

## 4 - 22 カラチ港ケマリ石油タンク及び消防施設の現状

GOVERNMENT OF PAKISTAN  
MINISTRY OF COMMUNICATIONS  
(PORTS & SHIPPING WING)

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### BRIEF ON KARACHI PORT, KEAMARI OIL TANKS FARMS AND EXISTING FIRE FIGHTING ARRANGEMENTS:

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#### KARACHI PORT:

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The Port of Karachi is one of the two Ports serving the entire country and has area of 310,000 Sq. Miles, it is the main Port of Pakistan and besides being a Port of call for both Ocean-going and coastal vessels, it is also the home Port of the bulk of Pakistan's merchant fleet and the Pakistan Navy. Karachi Port has 17 berths on East Wharf and 11 berths on West Wharf for general cargo and 4 dedicated berths for handling mineral and edible oil. Besides the above there are 5 other berths being NM Boat Wharf, Lighterage Wharf and Ship Repair Jetties. Adjacent to the KPT para-meters wall outside the Oil Terminal there is a large area covered by a number of Oil Storage Tanks belonging to Oil Companies namely, PSO, PARCO, CALTEX, PBS, NRL and PRL. In addition there are a large number of molassess tanks.

2. There has not been any major oil fire in the Port of Karachi due to any explosion of Oil Tankers or any major fire on board ships but there was fire in the Oil Tanks Farms in 1971. The fire was contained after hectic efforts and no major disastrous situation arose.

NM	7507-11 7-11
PSO	Pakistan State Oil Co. Ltd.
PARCO	110-7 757" 1170711- Co.
CALTEX	8147-11
PBS	1107298 11-2 Shell
NRL	National Refining Limited
PRL	Pakistan Refinery Limited

3. KPT is responsible for fire fighting arrangements within its own port limit and has necessary fire tugs, fire hydrants and other fire fighting equipment as listed in Annexure-B. However, for fire fighting in the Oil Tanks Farm, the responsibility rests with individual Oil Companies who have for their oil tanks dykes besides other arrangements such as water hydrants, water sprayers, water pumps, foam compound etc., but there is no Organization which coordinates the actions of all the Oil Companies. The general security of the area rests with the local administration. Another problem which needs attention is thickly populated area in close proximity to the oil tanks farms which could be affected by any major fire or disastrous situation.

4. Though there are laid down rules and regulations for handling explosives in the Port and outside the Port but apparently nothing is laid down regarding control of major fire or disastrous situation as a result of fire at the Oil Tanks Farms or major accident in the Port.

5. Agenda for discussions with JICA Team is placed at Annexure-A.

AGENDA FOR DISCUSSIONS WITH JICA TEAM

1. Review of existing fire-fighting arrangements in the Oil Storage Areas at Keamari and West Wharf and Port Qasim.
2. Fire threats to Keamari Oil Tanks Farm and other sensitive areas and necessary arrangements to counter them. <sup>SITEM,</sup>
3. Repercussions of restrictions on further construction of tankage at Keamari area imposed by the Defence Committee of the Cabinet (DCC).
4. To suggest immediate measures to supplement and instal any additional Fire Fighting equipment in order to prevent future major or minor conflagration on account of any accident.
5. To examine the setting up of an effective Fire Fighting and control organization which can be mobilized for immediate action.
6. To examine the storage arrangements by the different oil companies and if necessary to enforce redistribution of products/petroleum on a pooling basis with a view to minimising the threat of fire.
7. To take all such measures and actions which it may deem necessary to ensure the safety of the oil installations.
8. To prepare and implement a Disaster Plan for the areas concerned.
9. Preventive measures for Oil Tanks Farms, Refineries and proposed tanks both for buffer storage and for strategic reserves in Pipri area.
10. Additional Fire Fighting equipment needed by KPT and other organizations to ensure effective arrangement to deal with a major oil, solid or electrical fire.
11. Any other issue with the permission of the Chair.

