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96349

# **ENVIRONMENTAL ASSESSMENT REPORT**

**Agip Kapiri Mposhi**

**Great North Road**

**Kapiri Mposhi**

**Date Assessed : April 26, 1995**

**Prepared for the  
ZAMBIA PRIVATISATION AGENCY**

**Prepared by  
P H ASSOCIATES, INC.**

**June 14, 1995**

## **CONFIDENTIALITY STATEMENT**

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## 1. INTRODUCTION

An environmental assessment was conducted by PH Associates, Inc. of the Agip Kapiri Mposhi facility, Zambia. The purpose of the assessment was to determine whether air, soil, surface water, or groundwater has been potentially affected at the facility site by current or past site activities or processes, and to provide information concerning potential environmental liabilities. This assessment was based on Ministry reviews and interviews, review of applicable environmental regulations, aerial photographs, facility records, interview of site personnel, and an onsite/offsite reconnaissance of the property.

This report has been prepared for the Zambia Privatisation Agency (ZPA) pursuant to a contractual agreement between the U S Agency for International Development (USAID) and PH Associates, dated March 16, 1995. The report is based on limited documented information and interviews with available facility personnel, is accurate to the best of PH Associates knowledge and belief, and has been prepared for the exclusive use of ZPA for specific application to the above-referenced facility. No warranty, expressed or implied, is made. In the event of any changes in the nature, design or locations of the facility site or structures, the conclusions and recommendations in this report should not be considered valid unless the changes are reviewed and the conclusions are verified in writing by PH Associates. This report should not be construed to be a legal representation or interpretation of environmental laws, rules, or regulations.

### 1.1 Background

As part of a preliminary information gathering activity in 1992, the ZPA distributed a questionnaire requesting disclosure of specific company and site information that would be relevant to completing the environmental assessment. The questionnaire for this specific facility was not returned.

Additional environmental data was requested by PH Associates in the form of a questionnaire submitted to the facility during June and July 1994. The purpose of the PH Associates questionnaire was to obtain information that was either not available at the time, or to supplement information not fully detailed in the returned ZPA questionnaire. The additional data was obtained by distributing an extensive environmental survey questionnaire to facility management, and requesting their cooperation in completing and returning the survey form. The questionnaire for this Agip facility was not returned.

The Agip facility is located on the west side of the Great North Road, Kapiri Mposhi, Zambia (Section 7, Figure 1). The site address is Stand No 57, Great North Road and the facility is located within a mixed commercial, industrial and residential area. Within a 1 kilometer radius north-northeast of the Agip site are residential apartments for LK Transport (same ownership/management as Agip Kapiri Mposhi), and Agip Kapiri Mposhi staff, a Tazara Railways buildings (east), a bar (west) and a Unit motel located across the Great North Road.

The Agip Kapiri Mposhi facility is a filling station that retails leaded super gasoline (petrol), gas-oil (diesel) fuel, kerosene, and vehicle maintenance supplies such as batteries, tires, tire repair chemicals, automotive parts, engine oil, rust sealant, radiator fluids, fire extinguisher powder, welding equipment, battery acid, and various car washing detergents. Vehicle services such as battery charging, tire mending, small vehicle repair, wheel balancing and alignment, and oil changes and lubrication are also provided.

## 2. SCOPE OF WORK

PH Associates performed an environmental assessment assess and document potential adverse environmental effects on air, soil, surface water, and groundwater that might have resulted from either current or past activities on the site. This assessment was qualitative, based on readily available existing information, interviews and field observations. It did not involve environmental field testing or sampling, laboratory analyses, or an asbestos survey.

In general, PH Associates staff endeavored to:

- Conduct interviews with Ministry personnel and other pertinent organizations to assess the current state of environmental affairs and regulations.
- Review available Ministry reports on past facility inspections and geologic and hydrogeologic data.
- Evaluate existing environmental regulations that are applicable to assessing potentially adverse effects on air, soil, surface water and groundwater.
- Review available facility files to investigate past or current activities on the site with respect to environmental permits and compliance, wastewater, site drainage, and air emissions; and handling, storage, treatment, and disposal or spills of potentially hazardous materials and wastes.
- Review readily available aerial photographs of the site and adjacent properties. In addition, PH Associate reviewed available drawings of the site showing facility layout, underground piping, buried tanks, utilities and site drainage systems.
- With the consent of the site management, perform an onsite field reconnaissance of the facility. During the field reconnaissance, PH Associates looked for evidence of releases of potentially hazardous chemicals, petroleum products, or process wastes to the soil, surface water, and groundwater by spilling, dumping, burning or burial of materials.
- Perform a field reconnaissance of the area, within approximately 1 kilometer radius of the facility, that was feasible within the level of effort identified for this contract. During the field reconnaissance, PH Associates attempted to identify neighboring commercial and industrial sites that may potentially adversely affect the environmental conditions at the facility.
- Interview available staff who were knowledgeable of current and past site activities and processes at the facility and of surrounding properties.
- Document the findings and observations of the visited site with photographs. Copies of these photographs are included in Section 8 of this report.
- Prepare an Environmental Assessment Report presenting the areas of environmental concerns, results of the Ministry records, applicable environmental regulations, aerial photograph reviews, site visits and personnel interviews, and provide conclusions and recommendations for submission to USAID and ZPA.

### 3. METHODOLOGY

This section presents the methodology used to complete the scope of work for the environmental assessment project. Methods used include a review of the ministry records, environmental regulations, aerial photographs, facility records, ministry and facility personnel interviews, and site visits. Results of the assessment are presented in Section 4.0, and the conclusions and recommendations are presented in Section 5.0.

#### 3.1 Ministry Records Reviews and Interviews

PH Associates interviewed Ministry personnel and other pertinent organizations to discuss the current state of environmental affairs and regulations in Zambia. Ministry records, such as factory inspections, geologic and hydrogeologic reports, were also obtained and reviewed for the sites to be assessed.

The following Ministries personnel and other pertinent organizations were interviewed and the results of these discussions are included in Appendix C.

##### Environmental Council of Zambia

Mr Julius Kanyembo, Director - April 13, 1995

Mrs I Mbewe, Legal Officer - April 24, 1995

##### Ministry of Energy and Water Development, Water Affairs

Mr Stan Chisala, Senior Engineer - April 18, 1995

##### Ministry of Labor and Social Security, Chief Inspector of Factories

Mr K Mapani, Chief Inspector of Factories - April 20, 1995

Mr Kakoma Chivundu, Inspector of Factories - April 28, 1995

Mr Lukwesa, Inspector of Factories - April 28, 1995

##### Ministry of Mines and Minerals Development, Geological Survey Department

Mr O Ng'ambi, Acting Director - April 24, 1995

Mr Clement Namateba, Senior Geologist (PGR) - April 24, 1995

##### International Bank for Reconstruction and Development (World Bank)

Mr Gedion Nkojo, Resident Representative - April 24, 1995

Mr Julius Chileshe, Natural Resource Economist - April 24, 1995

#### 3.2 Environmental Regulations

Legislative Policies, Acts, and Regulations enacted by Zambia were reviewed for their applicability to completing environmental assessments of the facilities identified by the ZPA. The purpose of the review was to evaluate and summarize those guidelines pertaining to environmental issues which industries in Zambia are required to adhere. A summary of the environmental regulations for Zambia is presented in Appendix D, Table 1. Twelve regulations were selected for review based on their potential applicability to the assessed sites. Six of these regulations contained applicable environmental laws addressing air, soil and water pollution and include:

- Water Act of 1949
- Environmental Protection and Pollution Control Act of 1990
- Water Pollution Control Regulations of 1993
- Waste Management Regulations of 1993
- Mining (Dumps) Regulations of 1972
- Mines and Minerals Act of 1976

The applicable regulations or laws used to evaluate environmental compliance of the facilities assessed are summarized in Table 2 of Appendix D. Only recently have regulations addressing the protection of human health and the environment in any detail been enacted. Prior to the passing of the Environmental Protection and Pollution Control Act of 1990 and the establishment of the Environmental Council of Zambia, legislation mostly addressed issues of worker health and safety.

Currently, no guidelines have been implemented by the Environmental Council of Zambia defining specific materials or chemicals as hazardous. Application of the term "hazardous" is generally based on specific characteristics of a substance or constituent such as ignitability, corrosivity, reactivity, and toxicity. Depending on the concentration of the constituent in sludges, soil, surface water, or groundwater, the constituent may or may not be considered hazardous.

Since Zambia has not developed hazardous chemicals guidelines, PII Associates applied fourteen programs adopted by the United States Environmental Protection Agency (EPA) and State Governments that identify substances as either hazardous, extremely hazardous, toxic or carcinogenic. The California EPA May 1992 Chemical Cross-Index reference tabulates all the hazardous chemicals and compounds listed in these programs and was used by PII Associates to assess whether substances found during the assessments were potentially hazardous.

### **3.3 Aerial Photographs**

On April 12, 1995 the Mapping Services Section of the Survey Department was visited by PII Associates to review any available and applicable aerial photographs of the sites to be assessed. The aerial photographs were reviewed to identify possible changes in structures, topography, site activities, processes, and waste disposal practices that could be used as additional information to the current site conditions observed during PII Associates visit.

Review of the aerial photographs from the Survey Department indicated that the photographs and any enlargements are at a scale where ground objects are much too small to provide any useful information or details of the sites. Aerial photographs were available at a scale of 1:30,000 and enlargements at a scale of 1:7,500. Based on PII Associates past experience it was determined that no applicable information would be gained from use of aerial photographs at this scale.

### **3.4 Facility Site Reviews**

Site reviews were conducted by PII Associates and included site visits, analysis of facility records and facility personnel interviews.

### **3.4.1 Site Visits**

PH Associates conducted a field reconnaissance of the site focusing on identifying site activities and practices that have or may have potential environmental effects in the future. An Environmental Assessment Checklist survey form was completed during the field reconnaissance and is attached in Appendix E. The Location Map and Site Plan for the facility are attached in Section 7. Photographs of the field observations taken during the site visit are included in Section 8.

A field reconnaissance of the area within approximately 1 kilometer radius of the facility was also performed to identify neighboring industries that may potentially adversely affect the environmental conditions at the facility. The offsite reconnaissance, that was feasible for the contracted level of effort, involved interviews with facility personnel and a drive-by of the surrounding area. No offsite industries were contacted or visited by PH Associates.

### **3.4.2 Facility Records**

Facility records and aerial photographs applicable to completing the environmental assessment were requested from the facility. Records requested included documents containing information and details on building and structure designs, underground storage tanks, process flow diagrams, process materials and wastes, waste disposal, environmental permits, monitoring programs and controls, and documentation on storage or use of potentially hazardous materials. These records, if made available to PH Associates, are attached in Appendix F.

### **3.4.3 Interviews**

Interviews were conducted with available facility personnel, usually site managers, who could provide information on past or current site activities and processes, potentially hazardous materials use and storage, spills, accidents, utilities, fuel storage areas, maintenance practices, waste disposal, permits, monitoring programs, and laboratory analyses.

## 4. RESULTS OF ENVIRONMENTAL ASSESSMENT

The results of the environmental assessment are presented below and include the following sections: Facility Ministry Records/Site Aerial Photographs/Facility History and Records/Site Activities and Processes/Environmental Setting/Field Reconnaissance Results and Applicable Environmental Regulations.

### 4.1 Facility Ministry Records

No Ministry Records were available for this facility.

### 4.2 Aerial Photographs

No aerial photographs were available for this facility.

### 4.3 Facility History and Records

On April 26, 1995, Ms Elena Pomar of PH Associates, interviewed Mr Liaquat Kapdi, owner, and Mr Charles Ziba, Manager of the Agip Kapiri Mposhi facility. On May 29, 1995 Ms Pomar interviewed Agip Chief Engineer, Mr Sanidah Lwenje. The purpose of the interview was to obtain information on the Agip site history, facility layout, products, services, and available facility records. The Site Assessment Checklist for the Agip site is provided in Appendix E.

A site layout plan for the facility is shown in Section 7, Figure 2. The site initially began operations in September, 1994. According to Mr Kapdi, the owner, the site was formerly undeveloped.

The following facility records were available for review by PH Associates and are attached:

- Site Layout Plan
- Inventory of chemicals and automotive parts at the Auto Spares Shop (Appendix F)
- Typical Tank Construction Details (Appendix F)
- Petroleum Usage Report (Appendix F)

According to Mr Lwenje, the facility has licenses to possess dangerous petroleum in bulk and other than dangerous petroleum (Forms B & F), but did not provide PH Associates with a copy.

### 4.4 Site Activities and Processes

The Agip Kapiri Mposhi facility is a filling station that retails petrol (leaded super gasoline), diesel (gas-oil) fuel, kerosene, and vehicle maintenance supplies such as batteries, tires and tire repair chemicals, automotive parts, engine oil, rust sealant, radiator fluids, fire extinguisher powder, welding equipment, battery acid, and various car washing detergent (Section 8, Photographs 1 through 5). Vehicle services such as battery charging, tire mending, small vehicle repair, wheel balancing and alignment, and oil changes and lubrication are also provided (Section 8, Photographs 6 through 8). Oil changes and greasing are carried out in the Vehicle Maintenance/Service area (Section 8, Photograph 9). The layout of the facility is shown in (Section 7, Figure 2). The Agip site includes a Mini

Mart where they sell household cleaners, car wax, paper household goods, selected groceries and sundries (Section 8, Photograph 10). There is a Take Away Shop on the premises that sells food, ice cream, and beverages (Section 8, Photograph 11).

A total of 6 underground storage tanks (USTs) are located onsite. The six USTs are located in a vertical line running north-south on the eastern side of the facility, and contain petrol (2 tanks), kerosene (1 tank) and diesel (3 tanks), (Section 7, Figure 2 and section 8, Photograph 12). According to Mr Ziba, the six USTs are less than a year old, since they were installed in September 1994.

Based on the site Petroleum Usage Report for 1994/1995, the total quantities of petroleum products used onsite include 4,483 kilograms of lubricating (greasing) oils and 210,000 liters of fuel (Appendix F).

## 4.5 Environmental Setting

The environmental setting of the Agip Kapiri Mposhi facility including topography, geology, and hydrogeology is summarized below.

### 4.5.1 Topography

The Agip facility is at an elevation of approximately 1260 meters above mean sea level with a site surface of concrete. The surface of the facility site slopes to the east and surface water runoff is collected in north-south constructed surface drains to the east of the facility, parallel to the Great North Road. Two rivers are located near the facility, the Mulungushi approximately 0.8 kilometers west and the Lunchu, approximately 1.6 kilometers east (Section 7, Figure 1). The Mulungushi River flows westward and the Lunchu River flows toward the northeast. The Kapiri Mposhi Local Forest (Reserve) and Kapiri Mposhi Hill are located approximately 10.5 kilometers north of the facility (RZGSD, 1979).

### 4.5.2 Geology

The surficial geology of this area is dominated by the Kapiri Mposhi Hill located north of the Agip Kapiri Mposhi and consisting of quartzites associated with quartz-biotite-muscovite schists to form the Kalonga Formation. There are numerous surface sand deposits in the area, largely derived from the Kapiri Mposhi Hill. At an elevation of 1425 meters the Kapiri Mposhi Hill is a relic of the ancient central African plateau surface that presently ranges from 1,220 to 1,290 meters above mean sea level. The bedrock in this area is complex and consists of Pre-Cambrian undifferentiated granitic gneisses, and quartzites belonging to the Basement Complex. These formations were uplifted, faulted, and eroded during several major orogenic (uplift) events, with the latest occurring approximately 460 million years ago (Thieme, 1983; RZGSD, 1969).

### 4.5.3 Hydrogeology

No specific hydrogeologic studies have been completed for the Kapiri Mposhi area. However in the 1969, RZGSD study, groundwater was encountered at approximately 1.5 meters below ground surface in 11 of 282 sand survey pits. These 11 pits were located adjacent to the Mushirabiri River and dambo or marsh areas.

According to Mr Ziba, the depth to groundwater beneath the Agip Kapiri Mposhi facility is approximately 25 meters. This depth was reached at a borehole in the

property adjacent (LK Transport - under same management) drilled in 1970 but later abandoned due to insufficient pressure. According to records, the quartzite horizons, where the Agip Kapiri-Mposhi borehole was placed, are highly metamorphosed and has a very low porosity (RZGSD, 1969).

