical power, or general mechanical engineer.
- A minimum period of 2 years experience in diagnosis of motor vehicle faults. An overall previous experience of 4 years is required, preferably in an automotive service center. Shall be appointed on the third degree cadre.
- Fluency in English. Knowledge of German and/or French highly desirable. Good knowledge of computers and databases required.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

5. TRAINING TECHNICIAN

General Description

- The candidate shall report to and receive instructions from the assistant calibration and training engineer.
- This candidate shall, in general, be concerned with providing practical training for traffic staff.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from assistant calibration and training engineer.
2. The candidate shall perform all practical training necessary for traffic inspectors under supervision of the assistant and senior training and calibration engineers.
3. The candidate shall handle the copying and production of all training materials for trainees.
4. The candidate shall perform any other similar or additional assignments.

Selection Criteria

- Secondary education is the minimum acceptable education; technical secondary education is preferable.
- A minimum period of 2 years experience in vehicle emission measurements. Overall previous experience of 4 years is required, preferably in the automotive field. The candidate shall be appointed on the third degree technical cadre.
- Some English language knowledge is preferable.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

6. CALIBRATION TECHNICIAN

General Description

- The candidate shall report to and receive instructions from the assistant calibration and training engineer.
- The candidate shall, in general, be concerned with calibrating emission gas analyzers.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from assistant calibration and training engineer.
2. The candidate shall perform all calibration processes necessary for traffic emission gas analyzers as well as the equipment presently at the technical center.
3. The candidate shall handle all necessary calibration materials.

4. The candidate shall perform any other similar or additional assignments.

Selection Criteria

- Secondary education is the minimum acceptable education; technical secondary education is preferable.
- A minimum period of 2 years experience in vehicle emission measurements is required. Overall previous experience of 4 years is required, preferably in the automotive field. Shall be appointed on the third degree technical cadre.
- Some English language knowledge is preferable.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

7. DIAGNOSTICS TECHNICIAN

General Description

- The candidate shall report to and receive instructions from the diagnostics engineer.
- This candidate shall, in general, be concerned with performing emission faults diagnosis.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the diagnostics engineer.
2. The candidate shall operate diagnostics equipment to determine causes for emission faults.
3. The candidate shall be responsible for preparing vehicles for testing.
4. The candidate shall print out test results and deliver same to the diagnostics engineer.
5. The candidate shall perform any other similar or additional assignments.

Selection Criteria

- Secondary education is the minimum acceptable education; technical secondary education is preferable.
- A minimum period of 2 years experience in vehicle emission measurements. Overall previous experience of 4 years is required, preferably in the automotive field. Shall be appointed on the third degree technical cadre.
- Some English language knowledge is preferable.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

8. SECRETARY

General Description

- The candidate shall report to and receive instructions from the technical center manager.
- This candidate shall, in general, be concerned with performing all paper work, word processing, posting, and filing work for the technical center.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the technical center manager.
2. The candidate shall place and receive all phone calls and transfer them to the proper staff; the candidate shall also manage receipt and sending of faxes.
3. The candidate shall perform all paperwork for the technical center.
4. The candidate shall maintain a complete filing system for EEAA and other contacts.
5. The candidate shall keep an inventory of all equipment in the technical center and shall remind the staff of service and calibration dates.
6. The candidate shall manage the general manager’s office and arrange his appointments.
7. The candidate shall be responsible for ordering supplies for the technical center.
8. The candidate shall perform any other similar or additional assignments.

Selection Criteria

- Secondary education is the minimum acceptable education; a secretarial certificate is preferable.
- A minimum period of 2 years experience as a secretary. Overall previous experience of 4 years is required in administrative office work. Shall be appointed on the third degree technical cadre
- Acceptable command of English language is preferable. Computer skills are required.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

9. SECURITY OFFICER

General Description

- The candidate shall report to and receive instructions from the technical center manager.
- The candidate shall, in general, be concerned with the security and discipline of the technical center.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the technical center manager.

2. The candidate shall be responsible for safety within the technical center and should follow all safety rules.
3. The candidate shall be responsible for discipline within the technical center and should always keep tracking the technical staff to ensure their tools and equipment is properly stored.
4. The candidate shall report any defective lights, water supply, toilets, or any other facility disorder.
5. The candidate shall be responsible for securing the technical center during and after working hours.
6. The candidate shall send immediate warnings to police, ambulance, or fire departments as well as notifying the technical manager of any hazardous accidents in the technical center.
7. The candidate shall be responsible for writing down details of visitors and checking their identification.
8. The candidate shall be responsible for control of vehicle entry and exit so as to prevent accidents and traffic jams.
9. The candidate shall perform any other similar or additional assignments.