KARACHI PORT TRUST FIRE SERVICES

Preliminary

The Karachi Port is the only port of the country at present through which all the trade is conducted and as such all types of goods are imported and exported through the Port. Fairly large quantities of goods always remain in the premises of the port in sheds and on open plinths. This includes dangerous chemicals, explosives, ammunition, cotton bales, cotton products, jute bales, jute products, machinery, and equipment and all other goods relating to the development of the country.

Besides the above goods a number of ships and oil tankers remain in the port constituting a fire risk.

The structural and mechanical installations of the port is a further fire risk to be looked into properly.

It is an obligatory duty of the Karachi Port Trust to maintain the Fire Services for the protection of the goods against fires and its hazard as bales. Moreover the Karachi Port Trust is required to maintain an efficient Fire Service under the fire orders for the Port of Karachi issued by the Federal Government under Clause 2 of Dangerous cargoes Act 1953 (V of 1953).

Before the second world war the Karachi Port Trust had a small fire service organization consisting of a couple of fire engines under the charge of a small staff supplemented by some of the Traffic Manager's outdoor employees who were trained in fire fighting. This scheme was mainly confined to the T.P.X. area for protection of cotton stored there.

During second world war, owing to the risk of air attacks and the possibility of big fires starting

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... in the port, the Karachi Port Trust was required by the then Central Government of India under the Defence of India Rules to provide an adequate fire service of its own. Consequently 50 Trailer Pumps and other equipments were purchased and nearly 100 men were employed in a separate department consisting of the Port Fire Officer, 5 Sub Fire Officers and other subordinate staff.

With cessation of hostilities the strength of equipment, appliances and staff was reduced to the minimum necessary to maintain 3 Fire Stations.

DEVELOPMENT AFTER ESTABLISHMENT OF PAKISTAN

After the establishment of Pakistan in the year 1947 the position of the Karachi Port Trust Fire Stations and appliances were as under:-

1. MAIN FIRE STATION AT NMB WHARF

This fire station was housed in an old building of a power house which contained only one hall, and was being used as appliances room. The following fire appliances were available

at this station.

- (a) Water Tenders of 500 gallons capacity each with auxiliary pumps ... 2
  - (b) Towing Vehicles ... 2
  - (c) Trailer Pumps 500 g.p.m. ... 2
  - (d) Heavy Trailer pumps 750 g.p.m. ... 2
2. M.I. YARD FIRE STATION  
 Water Tender of 500 gallons capacity each with auxiliary pumps ... 2
3. T.P.X. FIRE STATION.  
 Water Tender of 500 gallons capacity ... 1  
 Hose Tender ... 1

It may be pointed out that the above fire appliances were improvised by mounting the auxiliary pumps on water tankers departmentally.

Besides the above fire stations and appliances a

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ring main system exists in the T.P.X. area which is fed by three diesel pumps installed at China Creek pump house. About 172 fire hydrants were installed at suitable distances on the ring main system throughout the T.P.X. area. The ring main system remains pressurized from the overhead tank of 40,000 gallons capacity. The system was installed in the year 1930.

The above ringmain system was further extended to the new T.P.X. area with addition of 32 more fire hydrants.

The organisation of the Fire Services and related technique mostly depends on the pace and nature of industrialization of the country. During the period from 1947 to 1958 the port activities were limited and the capacity of the Port was also much lesser, but at the same time much improvement was noticed in the trade activities and the country stepped up towards the industrialization and naturally the Port activities started expanding. It was, therefore, considered necessary that the fire fighting appliances and equipment already held by the Karachi Port Trust Fire Services should be replaced by more efficient and modern appliances to match the purpose for which they are required. Proposals and plans were prepared in this respect and it was decided that six self propelled Fire Tenders with standard fire fighting equipment should be purchased and finally these Fire Tenders were imported from U.K. in the year 1954 and 1956.