## **4.6 Field Reconnaissance Results**

On April 26, 1995, a tour of the Agip Kapiri Mposhi facility by PH Associates was conducted by Mr Charles Ziba, Manager, and an interview was conducted by Mr Liaquat Kapdi, the owner of the filling station. The results of the field reconnaissance and discussions about Agip's operations and products are presented in this section.

### **4.6.1 Utilities**

The following is a summary of the utilities that service the Agip Kapiri Mposhi facility as reported by Mr Kapdi and Mr Ziba on April 26, 1995, and based on a review of the Site Layout Plan (Section 7, Figure 2).

#### **4.6.1.1 Electricity**

Zambia Electricity Supply Corporation Ltd. (ZESCO) provides electricity to the facility. There are no electrical transformers located onsite.

#### **4.6.1.2 Water Supply**

The Agip Kapiri Mposhi facility water supply is obtained from the Kapiri Mposhi District Council. Management indicated that they were unable to access Council water approximately 30 percent of the time, which created problems in the day to day running of the facility. As a result a 10,000 liters water holding tank is being constructed on the northwest side of the facility (Section 7, Figure 2 and Section 8, Photograph 13).

#### **4.6.1.3 Sanitary Sewer**

Agip's sanitary wastes discharge to a septic tank system located at the northwest end of the site. The septic system consists of a single tank connected to a single Soakaway (Section 7, Figure 2 and Section 8, Photograph 14). A connection to the septic tank is located behind the manager's office. (Section 7, Figure 2 and Section 8, Photograph 15). The septic tank is constructed of concrete walls and floor, and the soakaways have concrete walls with a gravel floor base.

Based on the Site Layout Plan shown in Section 7, Figure 2, suction pipes are used to convey the sewage to the septic tank and Soakaway. According to Mr Iwenje, the solids settle out in the septic tank and liquids flow to the Soakaway where they eventually percolate downward into the subsurface strata. According to Mr Ziba, the tank has not yet been cleaned.

#### **4.6.1.4 Stormwater Control**

The facility is predominantly paved with concrete and asphalt. Surface water drains were observed, located on a vertical line running north-

south, parallel to the Great North Road on the southern side of the site (Section 8, Photograph 16). The stormwater drains were obstructed by solid trash such as plastic bottle, packaging, papers, etc. Mr Lwenje mentioned that since the Kapiri Mposhi facility is not connected to the Council, the stormwater runoff drains just lead to the subsurface strata.

#### **4.6.2 Structures**

Structures at the Agip facility consist of brick, concrete, and steel. According to Mr Kapdi, the main building was constructed in late 1994. Proposed structures such as a Service Bay, two 10,000 liters USTs, and a second septic tank located to the south of the kitchen on the western side of the property, are pending approval (Section 7, Figure 2). The location of each building, including proposed structures at the facility, are shown on the Site Layout Plan in Figure 2 and include:

- One main building with the manager's office, auto spares shop, mini mart, take away store, vehicle maintenance/servicing area and auto workshop
- Three fuel pump islands (two located to the south, and one to the east)
- Six steel underground fuel storage tanks
- One underground soakaway connected to the septic tank
- One aboveground concrete water tank under construction
- One proposed underground storage tank and two pumps
- One proposed septic tank

#### **4.6.3 Environmental Effects and Observations**

Observations made during the field reconnaissance and potentially adverse environmental effects at the Agip Kapiri Mposhi facility are discussed in the following sections.

##### **4.6.3.1 Chemicals, Petroleum, and Process Materials**

Details of petroleum and the quantities used at the Agip facility are included in the Petroleum Usage Report in Appendix F. Based on the site Petroleum Usage Report for 1994/1995, the total quantities of petroleum products used onsite include 4,483 kilograms of lubricating (greasing) oils and 210,000 liters of fuel (Appendix F).

##### **4.6.3.2 Process Waste Streams**

Petroleum products are the only source of process waste at the facility. The only known waste stream is stormwater surface runoff which runs into the Kapiri Council drains (Section 8, Photograph 16).

The oil from the Vehicle Maintenance/Servicing area is collected in an Oil Catch Basin (transversely cut drum) and placed in the Service Pit (Section 8, Photographs 9 and 17). This oil is periodically removed, placed in large drums and disposed at the dump outside Kapiri Mposhi Council area.

#### 4.6.3.3 Air Emissions

Air emissions produced at the site include volatile organics, such as benzene, ethylbenzene, toluene, and xylenes which are emitted from petroleum products, particularly gasoline. The emissions occur at the UST vents, pump stations - and when the petroleum products are used in the service bay. Other emissions include carbon monoxide from vehicle tailpipes. Customers and staff are generally exposed to these onsite emissions for a short period of time only.

#### 4.6.3.4 Pesticide/Herbicide Use

According to Management, no pesticides or herbicides are used onsite.

#### 4.6.3.5 Potentially Hazardous Materials

Currently, no guidelines have been implemented by the Environmental Council of Zambia defining specific materials or chemicals as hazardous. Application of the term "hazardous" is generally based on specific characteristics of a substance or constituent such as ignitability, corrosivity, reactivity, and toxicity. Depending on the concentration of the constituent in sludges, soil, surface water, or groundwater, the constituent may or may not be considered hazardous.

Materials onsite such as the petroleum products and stormwater runoff may potentially contain specific constituents at levels that could be identified as hazardous and regulated once guidelines are enacted. Fuels at the site contain lead, benzene, ethyl benzene, toluene, and xylenes. Applying regulations adopted by the United States Environmental Protection Agency these constituents potentially pose a threat to human health and the environment, based on ignitability, toxicity, and human carcinogenic risk (CAL EPA, 1992). Excessive levels of lead have been shown to retard the developmental growth of children while benzene is a known cancer causing compound.

#### 4.6.3.6 Waste Disposal

Waste produced at the Agip Kapiri Mposhi facility include septic tank sludges, waste oils, tires and tire repair chemicals, engine oil, rust sealant, radiator fluids, fire extinguisher powder, welding equipment, battery acid, and various car washing detergent and garbage. The sewage from the bathrooms flow into the septic tank where the solids settle out and the liquids move to the Soakaway, where according to Mr Lwenje, it drains into the subsurface strata (Section 7, Figure 2). Solids accumulated in the septic tank have not been removed since the facility began operations.

Waste oil is collected in the Oil Catch Basin. According to Mr Ziba, the Catch Basin is cleaned out and the oil placed in drums and taken offsite to the Kapiri Council. There is no evidence of oils spills at this facility.

The garbage generated at the site is collected and disposed of in bins, that when full, are taken by LK Transport, trucks to a Kapiri Council dump site. One truckload per week is generated at the Agip Kapiri Mposhi filling station. Paper garbage and packaging is burned at the site.

site. One truckload per week is generated at the Agip Kapiri Mposhi filling station. Paper garbage and packaging is burned at the site.

#### 4.6.3.7 Underground/Aboveground Storage Tanks

There are a total of 6 underground storage tanks (USTs) located at the Agip Kapiri Mposhi site. The six USTs are located on a vertical line running north-south on the eastern side of the facility, and contain petrol (2 tanks), kerosene (1 tank) and diesel (3 tanks). (Section 7, Figure 2 and Section 8, Photograph 12). According to Mr Ziba, the six USTs were installed in September 1995, and are therefore less than a year old.

The USTs consist of two 10,000 liter tanks of petrol (super gasoline), one 10,000 liter of kerosene, and the three 10,000 liters of diesel. Typical Agip construction details for the USTs are attached in Appendix F.

According to Mr Kapdi and Mr Ziba, fuel volumes in the USTs are monitored twice a day (morning and evening), 7 days per week, using a metered stick with dip wax. The metered records were not available for review by PH Associates.

No leaks from the USTs were reported by Management. Any suspected leaks are checked by Agip using the water pressure method of testing. The six USTs are less than a year old. Dip stick monitoring has an approximate accuracy of 1 to 2 % of the total tank volume.

Two new USTs for petrol (leaded super gasoline) are proposed for construction at the south side of the filling station.

#### 4.6.3.8 Releases/Spill Controls

Minor spills occur at the pump stations from car/truck leaks of the gas nozzle. The locations where the onsite spills occur are paved, and surface water runoff eventually carries the petroleum spills offsite to the subsurface strata, since, according to Mr Lwenje, the facility is not connected to the Kapiri Mposhi Council.

## 4.7 Applicable Environmental Regulations

A summary of the applicable environmental regulations for Zambia are presented in Table 2 of Appendix D. Based on review of these regulations, the Agip-Great East Road facility is:

- illegally discharging wastewater containing some petroleum products as stormwater runoff directly into the subsurface strata
- illegally transporting solid wastes (including oil from the vehicle maintenance/service area)
- illegally disposing of potentially hazardous waste (oil from the vehicle maintenance/service area) at the Kapiri Council, if this dump site is not an ECZ licensed facility.
- illegally burning wastes on site

The Water Pollution Control (Effluent And Wastewater) Regulations of 1993, require a license to discharge wastewater that may pollute the environment. The conditions of the

license include: discharge record keeping, weekly sampling and testing of the wastewater, and submission of a bi-annual report to ECZ. The discharged wastewater must meet the standards (limits) for parameters listed in Table 3 of Appendix D. In addition, the discharger has 12 hours to report any abnormal wastewater discharges (above limits) to ECZ.

The Waste Management (Licensing of Transporters of Wastes and Waste Disposal Sites) Regulations of 1993, require a license to transport solid wastes offsite.

Pursuant to the Environmental Protection and Pollution Control Act of 1990, it is illegal to dump or burn waste anywhere but at a licensed disposal facility.

## 5. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are presented addressing areas of environmental concerns at the Agip Kapiri Mposhi facility based on the findings of the environmental assessment.

- Pursuant to the Water Pollution Control Regulations of 1993, wastewater containing petroleum fuel is being discharged illegally through stormwater runoff into the Kapiri Mposhi Council system.
- Contrary to the Environmental Protection and Pollution Control Act of 1990, wastes are being burned and buried at the site.
- No transformers are located onsite.
- Agip lacks an environmental and procedures plan detailing storage, handling, cleanup, and disposal procedures for the facility, particularly for solid and liquid wastes.
- Based on the field reconnaissance of the area surrounding the facility, neighboring residential, industrial and commercial sites could also have septic systems and use inadequate waste disposal methods which could potentially adversely affect the environmental conditions at the site.

### PH Associates recommends that

- Agip investigate the pre-treatment sewage facility at Tazara to adequately have the sewage from the Agip Kapiri-Mposhi properly treated before disposal in the Kapiri Council system. The investigation should include testing, removal and proper disposal of all at the site.
- Agip should acquire a license from the Environmental Council of Zambia to discharge wastewater containing petroleum. Oily water generated at the site needs to be properly collected in a tank/container, treated, and disposed of, so as not to potentially contaminate underlying soil and groundwater.
- Agip must immediately stop illegal burning waste on site.
- Agip must immediately stop illegal transport of solid waste from the facility, or have I K Transport acquire a license to transport these wastes.
- Agip develop and implement an environmental safety and procedures plan detailing storage, handling, monitoring, cleanup, and disposal procedures for the facility to minimize potential adverse effects to the environment in the future.
- Agip maintain inventory and waste disposal records specifically listing the types and quantities of chemicals, fuels, oils, and materials brought onsite and materials recycled or disposed of and their disposal locations. This "cradle-to-grave" tracking of materials should be incorporated into the environmental safety and procedures program.

## 6. REFERENCES

### **CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY**

Toxic-Related Chemical List Cross Index, May 1992 (based on 14 US Federal and State Government Programs)

### **GOVERNMENT OF ZAMBIA**

The Environmental Protection and Pollution Control Act, No 12 of 1990

### **GOVERNMENT OF ZAMBIA**

The Mines and Minerals Act, 1976, Chapter 329 of the Laws of Zambia

### **GOVERNMENT OF ZAMBIA**

The Mining (Dumps) Regulations, 1972, Chapter 329 of the Laws of Zambia, Section 132

### **GOVERNMENT OF ZAMBIA**

The Waste Management (Licensing of Transporters of Waste and Waste Disposal Sites) Regulations, 1993 - Statutory Instrument No 71 of 1993, The Environmental Protection and Pollution Control Act No 12 of 1990

### **GOVERNMENT OF ZAMBIA**

The Water Pollution Control (Effluent and Wastewater) Regulations, 1993 - Statutory Instrument No 72 of 1993, The Environmental Protection and Pollution Control Act No 12 of 1990

### **LWENJE S**

Chief Engineer, Agip Head Office, P O Box 32353, Lusaka, Zambia; telephone 242975; Personal Interview, April 13, 1995

### **KAPDI, L**

Owner, Agip Kapiri Mposhi Facility, Personal Interview, April 26, 1995

### **NORTHERN RHODESIA GEOLOGICAL SURVEY**

The Geology and Groundwater Resources of the Lusaka Area, Report No 16 of 1963, J G Simpson, A R Drysdall, and H H J Lambert

### **REPUBLIC OF ZAMBIA**

The Water Act, 1949, Chapter 312 of the Laws of Zambia

**REPUBLIC OF ZAMBIA GEOLOGIC SURVEY DEPARTMENT**

1979; Topographic Map of Kapiri Mposhi Area, Series ZS51, Sheet 1328 D3, Lusaka, Zambia

**REPUBLIC OF ZAMBIA GEOLOGIC SURVEY DEPARTMENT**

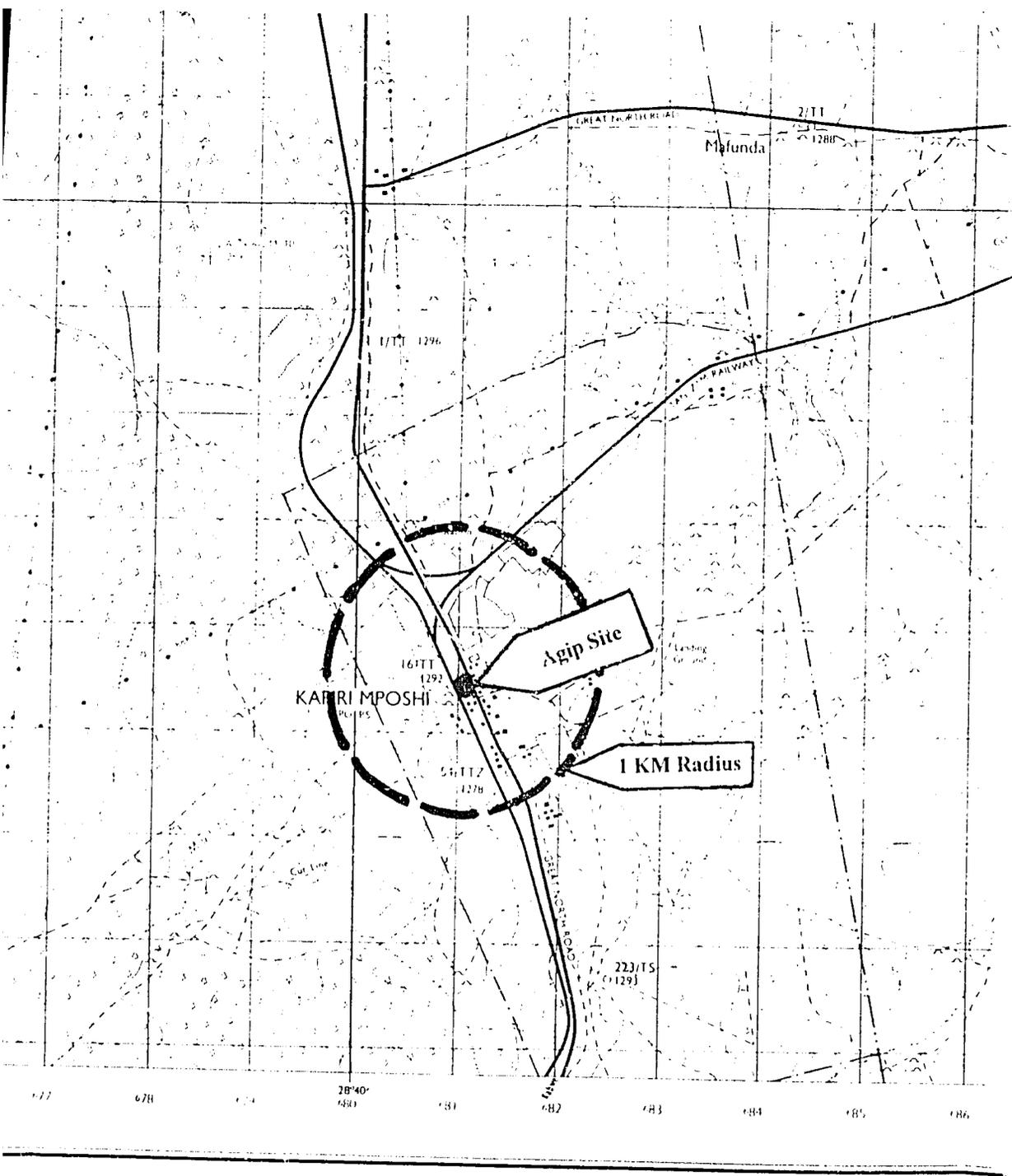
1969; The Kapiri Mposhi Glass Sand, Economic Report No. 24,