Selection Criteria

- Secondary education is the minimum acceptable education; a military certificate is preferable.
- A minimum period of 2 years experience in the same job. Overall previous experience of 4 years is required in the security field. Shall be appointed on the third degree technical cadre.
- Knowledge of English is preferable.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

10. OFFICE PERSON

General Description

- The candidate shall report to and receive instructions from the technical center manager.
- The candidate shall, in general, be concerned with the technical center cleaning and services.

Duties and Responsibilities

1. The candidate shall report to and receive instructions from the technical center manager.
2. The candidate shall be responsible for cleaning the technical center test area as well as the offices, kitchen, and restrooms.
3. The candidate shall be responsible for serving beverages to staff and visitors.
4. The candidate shall assist the secretary in copying papers, collecting post, and any other similar work.
5. The candidate shall convey messages between EEAA and the technical center when needed.
6. The candidate shall operate the kitchen and take care of its furniture and equipment.
7. The candidate shall perform any other similar or additional assignments.

Selection Criteria

- Preparatory education is the minimum acceptable education; higher education is preferable.
- A minimum period of 2 years experience in the same job.
- Shall pass the training courses available at the EEAA designated for the holder of this position.

Appendix D

Technical Center Training Plan

Table 4 Training Plan for Shoubra Technical Center

Title	Description	Participant	Trainers	Duration
General Session	General orientation to introduce the staff of the technical center to the function of the center; its roles and responsibilities; the equipment; relationships with partner institutions and government agencies, etc.	All center staff	CAIP	1 day
Management and Communication Training	Management training—relevant topics for the management staff of the center, in addition to communication training to deal with the public.	Management staff	Local training provider/CAIP	5 days
Emissions Testing—Introduction	Introduction to emission testing, methods, and results. Introduction to the use of emissions equipment, lane operations, and interfacing with the public. Managers attend to be aware of the operations they will be supervising.	Engineers and operators	Equipment provider/CAIP	2 days
Gasoline Engine Diagnostic Training for Engineers	Training in operation, maintenance, troubleshooting, and repair of the gasoline engine diagnostic units, in addition to lane operation as relevant to the equipment. Managers attend to be aware of the operations they will be supervising.	Center engineers	Equipment Provider/CAIP	2 days
Gasoline Engine Diagnostic Training for Operators	Training in operation, maintenance, troubleshooting, and repair of the gasoline engine diagnostic units in addition to lane operation as relevant to the equipment. Managers attend to be aware of the operations they will be supervising.	Center operators	Equipment Provider/CAIP	2 days
Opacity Meter Training	Training in operation, maintenance, and troubleshooting of the Opacity Meter in addition to lane operation as relevant to the equipment. Managers will attend to be aware of the operations they will be supervising.	Engineers and operators	Misr Lab/CAIP	2 days

Title	Description	Participant	Trainers	Duration
Emission Testing Units Training	<p>Training in operation, maintenance, troubleshooting, and calibration of the emission testing units that will be identical to the ones to be purchased by the Ministry of Interior. Training will include in-lane operation as relevant to the equipment.</p> <p>Training will focus on providing the trainees with the necessary skills to handle training the ministry staff in operation, maintenance, and calibration of the equipment.</p> <p>Managers attend to be aware of the operations they will be supervising.</p>	Engineers and operators	Equipment Provider/CAIP	2 days
Safety Training	<p>Training in use of safety equipment and applying safety rules and conditions in the center. Training should also include handling emergency situations, e.g. fires.</p> <p>Managers attend in order to be aware of the operations they will be supervising.</p>	Managers, engineers, and operators	Equipment Providers/CAIP	2 days
Training of Trainers	Training the operators of the center to be able to train others, such as ministry staff, in operating the emission testing equipment available at the technical center.	Engineers	Training Provider/CAIP	7 days
SOP Training	Training in using the SOP manual that will be developed for the center and in applying its steps. Training will be offered to all management and technical staff, as relevant to their jobs.	Management and technical staff	CAIP	4 days
OST	An observation study tour to expose CAIP counterpart governorate staff to emission testing facilities in the US that are similar to the Shoubra Technical Center.	CAIP counterpart governorate staff involved in emission testing		2 weeks