The capacity of the water tanks of the Fire Tenders was 1000 gallons each with a Fire Fighting pump of 500 g.p.m. connected to the engine through the power take-off.

Two Fire Tenders were placed at each of the three Fire Stations covering the entire port area.

It was further considered necessary to procure a foam producing fire tender to deal with the petroleum fires etc. according to the fire risk which existed at that time. The foam fire tender was accordingly imported in the year 1958 with

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water tank capacity of 1000 gallons and foam tank capacity of 50 gallons with a fire pump installed through power take-off.

Thus the position of the Karachi Port Trust Fire Stations and appliances from 1950-1960 was as under: -

1.	<u>MAIN FIRE STATION - NMB WHARF</u>	
	Dennis Fire Tender	... 1
	Thames Fire Tender	... 1
	Foam Fire Tender	... 1
	Hose Tenders	... 2
	Towing vehicle	... 1
2.	<u>M.I. YARD FIRE STATION</u>	
	Dennis Fire Tender	... 1
	Thames Fire Tender	... 1
3.	<u>T.P.X. FIRE STATION</u>	
	Dennis Fire Tender	... 1
	Thames Fire Tender	... 1

Major development work of the Karachi Port was taken up in the year 1957 and the entire East Wharf area was reconstructed increasing the capacity of the Port to a great extent with a number of transit sheds and over flow plinths and other installations of the Port. By this time the industrialization of the country came into full swing and the development of science and technology was taking place rapidly and a variety of goods, machinery, equipment, dangerous chemicals and agricultural products etc. used to remain on the premises of the port in large quantities thus increasing the fire risk to a far greater extent.

One of the most important items of goods are the hazardous chemicals with which the Port Fire Service is deeply concerned as they involve heavy losses due to fire incidents. A number of new chemicals are being introduced every year constituting extensive fire risk. Therefore special fire fighting appliances are required to be procured to minimise these losses. It would be pertinent to point out at this juncture that the cost of fire fighting equipment is nowhere proportional

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to cost of damages which could be sustained due to fire incidents.

It may also be mentioned here that during the development work of East Wharf about 100 fire hydrants were installed throughout the East Wharf Area and were suitably spaced on all plinths and roadways. These hydrants were installed on the salt water ring main which is fed directly by the 3 electric pumps installed for the purpose at power house M.S. 5/9 at Berth No. 7.

In view of the above development and increase in the fire risk the following fire fighting appliances and pumps were further procured.

Land Rover Fire Engines	...	4	- 1963
Merry Weather Trailer Pumps	...	3	- 1964
" " " "	...	3	- 1966
Snorkels (Hydraulic Platform 6 ft. height)	...	2	- 1967

Besides the procurement of the above appliances a small unit of the Fire Station was established at Manora workshop and a light Land Rover Fire Engine with a Trailer Pump was stationed at the unit.

Thus the composition of Fire Fighting Appliances and Fire Stations from 1960-1970 was as under: -

1.	<u>MAIN FIRE STATION - NMB WHARF</u>	
	Dennis Fire Tender	... 1
	Thames Fire Tender	... 1
	Foam Fire Tender	... 1
	Light Fire Engines	... 2
	Hose Tenders	... 2
	Towing vehicle	... 1
	Trailer Pumps	... 13
	Snorkels	... 2
	Breathing apparatus	... 7
2.	<u>M.Y. YARD FIRE STATION</u>	
	Dennis Fire Tender	... 1
	Thames Fire Tender	... 1

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T.P.X. FIRE STATION

Dennis Fire Tender ... 1  
Thomas Fire Tender ... 1  
Land Rover Fire Engine ... 1

MANORA FIRE UNIT

Land Rover Fire Engine ... 1  
Trailer Pump ... 1

The present Port Fire Officer was sent to Singapore in the year 1965 for advanced training in fire fighting and fire prevention and on his return a number of his recommendations for improvement of the Fire Services were accepted by the K.P.T. Administration.