J Wroblecki, Lusaka, Zambia

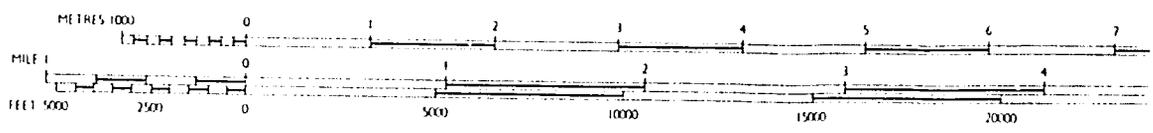
**ZIBA, C**

Manager, Agip Kapiri Mposhi Facility, Personal Interview, April 26, 1995

## **7. FIGURES**



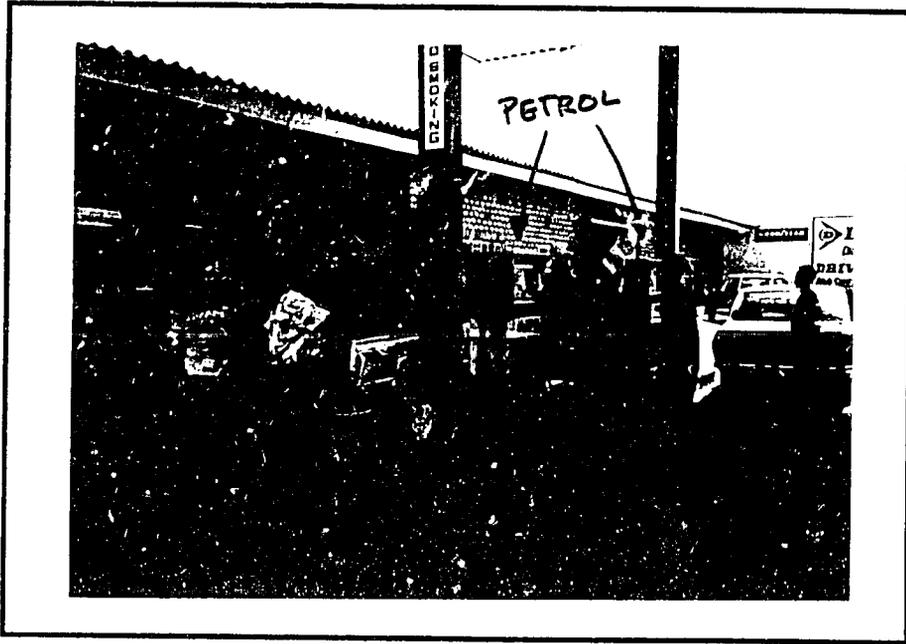
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**Figure 1**  
**Site Location Map**  
**Agip - Great North Road**  
**Kapiri Mposhi, Zambia**

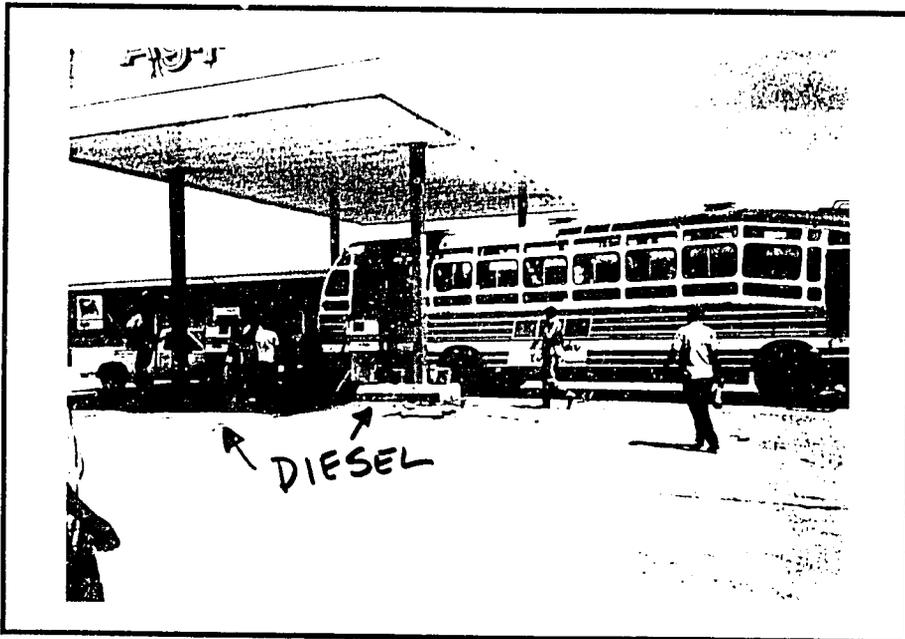
147

## 8. PHOTOGRAPHS



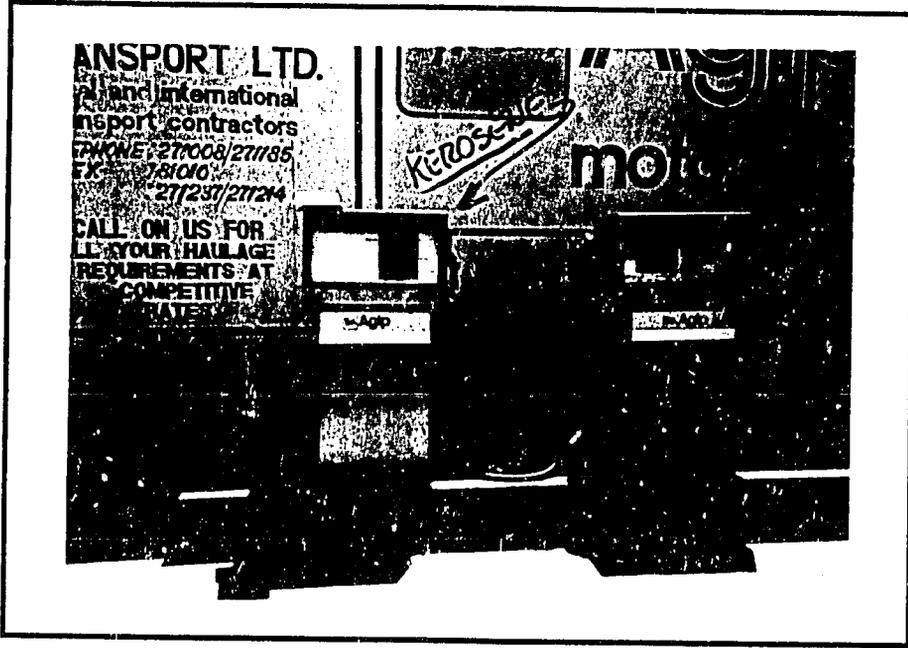
Photograph 1

PETROL FILLING PUMPS



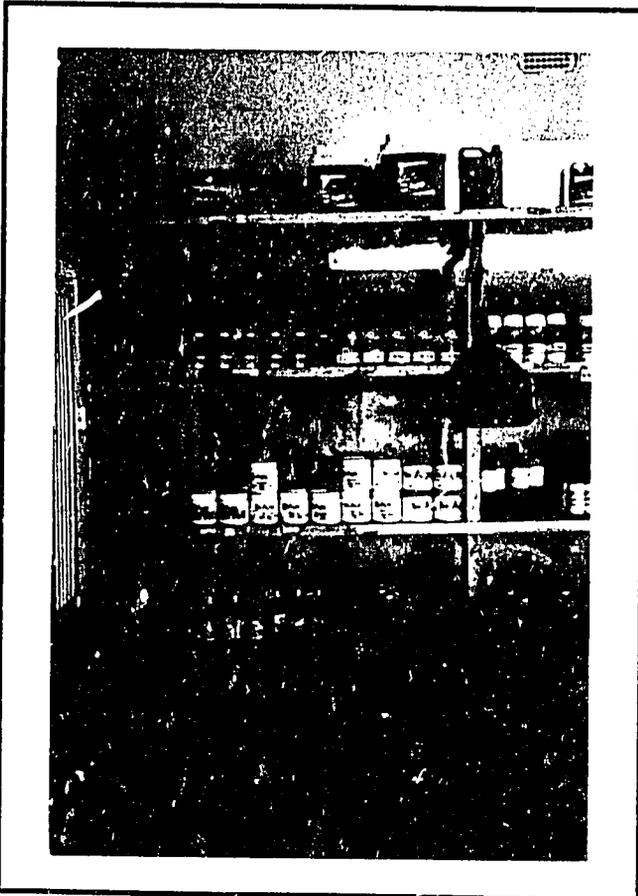
Photograph 2

DIESEL FILLING PUMPS



Photograph 3

KEROSENE AND DIESEL TANKS



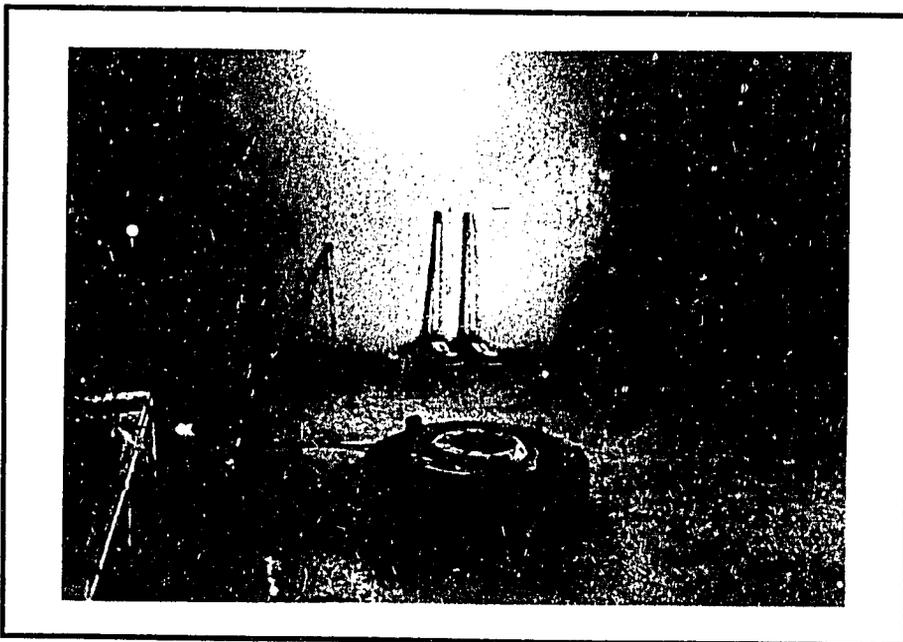
Photograph 4

AUTO SUPPLIES SHOP - RETAIL OF AUTOMOTIVE FLUIDS SUCH AS BATTERY ACIDS, ENGINE CLEANERS AND COOLANTS, RADIATOR SEALANTS, ETC



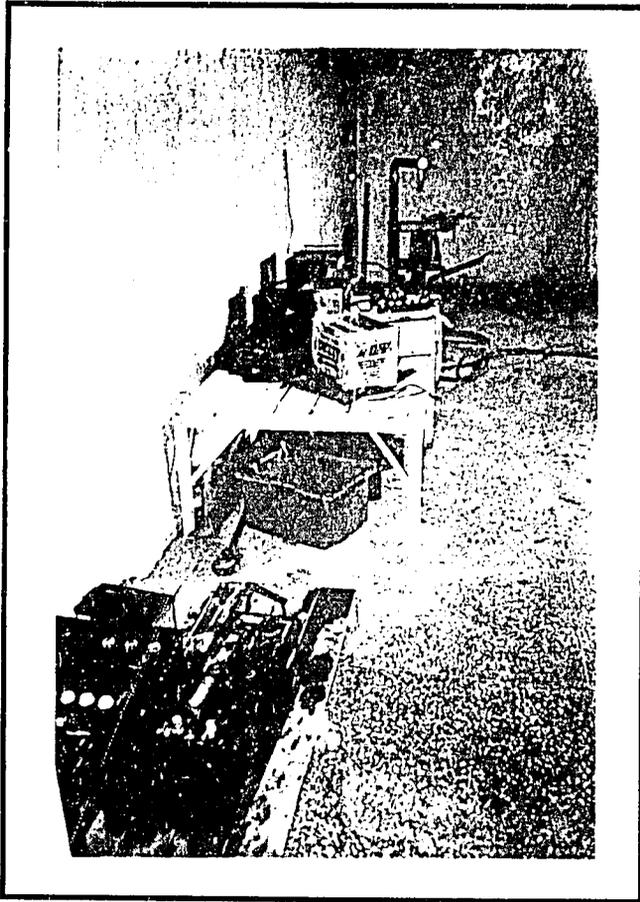
Photograph 5

AUTO SPARES SHOP - RETAIL OF VEHICLE MAINTENANCE SUPPLIES AND SPARE PARTS



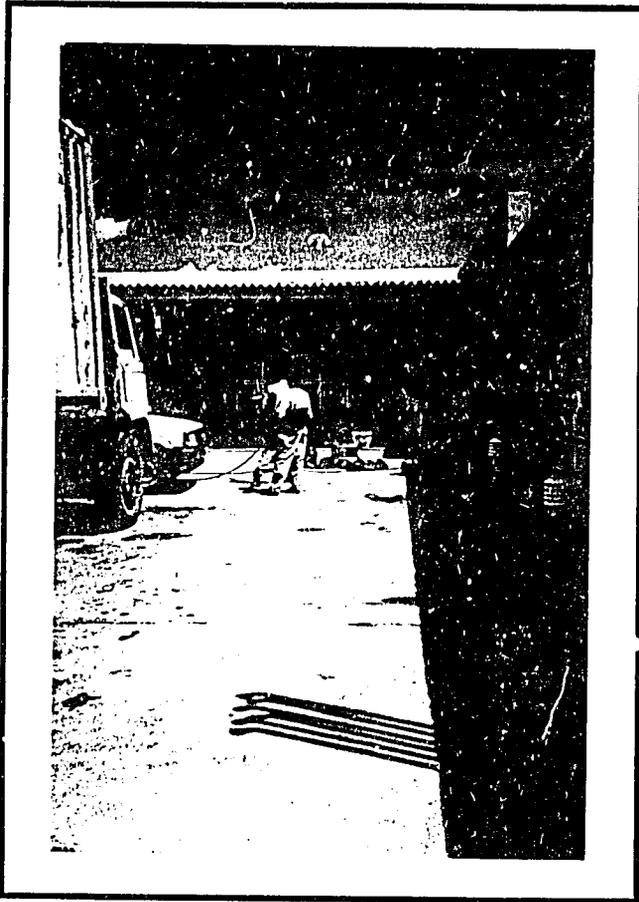
Photograph 6

AUTO WORKSHOP - TIRE MENDING SERVICES



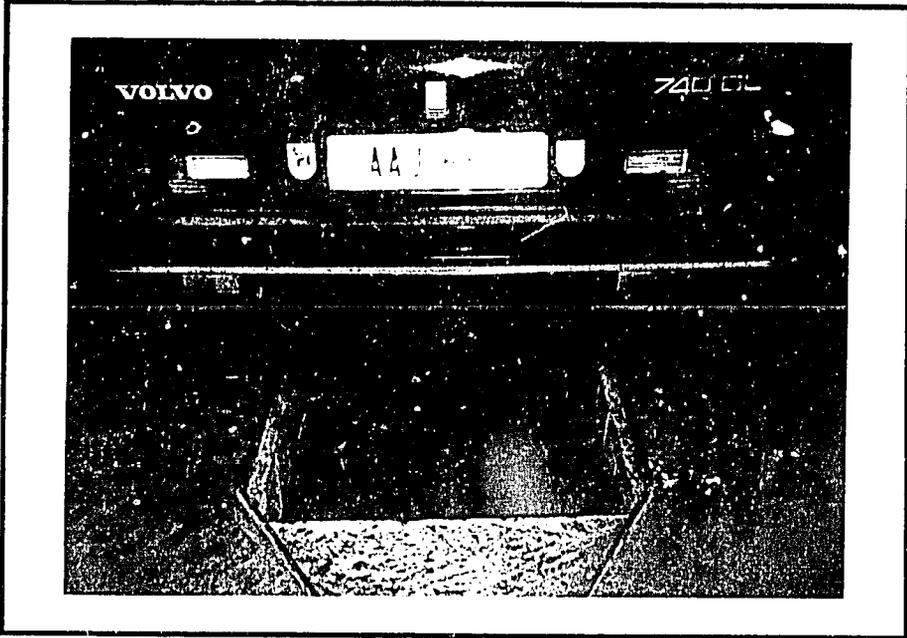
Photograph 7

AUTO WORKSHOP - BATTERY CHARGING SERVICES



Photograph 8

VEHICLE MAINTENANCE AREA - FLATS/BATTERY REPLACEMENT/WHEEL ALIGNMENT AREA



Photograph 9

VEHICLE MAINTENANCE AREA - SERVICE PIT



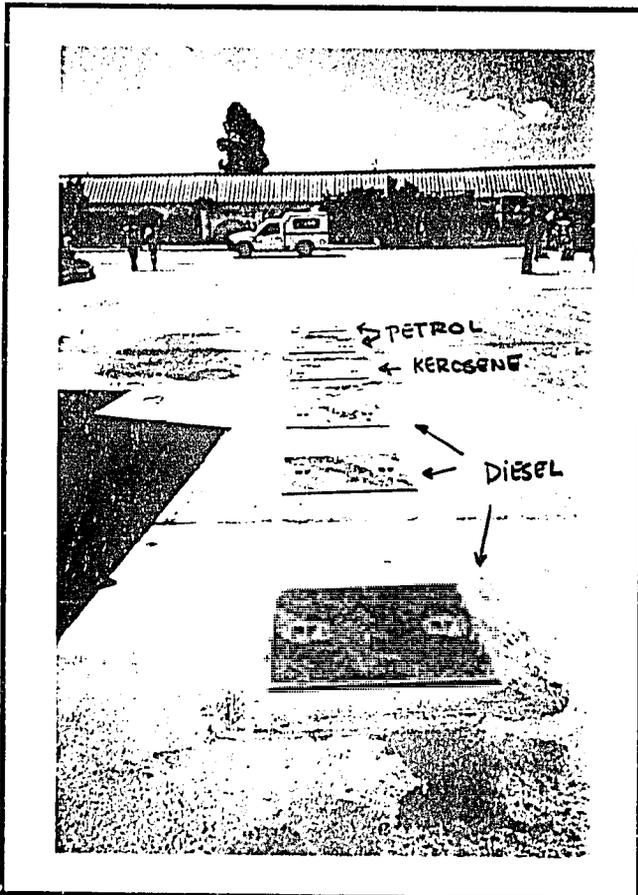
Photograph 10

MINI MARKET



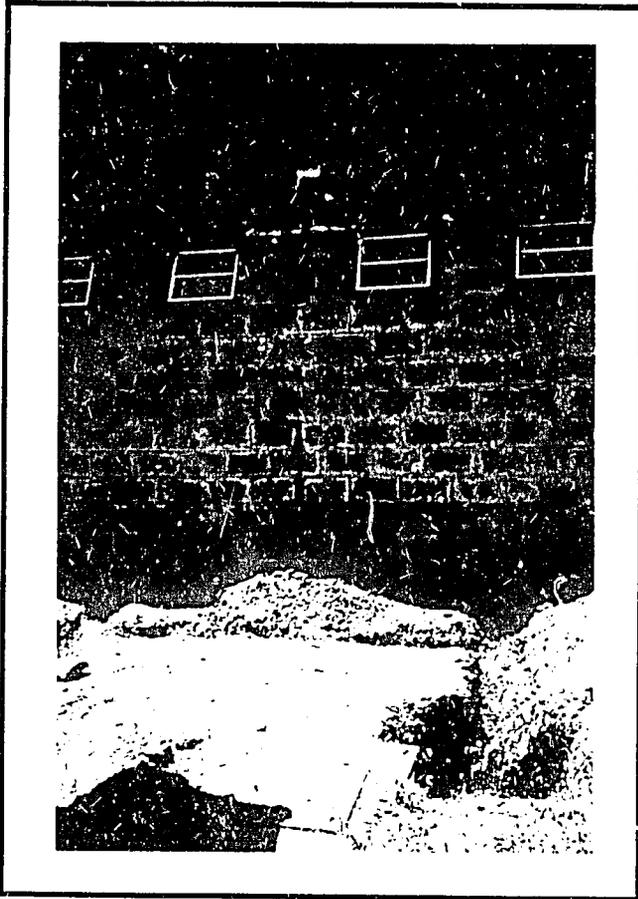
Photograph 11

TAKE-AWAY



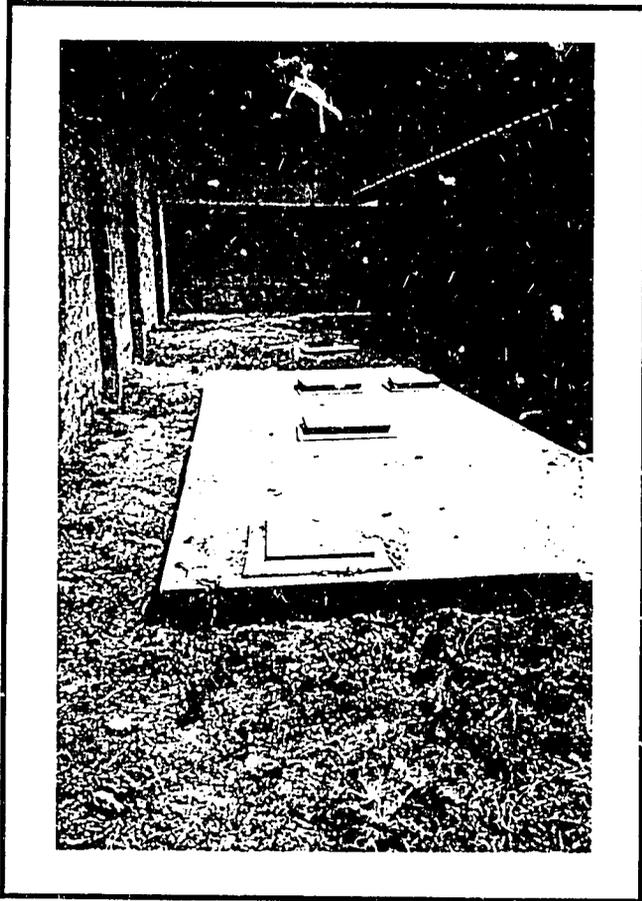
Photograph 12

USE AREA ON THE EASTERN SIDE OF THE FACILITY



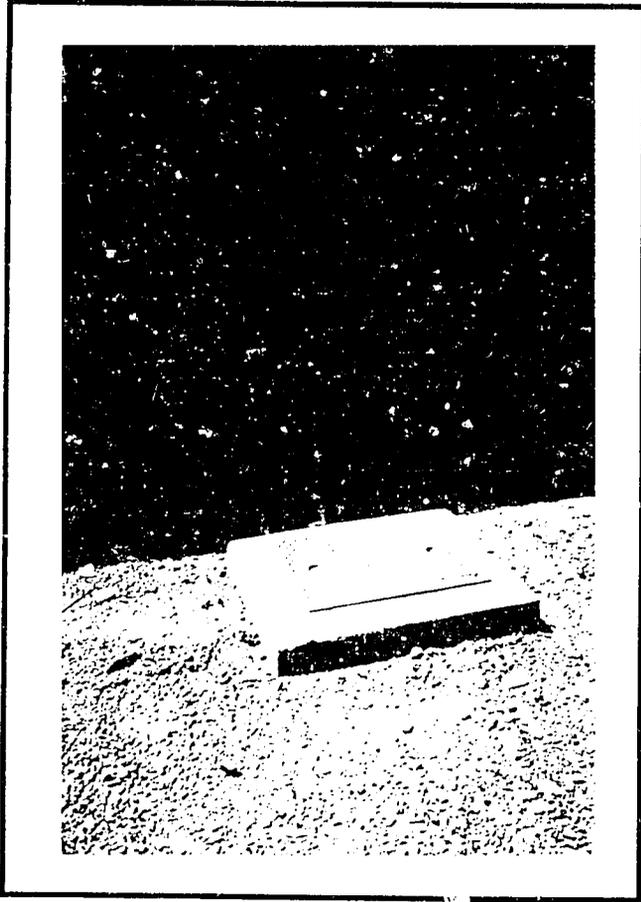
Photograph 13

FUTURE SITE FOR WATER HOLDING TANK



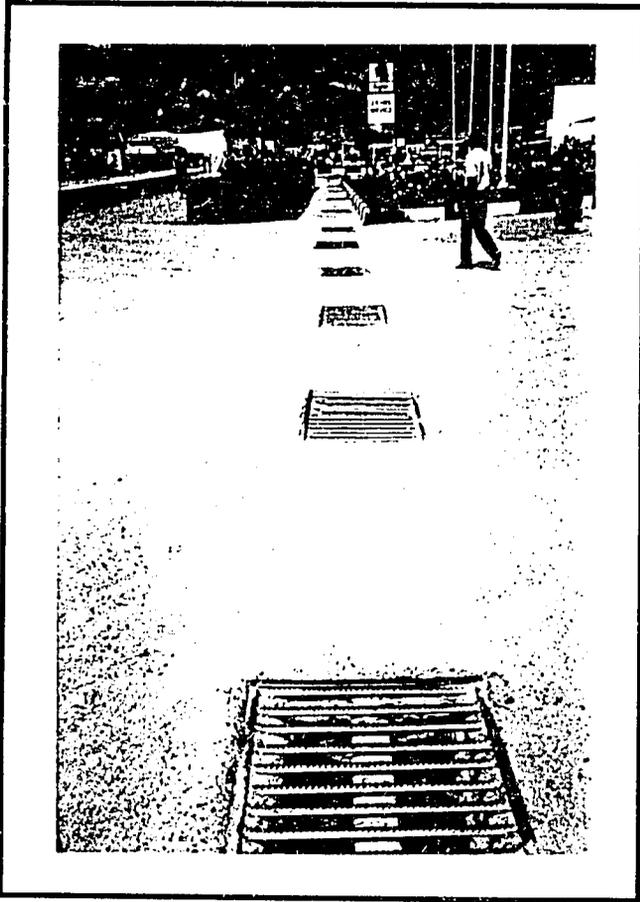
Photograph 14

SEPTIC TANK FIELD



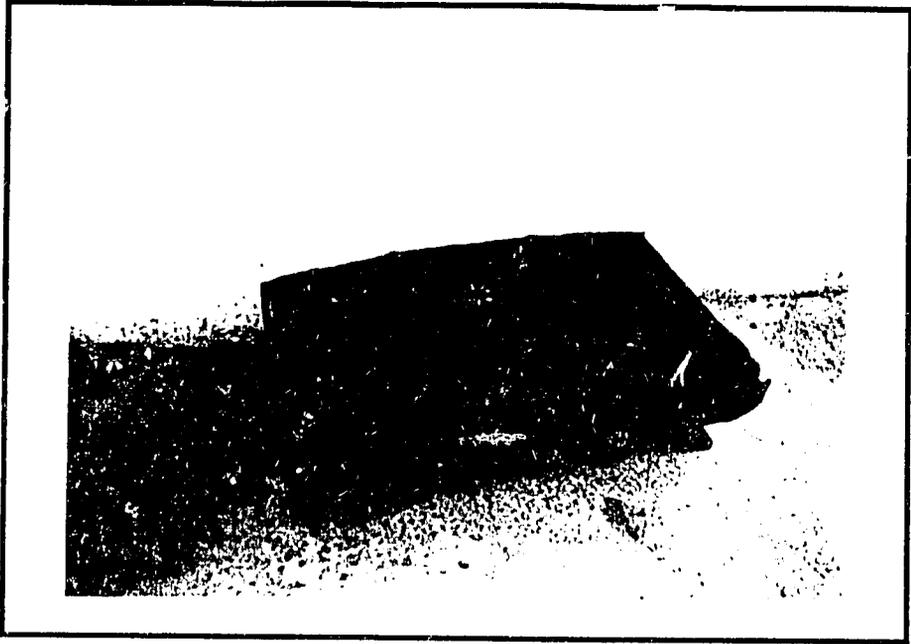
Photograph 15

CONNECTION TO SUPER TANK BEHIND THE MANAGER'S OFFICE.



Photograph 16

STORMWATER DRAINS



Photograph 17

OIL CATCH BASIN - VEHICLE MAINTENANCE SERVICING AREA

## **9. APPENDICES**

**Appendix A**  
**ZPA QUESTIONNAIRE**

**NO ZPA QUESTIONNAIRE  
WAS RETURNED FOR THIS FACILITY**

**Appendix B**  
**PH ASSOCIATES QUESTIONNAIRE**

**NO PH ASSOCIATES QUESTIONNAIRE  
WAS RETURNED FOR THIS FACILITY**

**Appendix C**  
**MINISTRY RECORDS, REVIEW AND INTERVIEWS**

## MINISTRY REVIEWS AND INTERVIEWS

PH Associates interviewed Ministry personnel and other pertinent organizations to discuss the current state of environmental affairs and regulations in Zambia. Ministry records pertaining to assessed sites were requested, however, minimal data was acquired because many of the environmental Ministries are either relatively new and have limited records or there is a lack of funding for the environmental programs and inspections. A more detailed discussion of the environmental regulations for Zambia are presented in Appendix D and a summary of interviews are discussed below.

### ENVIRONMENTAL COUNCIL OF ZAMBIA

Mr Julius Kanyembo - Director

Mrs I Mbewe - Legal Officer

On April 13, 1995, Ms Elena Pomar/PH Associates visited Mr Julius Kanyembo, Director of the Environmental Council of Zambia (ECZ). Information on the enforcement of the regulations was obtained on April 24, 1995 from Mrs Mbewe, Legal Officer for the Environmental Council of Zambia. The ECZ was started in 1990 to develop and implement regulations under the Environmental Protection and Pollution Control Act, but it was not functionally operating until June 1992. Legislation and regulations on water pollution control, waste management, environmental impact assessments were recently enacted in 1993 and 1994 and are currently in the process of enforcement. Inspection and site assessments have been conducted in very limited, selected cases. No enforcement activities have been conducted for the Pesticides and Toxic Substances Regulations. Regulatory policy and resolutions are currently being drafted on air pollution and wetlands management. The Environmental Council has set the following regulations in place under the Environmental Protection and Pollution Control Act of 1990:

#### The Water Pollution Regulations, 1993

These regulations determine the type and amount of effluent that can be discharged from a site and permit requirements.

#### The Waste Management Regulations, 1993

Requires licensing for transporters of solid and hazardous waste and for operators of waste disposal facilities.

#### Environmental Impact Assessment Regulations, 1994

These regulations require an environmental evaluation and licensing for new project developments, repairs, and expansion to existing projects.

#### The Pesticides and Toxic Substances Regulations, 1994

Requires registration with ECZ if manufacturing or importing/exporting a new pesticide or toxic substance.

The ECZ has very limited documentation on contaminated sites or industrial discharges since the Council was only established in 1990.

MINISTRY OF ENERGY AND WATER DEVELOPMENT

Mr Stan Chisala - Senior Engineer Water Affairs

On April 18, 1995, Ms Pomar visited Mr Stan Chisala, Senior Engineer of the Water Affairs Department (WA), in the Ministry of Energy and Water Development. The WA was established by the Water Act of 1949, which provides for the control, ownership, and use of water. Mr Chisala stated that the Ministry does not keep any environmental pollution records for any industry in Zambia.

PH Associates was provided with a copy of the November 1994 National Water Policy issued by the Ministry of Energy and Water Development. This document serves as a guide to conservation management, demand, and supply of water resources in the country. The National Water Policy, however, has no specific policy regarding contamination or water quality control by major industries, including the Council water supply.