In the year 1966 the Karachi Port Trust Administration had engaged Mr. G. Bennison a specialist in fire fighting to suggest measures for improvement of the existing fire fighting arrangements both at oil berths as well as the adjoining oil installations, so as to bring them up to modern International Standards and codes of practice.

The following suggestions were made by the fire fighting specialist Mr. G. Bennison: -

1. Procurement of a properly equipped fire float for services in the harbour on 24 hours basis.
2. SHORT TERM PROPOSALS
  - (a) Training, drills and exercises for the KPT firemen.
  - (b) Inspections, testing and overhauling of all fire hydrants and fire extinguishers.
  - (c) Purchase and installation of additional dry powder fire extinguishers.
  - (d) Commissioning of the two snorkel appliances.

The K.P.T. Administration subsequently purchased a fire float in the year 1973 from Holland which incorporates all types of fire fighting systems viz: foam producing system; Co<sup>2</sup> system and dry chemical powder system with latest fire fighting gear.

The short term proposals were also implemented.

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### LONG TERM PROPOSALS

1. Fire Alarm system.
2. Installation of a 12" diameter salt water main with suitable pumping arrangements to serve the oil installation.
3. Installation of a 3" diameter pipe line running parallel to the salt water main and connected with a 2000 gallons foam compound storage tank and a low pressure pump.
4. Procurement of two foam tenders.
5. A new fire station in the oil installation area.

A new fire station close to OP IV is under construction and the work will be completed in the near future. Two foam tenders have been purchased and the action on the other items will follow after reviewing the position when all these facilities are in commission.

The experiences during Indian aggression in the year 1971 brought out serious shortcomings as far as fire fighting organisation of the oil installation area are concerned. Apart from the action with other agencies are required to take, it was decided that the Port Fire Services should also possess most modern equipment in sufficient quantities to deal with such serious eventualities within the Port and in the proximity of the Port.

Before the procurement of latest fire fighting equipment, it was considered necessary to have a modern fire station with all the facilities for the efficient working of the fire service. The new Central Fire Station was constructed and was occupied in the year 1971.

Similarly the old M.I. Yard Fire Station building was also considered unsuitable for modern facilities therefore a new Fire Station was constructed and occupied in the year 1980. The Port Fire Services became the member of the most reputable Fire Protection Associations of U.K. and U.S.A. to gain knowledge about the latest fire fighting equipment and its techniques.

In the year 1974 one Foam Fire Tender was acquired which was locally fabricated.

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Two Foam Monitors were also purchased in the year 1975 and 1976.

The following appliances and equipment were further provided in the Budget Estimates for the years shown against each.

1. Foam and Dry Powder Fire Tender for Groyne Fire Station	1	1975-76
2. Fire Tenders (Water) .....	3	1976-77.
3. Foam Generating Fire Tender for Groyne Fire Station .....	1	1977-78
4. Dry powder & Co <sup>2</sup> Fire Tender ...	1	1977-78
5. Replacement of Land Rover Fire Engines .....	3	1977-78
6. Fire Service Snorkel	1	1978-79
7. Mobile Foam Units .....	6	1978-79
8. Variable Foam Inline Inductors .	6	1978-79
9. Heavy duty Trailer Pumps. ....	2	1978-79
10. Light duty Trailer Pumps (1000 g.p.m.) .....	4	1978-79
11. Automatic Dry Powder Fire Extinguishers .....	30	1978-79
12. Purchase of Jeeps for towing Foam Monitors .....	2	1978-79.
13. Heavy duty pumps 750 g.p.m. and light Trailers 8 Nos. 650 g.p.m. were purchased in the year 1978.		

In the year 1978 a high level Central Inspection Team deputed by Government of Pakistan visited the Karachi Port Trust Fire Services installation and recommended some more items of modern fire fighting equipment which were provided in the Budget Estimates 1979-80.