The Water Supplies and Water Resources Management Division of WA is expected to have a program in place within a year to monitor the quantity and quality of groundwater boreholes. Enforcement of this program will be made by the Environmental Council of Zambia. Water Affairs also hopes to have the funding to do more adequate monitoring of boreholes for bacteriological analysis in the future. They currently have a chemist to conduct sampling and analysis but these activities have not been performed due to lack of funding.

Mr Chisala discussed some of WA's concerns about industrial and domestic wastewater discharges into some of the major surface water bodies of Zambia. Industries such as textile mills, tanneries, fertilizer producers, breweries and domestic sewage are of great concern in the potential contamination of rivers. Solid waste was also pointed out to be a potential contamination problem in Zambia since most of the municipal councils do not have designated areas for the disposal of these wastes. Wastewater drainage was discussed as being inadequate since the problem of stagnation is present throughout the industrial and urban areas of the country.

MINISTRY OF LABOR AND SOCIAL SECURITY

Mr K Mapani - Chief Inspector of Factories

Mr Kakoma Chivundu - Inspector of Factories

Mr Lukwesa - Inspector of Factories

Mr K Mapani, Chief Inspector of Factories for the Ministry of Labor and Social Security, was interviewed on April 20, 1995, by Ms Pomar to request available information on the sites where environmental assessments are to be conducted by PH Associates. There is approximately 10 years of available data for facility site inspections at the Ministry of Labor and Social Security. Mr Mapani stated that his office is basically concerned with inspections of factory sites where accidents or complaints have been filed.

The Chief Inspector of Factories currently has approximately 364 factory/industrial sites entered into a database, and a series of old reports. A database template was prepared for each site and includes a workplace number, industry classification and various parameters on Worker Health and Safety. The database was found to be poorly maintained and apparently the best information is found in the original site inspection reports. According to Mr Mapani, the department is currently understaffed by about 50%, thus regular visits to all facilities are difficult to perform.

On April 28, 1995, Ms Pomar met with Mr Kakoma Chivundu and Mr Lukwesa, both Factory Inspectors. PH Associates were provided with site inspection reports for several sites where environmental assessments will be performed. These are summarized in the individual reports, where applicable. Typical problems that are encountered during their site inspections include old and outdated machinery that can cause accidents, lack of maintained fire extinguishers, and noise and air quality problems.

MINISTRY OF MINES AND MINERALS DEVELOPMENT

Mr O Mg'ambi - Acting Director of Geological Survey Department  
Mr Clement Namateba - Senior Geologist (PGR), Geological Survey

PH Associates met with Mr O Mg'ambi, Acting Director and Mr Clement Namateba, Senior Geologist of the Geological Survey Department to discuss the regional geologic and hydrogeologic setting of Zambia. A listing of available geologic and hydrogeologic reports and maps were provided by the Department, and those covering the sites to be assessed were purchased.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

Mr Gedion Nkojo - Resident Representative, World Bank  
Mr Julius Chileshe - National Resource Economist, World Bank

On April 24, 1995, Ms Pomar met with Mr Gedion Nkojo, Resident Representative and Mr Julius Chileshe, National Resource Economist of the World Bank to request any information regarding historical data for the sites where environmental assessments are to be conducted. Mr Nkojo and Mr Chileshe stated that there was no specific environmental information for the sites.

The importance of having a unified and more focused plan for addressing environmental concerns in the country on behalf of the Government of Zambia (GOZ), NGOs (Non-Government Organizations), International Development Organizations (such as World Bank, UNDP, African Development Bank, etc), and other donor countries, was discussed at great length. The World Bank is presently working on an Environmental Support Program to be included in the National Environmental Action Plan for the Secretariat of the Ministry of Environment and Natural Resources.

**Appendix D**  
**ENVIRONMENTAL REGULATIONS OF ZAMBIA**

## ENVIRONMENTAL REGULATIONS OF ZAMBIA

As part of the PH Associates scope of work, legislative Policies, Acts, and Regulations enacted by Zambia were reviewed for their applicability to completing environmental assessments of the enterprises identified by the ZPA for privatisation. The purpose of the review was to evaluate and summarize those guidelines pertaining to environmental issues which industries in Zambia are required to adhere. The industries to be assessed include food, agricultural and livestock farmlands, pharmaceutical drug, textile, sawmilling, storage and transportation, construction and engineering, mining and petroleum.

Regulations addressing the protection of human health and the environment have only recently been enacted in any detail. Prior to the passing of the Environmental Protection and Pollution Control Act of 1990 and the establishment of the Environmental Council of Zambia, legislation mostly addressed issues of worker health and safety.

Twelve regulations were selected for review based on their potential applicability to the assessed sites, and are listed in Table 1. Six of these regulations address environmental issues concerning air, soil, and water pollution and include:

- Water Act of 1949
- Environmental Protection and Pollution Control Act of 1990
- Water Pollution Control Regulation of 1993
- Waste Management Regulations of 1993
- Mining (Dumps) Regulations of 1972
- Mines and Minerals Act of 1976

These regulations are summarized in Table 2 and used to evaluate the environmental compliance of the facilities assessed by PH Associates. Of the six regulations listed above, the first four comprise the majority of established environmental legislation and are applicable to most of the assessed industries.

**TABLE 1  
ENVIRONMENTAL REGULATIONS AND  
ENFORCING MINISTRIES OF ZAMBIA**

<b>Policy, Act, or Regulation</b>	<b>Year Adopted</b>	<b>Responsible Ministry</b>
Water Act	1949	Ministry of Energy and Water Development (Water Board)
National Water Policy	1994	Ministry of Energy and Water Development
Environmental Protection and Pollution Control Act	1990	Environmental Council of Zambia
Water Pollution Control (Effluent and Wastewater) Regulations	1993	Environmental Council of Zambia
Waste Management (licensing of Transporters of Wastes and Waste Disposal Sites) Regulations	1993	Environmental Council of Zambia
Pesticides and Toxic Substances Regulations	1994	Environmental Council of Zambia
Environmental Impact Assessment Regulations	1994	Environmental Council of Zambia
Petroleum Act	1930	Ministry of Energy and Water Development (Department of Energy)
Petroleum (Exploration and Production) Act	1985	Ministry of Energy and Water Development (Department of Energy)
Agricultural (Fertilizers and Feed) Act	1990	Ministry of Agriculture
Mining (Dumps) Regulations	1972	Ministry of Mines and Minerals Development
Mines and Minerals Act	1976	Ministry of Mines and Minerals Development

**TABLE 2**  
**APPLICABLE ENVIRONMENTAL REGULATIONS**  
**OF ZAMBIA**

ACT OR REGULATION	APPLICABLE REGULATIONS
<b>The Water Act 1949</b>	<ul style="list-style-type: none"> <li>• Any person(s) shall have the right to the primary use of public water which is found in its natural channel where access is lawful.</li> <li>• A person(s) must have permission from the Water Board (WB) to impound, store, or divert water from a public stream for primary (drinking), secondary (irrigation), or tertiary (mechanical or industrial) use.</li> <li>• Any land owner must have permission from WB for use of private water supply.</li> <li>• Local authorities must get permission from WB to use public water for primary or tertiary use.</li> <li>• Any person(s) who willfully or through negligence pollutes or fouls any public water so as to render it harmful to man, beast, fish, or vegetation, shall be guilty of an offense.</li> </ul>
<b>The Environmental Protection and Pollution Control Act 1990</b>	<p><u>Water Regulations</u></p> <ul style="list-style-type: none"> <li>• No person may discharge (directly or indirectly), poisonous, toxic, obnoxious or obstructing matter, radiation or other pollutants into surface or groundwater bodies.</li> <li>• Industrial/trade owners or operations that discharge effluent from the facility into existing sewage system must obtain written permission from the local authority.</li> <li>• Local authority sewage systems may impose special conditions (ie pretreatment) to facilities that discharge effluent into their system.</li> <li>• Effluent may be mixed for treatment prior to discharge or for conveyance to common point of discharge.</li> <li>• No local authority sewage system or industry/trade shall discharge (directly or indirectly) effluent into surface water or groundwater environment without a license. Any changes to the type, quantity of pollutant, or discharge location must be authorized by the Inspectorate.</li> </ul> <p><u>Waste Regulations</u></p> <ul style="list-style-type: none"> <li>• No person(s) shall discharge waste so as to cause pollution in the environment. Based on the interpretation of this regulation by the ECZ, it is illegal to dump or bury waste anywhere but at a licensed disposal facility (no backyard dumping).</li> <li>• No person(s) shall transport waste to any site other than a licensed disposal facility.</li> <li>• Any person(s) intending to operate a waste disposal plant or generate hazardous waste must have a license.</li> <li>• No person(s) shall import any hazardous waste into Zambia.</li> <li>• No hazardous waste shall be exported to any country without a Council (ECZ) permit and consent of receiving country.</li> <li>• No hazardous waste shall be transported within or through Zambia without a Council permit.</li> </ul>

ACT OR REGULATION	APPLICABLE REGULATIONS
<p><b>Water Pollution Control Regulations of 1993</b></p>	<p><u>License to Discharge Wastewater</u></p> <ul style="list-style-type: none"> <li>• All commercial, municipal, and industrial facilities must possess a license to discharge wastewater that may pollute the environment.</li> <li>• Keep facility records of the licensed activities.</li> <li>• Conduct weekly sampling and testing of discharged wastewater at locations designated by ECZ Inspectorate.</li> <li>• The quality of wastewater discharged must meet the conditions and standards for all parameters contained in Table 3. If any wastewater test results exceed these standards, they must be reported to the Inspectorate within 12 hours.</li> <li>• Monitor the volume of wastewater discharged from the site using a metering device.</li> <li>• Submit bi-annual reports to the ECZ Inspectorate including the mean monthly test analyses results and mean monthly volume of wastewater being discharged.</li> </ul> <p><u>License to Withdraw Water</u></p> <ul style="list-style-type: none"> <li>• Facilities must possess a license to withdraw water from a watercourse for the purpose of diluting effluent.</li> <li>• The source of water being withdrawn would not significantly affect the water course.</li> <li>• The license holder must treat effluent so there are no adverse effects to the surface and groundwater environment.</li> <li>• The license holder must keep a record of licensed activities and provide a report to ECZ Inspectorate every six months.</li> <li>• The license holder must conform to all the following wastewater discharge regulations.</li> </ul>
<p><b>Waste Management Regulations 1993</b></p>	<ul style="list-style-type: none"> <li>• All commercial, municipal, or industrial facilities must possess a license to transport solid wastes offsite.</li> <li>• During loading and transport, wastes cannot be scattered, flowing out, or emitting bad smells.</li> <li>• Vehicles must transport wastes along approved, scheduled routes.</li> <li>• Transporter license may be valid from 6 months to 3 years depending on the transporters compliance with these regulations.</li> </ul>
<p><b>The Mining Regulations 1972</b></p>	<ul style="list-style-type: none"> <li>• Supervise/inspect site for the prevention of pollution of the surroundings or abatement of any nuisance.</li> </ul>
<p><b>The Mines and Minerals Act 1976</b></p>	<ul style="list-style-type: none"> <li>• Avoidance of wasteful mining practices or wasteful metallurgic practices.</li> <li>• Any effluent water discharged from any treatment or other process at a mine must comply with the provisions of the Water Act.</li> </ul>

## THE WATER ACT

### Chapter 312, Adopted 1949, Amendments up to 1970

The Water Act provided the initial guidance for the control, ownership, and use of water in Zambia. This Act established the Water Board (WB) in the Ministry of Energy and Water Development.

The purpose of the Water Board is to supervise all public streams in Zambia, protect the source of water streams, maintain and improve streams, and help prevent unlawful acts (polluting) of streams. The Act does not apply to the Zambezi, Luapula, and part of the Luangwa River.

### Applicable Regulations

The Act provides for some basic laws on water rights, some of the regulations that may apply to the assessed sites include:

- Any person(s) shall have the right to the primary use of public water which is found in its natural channel where access is lawful.
- A person(s) must have permission from the WB to impound, store, or divert water from a public stream for primary (drinking), secondary (irrigation), or tertiary (mechanical or industrial) use.
- Any land owner must have permission from WB for use of private water supply.
- Local authorities must get permission from WB to use public water for primary or tertiary use.
- Any person(s) who willfully or through negligence pollutes or fouls any public water so as to render it harmful to man, beast, fish, or vegetation, shall be guilty of an offense.

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## NATIONAL WATER POLICY OF 1994

This policy discusses planning, implementation strategies, management, and development of water resources for Zambia, and was issued as an internal guidance document under the National Water Policy Development Initiative (Water Development Board) by the Ministry of Energy and Water Development. The Water Development Board proposes and amends existing legislation and enacts new legislation.

### Applicable Regulations

None. The policy does not provide any water regulations.

**THE ENVIRONMENTAL PROTECTION AND  
POLLUTION CONTROL ACT  
Act No 12, Adopted 1990**

This Act provides for the protection of the environment, the control of pollution, and the establishment of the Environmental Council of Zambia (ECZ). The ECZ consists of representatives from 25 different ministries, and formulates policies relating to environmental management of natural resources and the control of industrial and other sources of pollution. The Council reviews environmental government reports, conducts studies and promotes research, educates the public about environmental issues, and conducts other relevant tasks.

The Act includes regulations for water, air, waste, pesticides and toxic substances, noise, ionizing radiation, and natural resource conservation. Many of these regulations are the basis for the updated Water Pollution Control Regulations (1993), Waste Management Regulations (1993), Pesticides and Toxic Substances Regulations (1994), and Environmental Impact Assessment Regulations (1994).

This Act and the ECZ were initiated in 1990, although the Council was not fully operational until June 1992 (Appendix C). Since the ECZ is still a relatively new institution, air, hazardous and toxic waste, and noise standards have not been established.

### **Applicable Regulations**

The Act provides generalized regulations that are applicable to discharge of solid waste and wastewater pollutants into the environment.

#### Water Regulations

- No person may discharge (directly or indirectly), poisonous, toxic, obnoxious or obstructing matter, radiation or other pollutants into surface or groundwater bodies.
- Industrial/trade owners or operations that discharge effluent from the facility into existing sewage systems must obtain written permission from the local authority.
- Local authority sewage systems may impose special conditions (ie pretreatment) to facilities that discharge effluent into their system.
- Effluent may be mixed for treatment prior to discharge or for conveyance to common point of discharge.
- No local authority sewage system or industry/trade shall discharge (directly or indirectly) effluent into surface water or groundwater environment without a license. Any changes to the type, quantity of pollutant, or discharge location must be authorized by the Inspectorate.

### Air Regulations

Based on discussions with the ECZ (Appendix C), legislation and standards on air pollution are currently being drafted. A review of the air pollution section of this Act shows the following areas will be addressed:

- No person(s) will be allowed to emit any pollutants above emission standards (to be developed).
- Polluting facilities will be required to have licenses, conduct period air sampling and testing, and provide reports to the Inspectorate.

Until these regulations are completed and adopted, there are no applicable air emission requirements for Zambia.

### Waste Regulations

Waste handling regulations are found in more detail in the Waste Management Regulations (1993).

- No person(s) shall discharge waste so as to cause pollution in the environment. Based on the interpretation of this regulation by the ECZ, (personal communication with Michael Sankwe/ECZ), it is illegal to dump or bury waste anywhere but at a licensed disposal facility (no backyard dumping).
- No person(s) shall transport waste to any site other than a licensed disposal facility.
- Any person(s) intending to operate a waste disposal plant or generate hazardous waste must have a license.
- No person(s) shall import any hazardous waste into Zambia.
- No hazardous waste shall be exported to any country without a Council (ECZ) permit and consent of receiving country.
- No hazardous waste shall be transported within or through Zambia without a Council permit.

### Pesticides and Toxic Substances Regulations

Many of the regulations regarding pesticides and toxic substances relate to the manufacture, import or process of a "new" pesticide or toxic substance. Currently, there are no guidelines or standards defining specific materials or chemicals as toxic or hazardous.

### Noise Regulations

No noise regulations are specified in the Act because the ECZ has yet to establish noise emission standards and guidelines.

## THE WATER POLLUTION CONTROL (EFFLUENT AND WASTEWATER) REGULATIONS OF 1993

These regulations are part of the Environmental Protection and Pollution Control Act of 1990. The regulations require that any local authority intending to operate a sewage treatment system or owner/operator of any industry that discharges wastewater (directly or indirectly) into any surface water or groundwater environment must apply for a license through the Environmental Council of Zambia (ECZ). Person(s) must also have a license from ECZ to withdraw water from a watercourse for the purpose of diluting effluent.

ECZ has developed standards (limits) for 59 physical, bacteriological, chemical, organic, metal, and radioactive parameters. These parameters and standards are listed in Table 3. Discharged wastewater may NOT exceed these parameter standards.

### Applicable Regulations

These wastewater discharge regulations are applicable to many of the sites to be assessed. The following conditions of the licenses are most noteworthy, refer to the original regulation for more specific details.

#### License to Discharge Wastewater

- All commercial, municipal, and industrial facilities must possess a license to discharge wastewater that may pollute the environment.
- Keep facility records of the licensed activities.
- Conduct weekly sampling and testing of discharged wastewater at locations designated by ECZ Inspectorate.
- The quality of wastewater discharged must meet the conditions and standards for all parameters contained in Table 3. Any wastewater test results which exceed these standards, must be reported to the Inspectorate within 12 hours.
- Monitor the volume of wastewater discharged from the site using a metering device.
- Submit bi-annual reports to the ECZ Inspectorate including the mean monthly test analyses results and mean monthly volume of wastewater being discharged.

#### License to Withdraw Water

- Facilities must possess a license to withdraw water from a watercourse for the purpose of diluting effluent.
- The source of water being withdrawn would not significantly affect the water course.

- The license holder must treat effluent so there are no adverse effects to the surface and groundwater environment.
- The license holder must keep a record of licensed activities and provide a report to ECZ Inspectorate every six months.
- The license holder must conform to all the wastewater discharge regulations.

Parameter	Standards (Unit)
Temperature	40° C
Color	20 (Hazen units)
Odor and Taste	Threshold odor number
Turbidity	15 NTU
Total Suspended Solids	100 mg/L
Settleable Matter	0.5 mg/L
Total Dissolved Solids	3000 mg/L
Conductivity	4300 US/cm
Total Coliform	25000/100 ml
Fecal Coliform	5000/100 ml
Algae	1000 cells/100 ml
pH	6.0 - 9.0
Dissolved Oxygen	5 mg/L
Chemical Oxygen Demand	90 mg (average)
Biochemical Oxygen Demand (BOD)	50 mg/L (Mean Value)
Nitrates	20 mg/L lakes 50 mg/L (watercourse)
Nitrite (NO <sub>2</sub> as nitrogen)	2.0 mg/L
Organic Nitrogen	5.0 mg/L (Mean)
Total Ammonia and Ammonium (NH <sub>3</sub> )	10 mg/L
Cyanides	0.2 mg/L
Total Phosphorous (PO <sub>4</sub> )	1.0 mg/L
Sulfates	1500 mg/L
Sulfite	1.0 mg/L
Sulfide	0.1 mg/L
Chlorides	8000 mg/L
Active Chloride	0.5 mg/L
Active Bromine (Br <sub>2</sub> )	0.1 mg/L
Fluorides	2.0 mg/L
Aluminium	2.5 mg/L
Antimony	0.5 mg/L
Arsenic	0.05 mg/L
Barium	0.5 mg/L
Beryllium salts	0.5 mg/L
Boron	0.5 mg/L
Cadmium	0.5 mg/L
Total Chromium	0.1 mg/L
Cobalt	1.0 mg/L
Copper	1.5 mg/L
Iron	2.0 mg/L

Parameter	Standards (Unit)
Lead	0.5 mg/L
Magnesium	500 mg/L
Manganese	1.0 mg/L
Mercury	0.002 mg/L
Molybdenum	5.0 mg/L
Nickel	0.5 mg/L
Selenium	0.02 mg/L
Silver	0.1 mg/L
Thallium	0.5 mg/L
Tin	2.0 mg/L
Vanadium	1.0 mg/L
Zinc	10.0 mg/L
Total hydrocarbons	10.0 mg/L
Oils (Mineral and Crude)	5.0 mg/L
Phenols	0.2 mg/L (steam dist) 0.05 mg/L (non-steam dist)
Fats and saponifiable oils	20.0 mg/L
Detergents	2.0 mg/L
Total Pesticides and PCB's	0.5 mg/L
Trihaloforms	0.5 mg/L
Radioactive materials	Not permitted
<b>NOTE</b>	
See original Water Pollution Control Regulations and third schedule for standard and test method details.	

## WASTE MANAGEMENT (LICENSING OF TRANSPORTERS OF WASTES AND WASTE DISPOSAL SITES) REGULATIONS OF 1993

These regulations are part of the Environmental Protection and Pollution Control Act of 1990. The regulations only address the handling of "solid waste" generated by commercial, municipal, and industrial sites (personal communication, Michael Sankwe/ECZ). The regulations do not apply to hazardous or toxic substances, generated at commercial, municipal, industrial or household sites. They also do not apply to residential domestic solid wastes of less than 45 kg (99 pounds) per week, or to the transport of inert (construction) debris.

Person(s) who transport solid wastes or own / operate solid waste disposal facility must have a license from the Environmental Council of Zambia (ECZ) and comply with all Waste Management Regulations.

### Applicable Regulations

PII Associates will not be assessing any solid waste disposal sites, but will identify each of the assessed facilities method of solid waste disposal. The following regulations are applicable to the transporters of solid waste.

#### License to Transport Solid Waste

- All commercial, municipal, or industrial facilities must possess a license to transport solid wastes offsite.
- During loading and transport, wastes cannot be scattered, flowing out, or emitting bad smells.
- Vehicles must transport wastes along approved, scheduled routes.
- Transporter license may be valid from 6 months to 3 years depending on the transporters compliance with these regulations.

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## THE PESTICIDES AND TOXIC SUBSTANCES REGULATIONS OF 1994

This regulation is part of the Environmental Protection and Pollution Control Act of 1990 and applies to person(s) intending to manufacture, import, export, improve, or process a "new" pesticide or toxic substance. The regulation includes specifications on product handling, use, storage, disposal, labeling, packaging, and worker health and safety issues.

### Applicable Regulations

None. PH Associates will be assessing a pharmaceutical drug company that does not manufacture, import, export, improve, or process new pesticides or toxic substances.

## ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS OF 1994

These regulations are part of the Environmental Protection and Pollution Control Act of 1990. The regulations require that a project brief and environmental impact study be performed for any new project, extension, repair, or maintenance of an existing project. This is to determine whether a project may have adverse or other significant impacts on the environment. Some of the projects that may require an environmental impact study include transportation, dams, mines, forestry, agriculture, industrial facilities such as refineries, tanneries, mineral and lime processing, foundries, breweries, motor assemblers, food processing, electrical substitutions, gas or fuel storage, and solid or hazardous waste disposal site.

### Applicable Regulations

None. The environmental impact assessment regulations apply to new projects or existing projects where extension, repair, or maintenance occur. All facilities that PH Associates will assess are existing projects where there are changes occurring, or operations which are closing down.

**THE PETROLEUM ACT**  
**Chapter 424, Adopted 1930, numerous amendments up to 1969**

The Act regulates the importation, conveyance, and storage of petroleum and other inflammable oils and liquids. This includes all petroleum, coal, schist, shale or other bituminous by-products. The Act requires licensing to transport or possess dangerous petroleum (gasoline, diesel etc.) and other dangerous petroleum. Dangerous petroleum transported on a public road must be in suitable and secure vessels that are certified and licensed by the Road Traffic Commissioner.

Licenses are required for possession of dangerous petroleum (exceeding 44 gallons) stored in non-inflammable storage sheds. A 55 foot buffer zone should surround the shed, and no storage sheds must be spaced less than 3 feet apart. Petroleum tanks located outside of sheds must be fenced with a 50 foot buffer zone.

**Applicable Regulations**

None. The Petroleum Act deals mainly with safety requirements and does not address underground storage tank or environmental issues such as storage tank integrity, leaks, or proper abandonment of tanks. Therefore, the Act does not apply to air, soil, or water pollution issues.

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**THE PETROLEUM (EXPLORATION AND PRODUCTION) ACT  
No 13, Adopted 1985**

This Act regulates petroleum exploration, development, and production in Zambia. It establishes a Petroleum Committee that regulates titles, contracts, and the control of petroleum operations prior to the export or entry into a refinery.

**Applicable Regulations**

The Act does not apply to petroleum depots, refineries, or gas stations, which are the type of sites to be assessed by PII Associates.

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**THE AGRICULTURAL (FERTILIZERS AND FEED) ACT**  
**Chapter 351, Adopted 1990**

This Act regulates and controls the manufacture, processing, importation, and sale of agricultural fertilizers and farm feed. It also provides effectiveness and purity standards for fertilizers and feed.

**Applicable Regulations**

None. The Act does not address the usage or disposal of fertilizers and feed at agricultural and livestock farms and therefore does not apply to any of the assessed sites.

## THE MINING (DUMPS) REGULATIONS Chapter 329, Section 132, Adopted 1972

These regulations provide guidelines for the maintenance of mine dumpings (consisting of solid or liquid materials) such as proper water drainage and diversion, and generally keeping the dump site stable. A designated Chief Mining Inspector regulates changes relating to the design and nature of the mine dumpings and requires periodic reporting from the management.

### Applicable Regulations

The regulation does not address specific environmental issues on air, soil, and water pollution. There is one very general provision included in the regulation:

- Supervise/inspect site for the prevention of pollution of the surroundings or abatement of any nuisance.

**THE MINES AND MINERALS ACT**  
**Chapter 329, No 32 Adopted 1976**  
**Amendments in 1981, 1984, and 1992**

The Act determines the policy requirements for exploration, prospecting, and mining licenses and regulates the renewal and termination of mining rights. The amendments mainly deal with increased licensing, permit, and surveying fees. The Act requires proper sanitation and adequate water supply for workers, and many health and safety issues such as exposure and safe handling of inflammable, explosive, and radioactive materials.

**Applicable Regulations**

Environmental issues relating to air, soil, and water pollution, generated by surface and underground mining operations are generally not addressed by the Act, with the exception of the following:

- Avoidance of wasteful mining practices or wasteful metallurgic practices.
- Any effluent water discharged from any treatment or other process at a mine must comply with the provisions of the Water Act.

Reference can be made to the Water Act for specifics relating to discharged wastewater. The Mines and Minerals Act does have some mine siting criteria and abandonment requirements. However, these requirements do not apply to the existing (active) mine site to be assessed by PH Associates.

**REFERENCES****ENVIRONMENTAL COUNCIL OF ZAMBIA**

Conditions Governing the License to Discharge Effluent and Wastewater, The Water Pollution Control (Effluent and Wastewater) Regulations, 1993

**GOVERNMENT OF ZAMBIA**

Agriculture (Fertilizers and Feed) 1990, Chapter 351 of the Laws of Zambia

**GOVERNMENT OF ZAMBIA**

Environmental Impact Assessment Regulations 1994, Environmental Protection and Pollution Control Act No 12 of 1990

**GOVERNMENT OF ZAMBIA**

The Environmental Protection and Pollution Control Act, No 12 of 1990

**GOVERNMENT OF ZAMBIA**

National Water Policy, 1994

**GOVERNMENT OF ZAMBIA**

The Mines and Minerals Act, 1976, Chapter 329 of the Laws of Zambia

**GOVERNMENT OF ZAMBIA**

The Mining (Dumps) Regulations, 1972, Chapter 329 of the Laws of Zambia, Section 132

**GOVERNMENT OF ZAMBIA**

The Pesticides and Toxic Substances Regulations, 1994, Environmental Protection and Pollution Control Act No 12 of 1990

**GOVERNMENT OF ZAMBIA**

The Petroleum (Exploration and Production) Act, 1985

**GOVERNMENT OF ZAMBIA**

The Waste Management (Licensing of Transporters of Waste and Waste Disposal Sites) Regulations, 1993 - Statutory Instrument No 71 of 1993, The Environmental Protection and Pollution Control Act No 12 of 1990

**GOVERNMENT OF ZAMBIA**

The Water Pollution Control (Effluent and Wastewater) Regulations, 1993 - Statutory Instrument No 72 of 1993, The Environmental Protection and Pollution Control Act No 12 of 1990

**REPUBLIC OF ZAMBIA**

The Petroleum Act, 1930, Chapter 424 of the Laws of Zambia

**REPUBLIC OF ZAMBIA**

The Water Act, 1949, Chapter 312 of the Laws of Zambia

**SANKWE M K**

Environmental Council of Zambia, P O Box 35131, Lusaka, Zambia; telephone 224009; Personal Communication, May 19, 1995

**Appendix E**  
**ENVIRONMENTAL ASSESSMENT CHECKLIST**

CONFIDENTIAL

# ENVIRONMENTAL ASSESSMENT CHECKLIST

## *Petroleum Sites*

Facility ACIP FILLING STATION - GREAT NORTH ROAD  
Location KAPIRI MASHI  
Date Assessed APRIL 26, 1995

Prepared for  
Zambia Privatisation Agency

## **CONFIDENTIALITY STATEMENT**

This is an internal document, prepared by PH Associates, Inc., for the use of USAID.

The information contained in this document is confidential and proprietary in nature, and is to be used in conjunction with other facts and data for the sole purpose of providing information concerning potential environmental liabilities.

### 1.0 GENERAL INFORMATION

- 1.1 Facility Name ACIP FILLING STATION
- 1.2 Facility Representative(s) (Name and Position) MR. LIAQUAT KAPDI, OWNER  
(217051 / 271178)
- 1.3 Date of assessment APRIL 26, 1995  
MR. CHARLES ZIBA, MANAGER  
MR. SANIDAH LWEUSE, AGENT IN CHARGE  
ENGINEER
- 1.4 Assessor(s) M. ELENA POLAR, PH ASSOCIATES, INC.
- 1.5 Facility size (hectares) ± 2,900 m<sup>2</sup>
- 1.6 Number of workers employed 27 WORKERS
- 1.7 Current owner (management) MR. LIAQUAT KAPDI, OWNER / ACIP TANKS & PUMPS
- 1.8 Length of current operation (years) SEPTEMBER 2, 1994
- 1.9 Previous owner(s) NONE / RECENTLY BUILT

### 2.0 FACILITY PROFILE

- 2.1 Type of facility GAS FILLING STATION WITH ① MINI-MART ② TAKE-AWAY  
③ AUTO SPARES AND ④ WORKSHOP (BATTERY CHARGING, TIRE MENDING,  
SMALL VEHICLE REPAIR, WHEEL BALANCING, & ALIGNMENT)
- 2.2 List onsite structures, uses and condition

Structures	Uses	Condition
TAKE-AWAY	TAKE-OUT & KITCHEN	NEW
MINI-MART	HOUSHOLD & FOOD ITEMS	"
AUTO SPARES SHOP	AUTO PARTS & MAINTENANCE PARTS	"
VEHICLE MAINTENANCE / REPAIR	PARTS REPAIR & SERVICES	"
AUTO WORKSHOP	TIRE MENDING & MACHINERY	"

- 2.3 Surrounding land use 6 PUMPS / 6 TANKS FULL DISPENSING  
RESIDENTIAL / INDUSTRIAL / COMMERCIAL

- 2.4 Type and name of surrounding facilities

Facility Type	Name of Firm	Discharges (effluent / air / solid waste)	Direction of Location from Site (N/S/E/W)
KAPRI TRANSPORT	TRADING CO.	POSITIVE (KAPRI TRANSPORT)	NORTH / NE
TRAIL WALKER / TAN-ZAMBIA	PARADIA PAVILION	AIR	E
MOTEL / HOTEL	UWIR HOTEL	DOWN DRAIN	S
BAR	—	EFFLUENT	W
RESIDENTIAL	FROM KAPRI TRANSPORT	—	NORTH

NA = NOT APPLICABLE

2.5 Company products and services description

Products	Services Description
PETROL, Diesel & Kerosene	(SEE REMEDIATION STATEMENT)
OIL CHANGING, LUBRICANTS OILS	OIL CHANGING, AND SERVICING
TIRE REPAIRING, EQUIPMENT & PARTS BY <sup>COMPANY</sup> AGENT	TIRE REPAIRING, & TIRE CHANGING
AUTO PARTS & MAINTENANCE SUPPLIES	SALE OF SUPPLIES (SEE ATTACHED LIST FOR AUTO SPARE PARTS)

2.6 Past products and services description

Products	Services Description
N/A	

2.7 Describe type, quantity of materials/chemicals used/stored

Type	Quantity	Purpose
(SEE ATTACHED LIST OF CHEMICALS)	PARTS AT AUTO SPARE SHOP	
NOTE: WHEN SERVICE STATION NEEDS PARTS / OILS, ETC. THEY USE IT FROM THE SPARE PARTS FACILITY DOES NOT STORE MATERIALS / CHEMICALS FOR THE MAINTENANCE / SERVICING.		