A. New Fire Station was proposed to be constructed in the new T.P.X. Area which was provided in the Budget Estimates and the construction is under process with the Civil Engineering Department. As already mentioned one more new Fire Station is under construction in the Keamari Groyne Complex and would be ready soon for occupation,

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The necessary equipment for the new Fire Station in Croyna Complex have already been provided as above.

The following items of equipment have been provided in the Budget Estimates 1979-80 & 1980-81.

1. Purchase of combination Fire Tender for Dangerous Cargo Shed as recommended by Central Inspection Team ..... 1 1979-80
2. Purchase of Water Tender of 1500 gallons capacity each for new TPX Fire Station. .... 2 1979-80
3. Replacement of One Foam Fire Tender .... 1 1979-80
4. Replacement of Trailer Pumps ..... 5 1979-80
5. Purchase of Remote Control Foam Monitor for Oil Piers recommended by Central Inspection Team..... 1 1978-80

The following items of equipment which were provided in the Budget Estimates from the year 1975-76 to 1978-79 have been received and are in operation.

1. Foam and Dry Powder Fire Tender ..... 1
2. Fire Tenders (Water) ..... 3
3. Foam Generating Fire Tender ..... 1
4. Mobile Foam Units ..... 6
5. Variable Foam Inline Inductor ..... 6
6. Trailer Pumps ..... 5
7. Automatic Fire Extinguishers.  
(Dry Powder) ..... 30
8. Heavy duty pumps 750 g.p.m. .... 2
9. Trailer Pumps ..... 8

In view of the receipt of new Fire Fighting Equipment during the period from 1971 to 1980 the position of equipment at each Fire Station is as under:-

CENTRAL FIRE STATION, KEAMARI.

1. Fire Tender (Water). .... 3
2. Foam Tender. .... 2
3. Hydraulic Platforms ..... 2

4. Hose Tenders	.....	2
5. Trailer Pumps (Light)	.....	14
6. Trailer Pumps (Heavy)	.....	2
7. Portable Pumps	.....	8 <i>to be provided</i>
8. Submersible Pumps	.....	2
9. Water/Foam Monitors	.....	1
10. Mobile Foam Units	.....	3
11. Multiple Jet Foam Inductor	.....	1
12. In-line Foam Inductor	.....	6
13. Pick-up	.....	1
14. Jeep (for Port Fire Officer)	.....	1
15. Breathing Apparatus	.....	9

M.I. YARD FIRE STATION.

1. Fire Tenders (Water)	.....	3
2. Water/Foam Monitor	.....	1
3. Mobile Foam Units	.....	3

GRAYNE COMPLEX FIRE STATION

1. Foam Fire Tender	.....	1
2. Dry Chemical & Foam Tender	.....	1

T.P.X. FIRE STATION

1. Fire Tenders (Water)	.....	2
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MANORA FIRE UNIT

1. Land Rover Fire Engine	.....	1
2. Trailer Pump	.....	1

FIRE FLOAT "SAHIL"

	.....	1
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In addition to the procurement of above fire fighting equipment the fire hydrant ring main system at East Wharf as already mentioned was extended to Berth No. 1 to 4 and  $C_9^2$  installations were provided in the pump house at B.No.7 and in the Electric Sub-Stations at East Wharves.

Dangerous goods shed was provided with 30 Nos. of Automatic Dry Powder Extinguishers.

Besides the above Fire Fighting equipment the purchase orders have been placed for the following appliances and

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Equipment:

1. Fire Tender Dry Powder & Co<sup>2</sup> ... 1
2. Replacement of Land Rover Fire Engine ... 3
3. Replacement of Trailer Pumps ... 4
4. Remote Control Foam Monitor ... 1
5. Fire Tender (Water) 1500 gallons water tank capacity. ... 2
6. Towing vehicle for Foam Monitors ... 2

The purchase of following appliances and equipment is under process: -

1. Fire Service Snorkel ... 1
2. Heavy duty Trailer Pumps ... 2
3. Combination Fire Tender ... 1
4. Replacement of Foam Tender ... 1

COMMUNICATIONS SYSTEM AND ITS EQUIPMENT

(a) TELEPHONES

A 2 + 10 lines inter communication system was installed at the Central Fire Station to facilitate efficient working for different sections in Port Fire Service.