2.8 Above/underground storage tanks

a) List how many, ages, size (volume), contents, construction material

Tank	A/U	Age	Volume	Contents	Construction	Leaks / Date
2	U	LESS THAN 1 YEAR	10,000 L	PETROL	STEEL	N/A
1	U	"	"	KEROSENE	"	"
3	U	"	"	DIESEL	"	"

b) Describe any suspected / known spills from tanks or discrepancy on dip readings

N/A. ALL TANKS ARE < 1 YEAR.

TYPE	QUANTITY	PURPOSE
RUST PREVENT	} VARIOUS SPRAY CANS 5 10 LITER	
UPHOLSTERY CLEANER		
CAR SHAMPOO		
" CLEAN		
CONTACT ADHESIVE	13 TINS / 1 LITER	
EXHAUST SEALANT	23 " / 200 GRAMS	
PAINT BOND	± 50 / 25ML ± 20 / 25ML	
RUBBER SOLUTION		
SHIM CUTTER ADHESIVE	± 40 TINS / 250ML	
POOL ACID	3 BOTTLES / 5 LITRES	POOL CLEANER
BATTERIES	24 NEW	
GAS CYLINDER	2cyl / 3KG, 2cyl / 4.5KG	FOR GAS LAUNDS; IMPROVED
<hr/>		
<u>MIN A LAUNDS</u>		
HOUSEHOLD CLEANERS		
CAR WAX		
TOILET		
FOOD STUFF		
SOME COSMETICS		
<hr/>		
<u>TABLE OUT</u>		
FOODS		
SNACKS		
BEVERAGES		

c) Describe the inventory monitoring program used, frequency of monitoring (tank tightness testing)

every morning & evening 7 days / week the tanks are monitored with the dip stick wires dip was applied.

d) Describe any maintenance completed on tanks, lines, pumps, etc. When?

A dip services pumps ~ 4 times / month and the borehole pump is serviced 3 times / week.

e) Any tanks out of service or removed at site. Why, When?

No, the tanks are new.

f) Any pumps replaced. Why, When?

No, the pumps are new.

2.9 Describe any sources of air emissions onsite (type, amount)

None, except at fuel pumping time.

2.10 Asbestos construction materials used onsite (YES/NO)

Location

2.11 Any radioactive materials used/disposed onsite (YES/NO)

2.12 Transformers at facility (YES/NO)

a) Owner

b) Type (hydraulic or heat transfer oils)

c) How many

d) Tested for PCBs (YES/NO)

e) Any past transformer oil leaks (YES/NO)

2.13 Utilities (names)

a) Water

Kapiti District Council

BOREHOLE / MUNICIPAL

b) Sewer

Septic Tank & Soakaways

ONSITE / OFFSITE

c) Electricity

Zesco

ONSITE / OFFSITE

d) Fuel use (type and purpose)

GENERATOR / PUMP / HEATING UNIT

2.14 List all permits for product handling, waste discharge, transportation of hazardous wastes / materials etc

According to Mr. Luwaji, facility is supposed to have a license to possess dangerous petroleum in bulk. Mr. Luwaji will try to secure a copy of the license

**3.0 LIQUID WASTE MANAGEMENT**

3.1 Offsite effluent disposal (open ditches, sanitary sewer system)

Type	Location(s)	Contents	Volume/Rate
<del>SEPTIC TANK</del>	<del>N/A FACILITY</del>	<del>SEWAGE</del>	<del>N/A</del>
<del>SEWAGE</del>	<del>SEWAGE</del>	<del>SEWAGE</del>	<del>N/A</del>

3.2 Describe onsite effluent treatment structures (oil-water separators, ponds, septic tanks, soakaways)

Structure Type	Location	Condition	Maintenance (removal of solids)
<del>SEPTIC TANK</del>	<del>N/A FACILITY</del>	<del>N/A</del>	<del>NO REMOVAL OF SOLIDS / TANK</del>
			<del>SEWAGE TREATMENT</del>

3.3 Volume / rate of onsite effluent treatment.

N/A

3.4 Any analysis of offsite effluent

YES / NO

**4.0 SOLID WASTE**

4.1 Onsite disposal (burned/incinerators, burial)

Describe location(s), wastes, volumes

GARBAGE COLLECTED AT FACILITY TAKEN OFF-SITE BY TRUCK TRANSPORT. TAPAL GARBAGE IS BURNED ON-SITE

4.2 Offsite disposal (landfilling, recycling)

Describe location(s), wastes, volumes

1 TRUCKLOAD / WEEK TAKEN TO COUNCIL TAMP.

4.3 Any treatment or recycling prior to disposal **NONE**

**5.0 ENVIRONMENTAL SETTING**

**5.1 SURFACE WATER**

Onsite drainage / ponds

Describe location, manmade or natural, and flow direction

**DRAINAGES IN FRONT OF SITE DRAINS DIRECTLY INTO SUBSURFACE.**

**5.2 Offsite surrounding drainage / rivers / lakes**

Describe location, manmade or natural, and flow direction

**A VERY SMALL STREAM WITH SITE DRAINS UP PZ. CH. T.**

**6.0 GROUNDWATER**

**6.1 Any onsite boreholes / wells**

(Location, number, age(s), active / inactive, well depths)

Borehole	Location	Age	Total Depth	Depth to Groundwater	Active/Inactive
			<b>N/A</b>		

Well usage (purpose and approx vol/day)

Borehole	Use	Approx Volume / Day
	<b>N/A</b>	

6.2 Water quality data available / analyses? **NONE**

YES / NO

## 7.0 SITE SETTING

- 7.1 Describe topography of surrounding area (flat terrain, vegetation, paved, gravel etc)

Flat terrain; no vegetation on site but

- 7.2 Describe percentage of site paving

~ 90%

- 7.3 Surface drainage and potential environmental adverse impacts

Any spills (not major spills observed) are washed by stormwater drainage

- 7.4 Surface soils

no stains / spills observed on soils

- 7.5 Observation of contamination (surface stains, discharges, spills, etc)

- 7.6 Overall site condition

Very good condition, very well maintained and new.

# 8.0 SUMMARY OF ATTACHMENTS REQUESTED

## Check items received

Site maps of the facility identifying buildings, structures, and drainage details for inclusion in our report

Y            N

Aerial photographs

Y            N

Materials/Chemical inventory listing including quantities stored onsite, onsite use, and monthly usage and disposal rate

Y            N

Copies of all environmental permits (discharge, transport etc.)

Y            N

Data concerning any releases or spills of materials/chemicals at the facility

Y            N

Address and type of industry listing of enterprises neighboring the facilities

Y            N

Copy of laboratory analyses of process waste streams (liquid and solid)

Y            N

Underground storage tanks; construction details, number, capacities, and use

Y            N

Any information about the geologic and groundwater conditions at the facilities (i.e. soil types, depth to groundwater, onsite wells including depth, production, construction details, and groundwater laboratory analyses, etc.)

Y            N



**Appendix F**  
**FACILITY RECORDS**

Construction Details and Petroleum Usage Report

STOCK AS AT 22<sup>ND</sup> APRIL 1995 - SPARE SHOP: WILSON

ARTICULARS	QTY	UNIT	QTY	UNIT	RATE	PREV. STOCK VALUE	1995 STOCK VALUE	GRAND STOCK VALUE	CARRY OVER VALUE
CLEAN SCREEN			19		1950=				
ENGINE CLEANER <sup>680ml</sup>			28		2500=				
UFF STUFF <sup>5LT</sup> POLYACID			3		7500=				
RUBBER TREATMENT <sup>500ml</sup>			15		3500=				
ASBOARDS CLEANER <sup>500ml</sup>			25		4500=				
WINDSCREEN WASHER FLUID			35		3500=				
RAKE FLUID 5LT			9		17500=				
GM GREASE 5KG			4		18500=				
ATF OIL 5LT			9		10300=				
DIESEL SIGMA <sup>5LT</sup> SAE 70			6		8500=				
" " <sup>5LT</sup> SAE 40			5		8800=				
HD MOTOR OIL <sup>5LT</sup> SAE 40			22		8800=				
" " " " " 1LT			20		2000=				
GEAR " 2.5LT			1		5000=				
ROTRA " " <sup>5LT</sup> SAE 80W/90			8		11200=				
" " " <sup>5LT</sup> LOAD TEST 85W/90			8		11300=				
MOTOR OIL <sup>500ml</sup> SAE 20W-50			<del>23</del> 24		1200=				
" " HD 10 500ml			<del>24</del> 10		1200=				
FUNDEL			5		10350=				
"			1		8500=				
ROTRA GEAR OIL <sup>35W</sup> 140 <sup>500ml</sup> Special			15		1750=				
" " " <sup>80W</sup> /90 <sup>500ml</sup>			6		1750=				
ATF OIL			5		1750=				
2 STROKE OIL			7		1700=				
FIRE EXTINGUISH POWDER			18		5500=				
TAR REMOVER			38		3500=				
TYRE INFLATOR			17		5500=				
ENGINE START <sup>375ml</sup>			5		5500=				

PARTICULARS	QTY	ISSUES	QTY	QTY	RATE	OPENING STOCK VALUE	ISSUES STOCK VALUE	CLOSING STOCK VALUE
ENGINE GREASER			14		7500=			
" FLUSH			7		7500=			
" COOLANT 1LT			5		4950=			
WATERBO PLS CHAMMS			5		9500=			
RUST PENETRANT			22		5500=			
RADIATOR FLUSH <sup>500ml</sup>			9		2500=			
" SEALANT			-		2950=			
UPHOLSTERY CLEANER SPRAY 500ml			14		4500=			
SPR SHAMPOO 500ml			28		4500=			
" CREAM 250ml			10		4500=			
CONTACT ADHESIVE 10			2		6950=			
" " TUFF STUFF			12		8200=			
EXHAUST SEALANT			23		1500=			
PLUMBERS DELIGHT			5		1650=			
TRINE POW RUBBER SIL			3		1350=			
AUTO FRESH LAVENDER			22		3900=			
RUBBER BOND SOLUTION <sup>25ml</sup>			25		1400=			
" " " 25ml			<del>292</del> <del>392</del>		600=			
" " " 50ml			128		800=			
SUPER GLUE			15		800=			
COMBINED SPANNER SET			3		95000=			
40PC TOOL KIT			1		39500=			
COMBINED SOCKET SET <sup>42PC</sup>			5		39500=			
DOOR - EASE x6			15		500=			
GENKEM R. SOLUTION <sup>25ml</sup>			53		650=			
" " " <sup>50ml</sup>			-		950=			
VULCANISING "			16		1000=			
R. PATCH			80		200=			

PARTICULARS	REPAIR	REPAIR	REPAIR	DATE	PRESENT STOCK VALUE	REPAIR STOCK VALUE	SPARE STOCK VALUE	CLOSING STOCK VAL.
R1 PATCH			-	250=				
R2 "			107	300=				
R3 "			120	400=				
R4 "			60	500=				
R5 "			23	600=				
R6 "			41	800=				
L7 "			337	700=				
L8 "			54	750=				
L9 "			48	850=				
L10 "			31	950=				
BRAKE FLUID 200ML			30	1200=				
WIND SCREEN CLOTH			76	1500=				
ACID PETROLEUM FELL			11	1850=				
BEARING GREASE <sup>500G</sup> 32FD			21	2300=				
MULTIPURPOSE " 500G			11	2200=				
SM GREASE 500G			6	2600=				
BATTERY ACID 750ML			58	8000=				
" " 2.5LT			12	2600=				
" " 5LT			10	5000=				
" WATER "			10	2600=				
" " 2.5LT			3	1800=				
" " 600ML			23	850=				
WELDING FLUID <sup>500ml</sup>			21	1650=				
DIESEL FUEL CONDITIONER <sup>375ML</sup>			5	3250=				
SMOGER OIL			-	800=				
RUSTOLA			1	1950=				
KEY VALVES			21	1600=				
TUBELESS "			49	2500=				

PARTICULARS	QTY	UNIT	QTY	UNIT	DATE	OPEN STOCK VALUE	ISSUED STOCK VALUE	CLOSE STOCK VALUE	CURRENT STOCK IN
TUBELESS VALVE			70		500=				
GAITOR No 1			77		1000=				
" No 2			37		1500=				
" No 3			24		2000=				
" No 4			19		2800=				
" No 5			18		3000=				
" No 7			3		4000=				
" TR 1			47		450=				
" MCV x 12			11		750=				
" MCV x 20			42		1000=				
" MCV x 24			8		1250=				
G VALVE TR 13			12		3700=				
" TR 15			27		3900=				
" TR 16			21		5700=				
" TR 150			49		4700=				
" TR 78A			8		6700=				
BRACE HOSE PIPE			19		18500=				
MUTTONS COOTH			16		4500=				
" "			18		2500=				
" "			10		1100=				
INSULATION TAPE			75		600=				
THREAD "			17		250=				
SAND PAPER No 2			30		250=				
" " No 1/2			54		250=				
DRILL SET			1		29000=				
HAND GRINDER			1		29500=				
ATLAS SCREWS			376		1950=				
CONTACT ADHESIVE 250ml			33		2650=				

PARTICULARS	ISSUED	ISSUED	ISSUED	ISSUED	RATE	ISSUED STOCK VALUE	ISSUED STOCK VALUE	ISSUED STOCK VALUE	ISSUED STOCK VALUE
CONTACT ADHESIVE 5ml				115	1350=				
TUBES 1200 x 20				2	35000=				
" 1100 x 20				9	35000=				
" 900 x 20				5	35000=				
" 750 x 16				47	14500=				
" 115				20	11500=				
" 14				28	8500=				
142 = 185 x 13				1	77000=				
" 175 x 14				2	85000=				
" 185 x 14				1	87000=				
" 195 x 14				2	92000=				
" 600 x 14				3	92000=				
" 650 x 14				4	107000=				
" 215 x 15				2	155000=				
" 700 x 15				2	123000=				
" 650 x 16				3	144000=				
" 750 x 16 BRIDGESTO				2	156000=				
" 750 x 16 D/UNIVERSAL				3	146000=				

STOCK AS AT 23 APRIL 1995

BARR-SIMP NYERLU

PARTICULARS	QTY	UNIT	QTY	UNIT	DATE	QTY	UNIT	QTY	UNIT
(LAND ROVER) INDICATOR COMPLETE LENSES			17		115000				
ZIG CONTACT ADHESIVES'			31		8500				
" " " D'			7		12000				
SPARK PLUG WREX/WTDC/ <sup>FREDC</sup>			158		18000				
" " NYTC			23		19500				
" " NGK			26		28000				
AUTO SUN SHADE			2		350000				
7 CORE CABLE			2		285000				
5 CORE " 1.6mm/m			30		20000				
WELDING " 35mm			3		58000				
AIR CABLE YELLOW/RED			5		350000				
GORILLA AIR DEVICE			9		600000				
COOLMAN WATER JUG			2		260000				
SALLY BOTTLE 8LT			1		355000				
" " 6LT			1		255000				
TRENDY JAR 8LT			2		185000				
MILANO DRINK JAR 8LT			2		245000				
SQUARE " "			2		255000				
MARINA COOLER BOXES			2		665000				
" "			3		725000				
SELLO TAPE			8		3000				
PARKING "			5		9500				
MASKING "			29		15000				
FUEL FILTER FF306			6		95000				
" " (2148) F083			3		75000				
" " (260) F052			4		35000				
" " F048 (2155)			11		65000				
" " 71038			2		235000				

PARTICULARS	ISSUES	ISSUES	ISSUES	ISSUES	RATE	REPAIRS STORED VALUE	ISSUES STORED VALUE	ISSUES STORED VALUE	UNPAID STORED VALUE
OIL FILTER 4154				1	23500=				
" " 0324-14-300				12	3500=				
" " 2143 (F013)				6	3500=				
" " F012				4	3500=				
" " F011 (2918)				9	4000=				
" " FF 304				8	4000=				
FUEL " 294 (P-1104)				6	10500=				
" " 2N40 (PH 2887)				5	4500=				
" " 71028				5	4500=				
OIL " Z60 (PA 2807)				<del>2</del>	6000=				
" " Z95				6	9500=				
" " G980 (CH 2980)				6	10500=				
FUEL " 9870				5	8500=				
" " G536 (CH 861)				4	6000=				
AIR " A6630				2	19500=				
" " 16546-18000=				3	4500=				
OIL " PZ-95				7	7500=				
" " Z74 (3140)				5	19500=				
DIESEL "				5	13800=				
OIL " (3033)				10	19500=				
AIR "				3	5500=				
OIL " Z123				6	12500=				
" " Z37				3	9500=				
FUEL " M3-36-4				2	4950=				
" " Z74 (PA 2846)				10	8500=				
OIL " C-120				3	5500=				
" " C-140				4	5500=				
CLUTCH KIT				2	6500=				

PARTICULARS	QTY	UNIT	QTY	UNIT	RATE	OPERATOR'S BOOK VALUE	ISSUES STOCK VALUE	SALVAGE VALUE	UNRECOVERED VALUE
FUEL FILTER AG 422			2		2500=				
DIESEL " R 4922			8		25000=				
" LS 144A			2		2500=				
" E74			1		3500=				
PLATE " Z 918			6		9500=				
" Z 76			3		3500=				
" Z 34			3		10500=				
" 2020			10		19500=				
" Z 71			5		12500=				
" CP 826			5		7500=				
" G 546			17		9500=				
" G 514			6		6500=				
" Z 29/7			2		3500=				
FUEL FILTER 904 058			59		3500=				
" " W 3.1/2			12		1500=				
AIR " AG 634			3		22500=				
" " AG 727			2		22500=				
" LF 637			4		4500=				
" Z 230=			7		4500=				
" Z 137=			3		3500=				
" Z 155=			6		3500=				
" Z 153			4		10500=				
" Z 148			3		9500=				
" Z 143			2		4500=				
" Z 131			2		8500=				
CLUTCH PLATE			4		45000=				
DISC BRAKE PAD AG 334/140			1		24500=				
" " " AG 334/140			1		21800=				

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PARTICULARS	QTY	UNIT	RATE	REPAIR STOCK VALUE	ISSUE STOCK VALUE	CASH STOCK VALUE	ADJUST STOCK VALUE
SC BRACKLE PRO AG 3:3/409	1		23000=				
" " AG 268/409	--		24000=				
" " AG 254/409	1		23800=				
AG 252/409	1		24500=				
AG 134/409	1		16000=				
" " ST 11006b	3		26500=				
ST 5006b	3		12500=				
" 2001b	3		9900=				
" 2006b	3		13500=				
" 2006b	3		15000=				
AG 524/140	1		24000=				
AG 488/140	1		25500=				
" 487/409	1		24500=				
" 479/140	1		24000=				
" 470/140	1		24000=				
DISTRIBUTOR KIT - <sup>H.L.V.</sup> TOYOTA	26		29500=				
" " DATSUN	21		29500=				
" " MAZDA	24		29500=				
" " PEUGEOT	12		29500=				
DISTRIBUTOR GREASE	7		25500=				
TOGGLE SWITCH	4		5900=				
" RELAY	10		86200=				
FUEL FILTER 1053	8		10500=				
REGULATOR 0192R24V	7		92000=				
" 0192x12V	5		72500=				
INTERMATOR BRUSHES	17		4500=				
STARTER "	10		7500=				
REFLECTOR	28		650=				

PARTICULARS	PNOS	ISSUES	QMS	CURR	DATE	PRDIN STOCK VALUE	FINC STOCK VALUE	AMOUNT PAID	AMOUNT PAID
INDICATOR INCOMPLETE LOSS				12	2500=				
TRAILOR SOCKET				5	12500=				
BRUSHES				7	1500=				
SCREEN DRIVER SET <sup>18 20</sup> (10)				21	3500=				
BENDING KIT				1	39500=				
HEAD LAMP PROJECT				1	67000=				
WATER PUMP "				1	85000=				
PISTON RING COMPRESSOR CL 314				1	9500=				
" " " CL 317				-	16500=				
IGNITION STARTER SWITCH				17	9500=				
" " "				4	8500=				
" " "				5	45000=				
HAMMER SMALL				9	3500=				
" LARGE				10	4500=				
CUT-OUT REGULATOR				10	46500=				
TAIL LAMP				10	73500=				
BEARING FRONT WHEEL KIT				2	39500=				
PLASTIC SCREW DRIVER 4"				7	1100=				
" " " 5"				12	1300=				
" " " 6"				5	1500=				
" " " 8"				22	1900=				
" STAR " " 6"				21	1900=				
WOOD " " 4"				26	1300=				
" " " 5"				49	1150=				
" " " 6"				46	1400=				
" " " 8"				48	1500=				
" " " 10"				48	1950=				
" " " 12"				48	2250=				

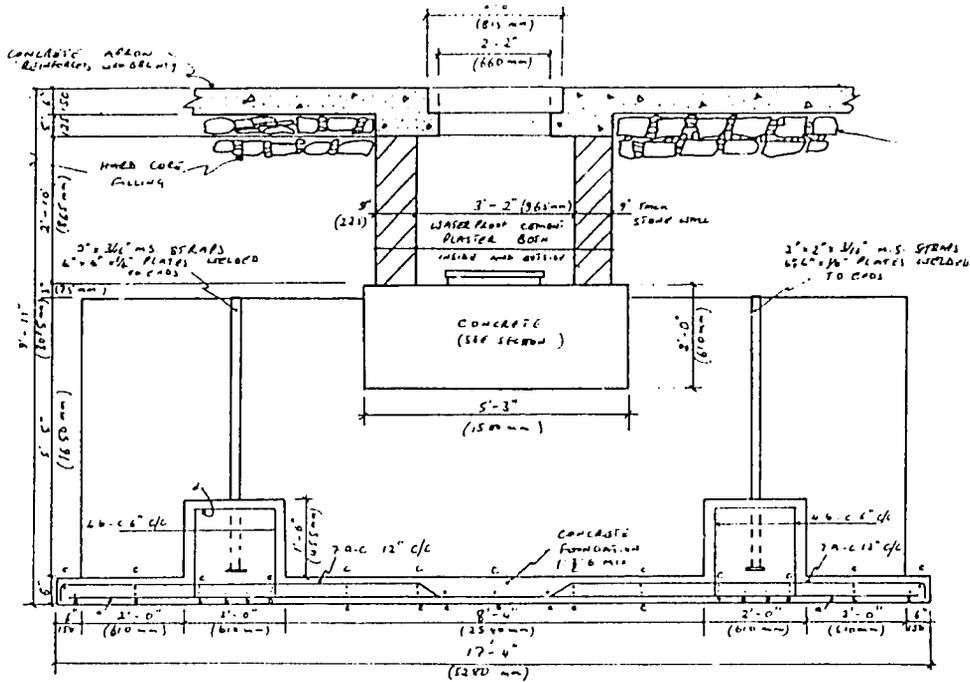
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PARTICULARS	PROD	QTY	GRAB	CLASS	RATE	PREV. STOCK NAME	ISSUE STOCK NAME	GRAB STOCK NAME	PREV. STOCK NAME
GRABED TOOL				10	25000-				
" "				16	15000=				
" "				3	20000=				
FLASHER UNIT 12V 46W				11	130000=				
" " 24V 55W				7	185000=				
" " " 21W				4	735000=				
" " 12V 18W				5	450000=				
ELECTRICAL FUEL PUMP				3	495000=				
KINETRON COIL				8	155000=				
GRABER LAMP				3	145000=				
SOLINETS				2	575000=				
IGNITION COIL				8	350000=				
GASKET SPALLAR				4	35000=				
TIMING CHAIN				10	155000=				
" BELT				9	155000=				
SEALED BEAM 24V 75/50W				5	165000=				
HALOGEN HEAD LAMP 165MM				4	165000=				
" " " 178MM				5	165000=				
SPOT LIGHT				2	550000=				
HEAD LAMP				2	145000=				
SPOT LIGHT				2	450000=				
" "				2	250000=				
HALOGEN HEAD LAMP 146MM				2	145000=				
" " " 200MM				2	185000=				
COMPLETE PEUGEOT LENSES				2	245000=				
TAIL LAMP + COVER R/L				4	135000=				
FRONT " LENSE R/L				2					
COMPLET TOYOTA LENSE				2	310000=				

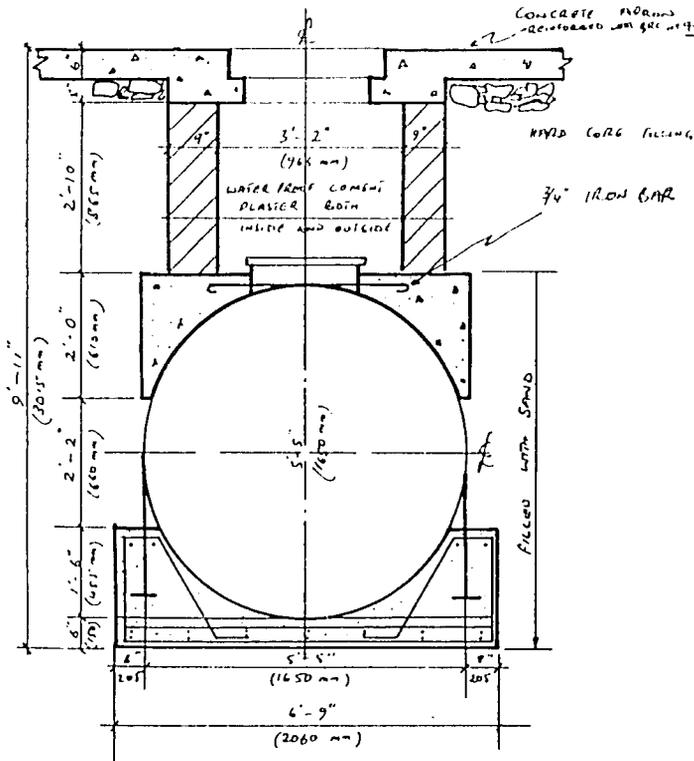
PARTICULARS	ISSUED	ISSUED	ISSUED	ISSUED	DATE	ISSUED	ISSUED	ISSUED	ISSUED
	STOCK	STOCK	STOCK	STOCK		STOCK	STOCK	STOCK	STOCK
TOYOTA COVER LENSE SPARK PLUG AL7C				3	15000=				
INDICATOR LENSE L & R				3	14000=				
OIL SEAL				20	3950=				
AUTO BULB 12V 21CP				0	650=				
" " 12V 21/6CP				0	650=				
SPOT LIGHT LAMP 12V/55W				11	2500=				
TUNGSTUM				9	2500=				
LAMP 24V 2W				10	950=				
24V 5W				5	1200=				
24V 18W				6	1100=				
LOW STARTER				20	400=				
DASH BOARD BULB				26	500=				
LOW STARTER				22	750=				
GLANDS LARGE				19	1800=				
" SMALL				19	900=				
PUSH CONNECTOR N938				28	240				
34				47	270 =				
3				50	150=				
33				50	260=				
40				50	180=				
36				50	200=				
10				34	200=				
11				29	150=				
32				50	200=				
5				50	160=				
15				48	200=				
12				20	120=				
2				48	100=				

PARTICULARS	QTY	UNIT	RATE	AMOUNT	DATE	REMARKS
AUTO BULB 24V 55/50	4		2500=			
PUSH CONNECTORS	291		500=			
RUBBER PUSHERS	108		2500=			
" KIT	74		700=			
WOODEN WINDER	17		9500=			
DISTRIBUTOR CAP	8		8500=			
" "	4		9500=			
INDICATOR SWITCH	2		140000=			
AUTO BULB 24V 6W	9		650=			
" " 12V 10W	12		650=			
" " 12/16V 30P	28		650=			
CONDENSER	84		3100=			
CONDENSER WITH CABLE	18		3500=			
" " "	16		4500=			
ROTOR	9		2500=			
CONTACT POINT	116		3100=			
" " JAP	20		3500=			
LANDOVER FILTER CAP	10		18500=			
" "	10		3500=			
SOLDERING IRON	1		9500=			
" CUP	1		25000=			
ELECTRICAL SET	1		22500=			
AIR LINE GAUGE	1		85000=			
CRIMPING TOOL SET	1		7500=			
ACCELERATOR CABLE	17		9900=			
INDICATOR LAMP	10		8900=			
CHANGE OVER SWITCH	4		4500=			
FUSES	120		250=			





ELEVATION 10000 LB. TANK



SECTION 10,000 LB. TANK

SIZE OF TANK	10,000 LB		
OVERALL DIMENSIONS	16'-6" x 5'-5" DIA x 9'-11" PLATE (5075 mm x 1650 mm x 3050 mm)		
MAX UPWARD FORCE DUE TO WATER PRESSURE - TANK EMPTY	LOS	KILOS	LBS
			20,000 (9072 kg)
WEIGHT OF EMPTY TANK	2780	(1261.34)	
WEIGHT OF CONCRETE SURROUNDING TO TANK MAXIMUM	2880	(1306.70)	
WEIGHT OF 9" BLOCK WALL TO 4" H	3330	(1510.89)	
WEIGHT OF CONCRETE SURROUNDING TO MANHOLE GROUND LEVEL	3350	(1522.20)	
WEIGHT OF 4" H (DOCK) FRAME	100	(45.35)	
COUNTER BALANCE ROD	4460	(2020.55)	11,440
WEIGHT OF CONCRETE SADDLES & SLAB TOTAL FOR 2" STRAPS			8560 (3883.84)
ACTUAL WEIGHT OF SADDLES & SLAB PROVIDED	SADDLES 2(21" x 21" x 7") = 150	2560	(1164.99)
	SLAB (6") 2(7'6" x 33") = 5	6600	(3012.30)
	TOTAL	9160	(4177.29)

Typical Agip  
10,000 Liter Tank  
Construction Details

Retail Sales Analysis

LUBRICATED

202

0

Agip

APRIL 1994 .....  
 MARCH 1995 .....

STATION	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	ANNUAL LUBS Kg.	line TOTAL FEET
SANVIEW	290500	266000	262500	311500	323500	252500	224000	233000	290000	243500	198500	225000	275913	2157000
FRANZMEL	108500	168000	178500	213500	164500	213500	178500	172500	194000	139500	136500	187000	16318	2090500
SPRING BRAND	42000	21000	21000	31500	42000	21000	42000	21000	31500	31500	31500	31500	22500	210000
NUMBO	-	10500	21000	10500	10500	21000	10500	10500	21000	10500	10500	21000	10500	157500
STATES	-	-	10500	21000	42000	17500	31500	21000	10500	-	-	-	15750	157500
EASTERN PET (AZADUKA) (K.L.B.) (KABWE) ELDER	-	-	185000	70000	14000	92200	141200	105000	105000	105000	105000	105000	23400	1145000
WYKATS	7000	-	3500	-	-	-	17500	29000	69000	29000	45500	52000	1874	231000
CENTRAL	28000	-	-	-	-	-	-	-	35000	31500	77000	119000	2272	232000
OP/LSHYA	206500	206500	182000	210000	203000	196000	150000	178000	192000	164500	150500	178500	10528	2211500
3MUNIONWA	126000	108500	129500	97500	126000	126000	126000	126000	117500	94500	105000	126000	8569	1396500
ACCRA RD.	171500	100000	175000	161000	161000	140500	119000	77000	94000	59500	73500	101500	12820	1463000
LEIMS	42000	63000	42000	63000	70000	42000	77000	52500	63000	52500	77000	49000	2012	693000
1 W.S.V.	-	-	13000	42000	28000	42000	35000	-	56000	21000	28000	42000	29	228000
KAPIKI MPOSH K.M.P.	-	-	-	-	35000	97000	136500	165500	178500	150000	136500	140000	10838	1088000
MAHMANISO	-	-	-	10500	21000	35000	24500	31500	29000	10500	31500	21000	1764	212500
ABWE RD.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SALOMO	-	-	-	-	-	-	-	35000	52500	31500	49000	59500	1124	227500
S.C.U.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TAL	1050000	1018500	1221500	1263500	1422600	1336200	1382200	1354500	1476000	1337500	1240500	1415000	137693	15992500