(b) V.H.F. SYSTEM

Besides the telephone arrangements at Fire Stations V.H.F. system was introduced in the Fire Service for its rapid deployment. Two main V.H.F. communication stations at Central Fire Station and T.P.X. Fire Station were established to streamline the working of the Fire Services. 12 mobile V.H.F. sets were also fitted in the fire tenders and vehicles to facilitate communication in case of fire.

8 portable Walkie Talkie sets were also provided for quick and point to point instructions.

(c) PUBLIC ADDRESS SYSTEM

A public address system has been installed in lecture room of the Central Fire Station for giving lectures to the trainees and enabling the orators

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to address the visiting teams for introduction and working of the Port Fire Section.

Four loud hailers have been also provided on the Fire Tenders to give instructions to the Fire Service crews during fire fighting operations.

(d) ELECTRIC FIRE ALARM SYSTEM IN T.P.X.

An electric alarm system was installed in the year 1973 in the TPX area where large quantities of cotton for export are stored. This system comprises of 21 Fire Alarms Boxes fixed at various locations in the yard. The fire alarm system is connected to the main supply from K.E.S.C. but in case of power failure it automatically switches over to a standby battery system provided with that plant.

To sum up, the present overall position of Fire Stations, Fire Fighting Appliances and Equipments with the Port Fire Service is as follows: -

(a) FIRE STATIONS

1. Central Fire Station, Kumbhari
2. Groyne Complex Fire Station
3. M.I. Yard Fire Station.
4. T.P.X. Fire Station
5. Manora Fire Unit
6. Fire Float 'Sabil' (floating Fire Station)
7. New T.P.X. Fire Station (under process)

(b) FIRE FIGHTING APPLIANCES AND EQUIPMENT

1. Fire Tenders (water)	1000	1	...	942
2. Fire Tenders (Foam)	1	...	3	
3. Fire Tender (Dry Powder and Foam)	1	...	1	
4. Light Fire Engine	1	...	1	
5. Hydraulic Platforms	2	...	2	
6. Large Trailer Pumps	14	...	14	
7. Heavy Trailer Pumps	2	...	2	
8. Portable Pumps	6	...	6	
9. Submersible pumps	2	...	2	
10. Foam Monitors	1	...	1	
11. Hoop Tenders	2	...	2	
12. Pick up	1	...	1	
13. Jeep (for Port Fire Officer)	1	...	1	

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14. Mobile Foam Units	...	6
15. Multiple Jet Foam Inductor	...	1
16. Inline Foam Inductors	...	6
17. Foam Compound	...	2250
18. Breathing Apparatus	...	9
19. Fixed V.V.P. Sets	...	2
20. Mobile V.V.P. Sets	...	12
21. Walkie Talkie sets	...	4

All the above Fire Tenders and Pumps are equipped with necessary Fire Fighting gears.

FIRE FIGHTING SYSTEM AT OIL PIER - IV

Under the Fourth Project of Karachi Port an additional 73,000 D.W.T. Oil Tanker Berth at OP-IV was commissioned in the year 1978. Elaborate fire fighting arrangements have been provided on the berth which comprises an electric-cum-diesel pump to feed the two remote control foam monitors and three fire hydrants. Two foam tanks of 600 gallons foam capacity each have been provided which are connected to the fire fighting main. The system is looked after by the Port Fire Services.

AUTOMATIC RINGMAIN SYSTEM IN WEST WHARF

An automatic ringmain system has been installed in the West Wharf from Berth No. 21 to 24 with 90 fire hydrants installed suitably spaced covering all the sheds, open plantings and roadways. The system is fed by electrical pumps installed in a pump house at Berth No. 22.

Further extension of the system to berth No. 20 and onward is under installation and would be in commission soon.

The provision for procurement of fire fighting equipment was further made as follows in the Budget Estimates for the year 1980-1981 and 1981-1982.

1 9 8 0 - 1 9 8 1

1. Light Trailer Pumps - 650 g.p.m. ... 4
2. High Expansion Foam Generating/ SMC extracting units. ... 3 units
3. High Expansion Foam Compound ... Gallons (2250 Litres)

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capacity

1961 - 1982

1. Towing Vehicle and special equipment carrier. ... 1
2. Fresh Air Hose Breathing apparatus ... 4
3. Self Contained Breathing apparatus close circuit of 90 minute duration ... 5
4. Anti-contamination protective clothing ... 5 sets
5. Submersible pumps capacity 1500-2000 gals. per minute ... 2
6. Portable cine projector 16 mm with screen 220 V-50Hz sound out-put 10 watts complete with Fire & Rescue Training films and slide projector 2" x 2", 35 mm size (for training purpose) ... 1

The fire risk always increases due to the structural and industrial development and the Karachi Port is no exception. The structural development is going on rapidly alongwith the industrial development and it is hoped that the capacity of the Port will increased considerably constituting greater fire risk accordingly within next 5 years.

In view of these developments the following fire fighting appliances and equipment would be necessary to be provided with provision of a sub-fire Station at Manora in the next 5 years: -

1. Construction of a Sub-Fire Station at Manora
2. Provision of Fire Boats about 23 ft. in length with fire fighting pumps & gears ... 2
3. Mobile Foam Minotors having 200 gallons Foam Tank capacity ... 2
4. Trailer Pumps large - 650 g.p.m. ... 6
5. Fire Tender (water) for M.I. Yard & West Wharf 1000 gallons water tank capacity ... 2
6. Fire Tenders (water) 500 g.p.m. water tank capacity for Manora ... 2
7. High Expansion Foam Generating unit/smoke extracting units.

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8. Breathing apparatus of different duration	12
9. Gas Masks	... 144
10. V.H.F. Sets fixed units	... 7
11. Mobile V.H.F. sets	... 24
12. Walkie Talkie sets	... 12
13. Fire Alarm system at East, West Wharves and T.P.X.	...
14. Towing Vehicles	... 3
15. Rescue van with automatic escapes and sliding equipment	... 2

#### CONCLUSION

The fire services play a very important role in safeguarding the economy of the country against fire, the Karachi Port being the gateway to Pakistan must receive serious consideration so far as the fire fighting arrangements are concerned and it may be seen that every effort is being made to bring the fire services on the international code and practice and to a great extent this has been done.

The most important installations which still remain to be replaced is the ring main system in the T.P.X. area alongwith the China Creek pump house which is 40 year old. The system can not withstand the required pressure for a big conflagration.

In the present era of science and technological development new fire fighting equipments are being manufactured every now and then and the Karachi Port Trust Fire Services must possess such suitable equipment according to the conditions prevailing at the Port in its various stages of development in order to meet its obligations.

KARACHI HAZARDOUS STORAGE FIRE MONITORING & CONTROL CELL

1. Hazardous storages are located in the following areas of Karachi and its vicinity.

- a. Keamari Oil Installations Storage Area.
- b. Karachi Port; including TPX Cotton Export Yard, East and West Wharves, Manora and other storage areas.
- c. Storages and installations at Korangi Refineries.
- d. Storage at proposed PARCO terminal at Pipri.
- e. Proposed tank farms for transit storage at Port Qasim.
- f. Strategic areas within Karachi Municipal limits.
- g. Airport areas and related institutions.

Adequate fire fighting systems/equipment and trained personnel are available with KPT and KMC to cover normal fires in the port areas (b) and Karachi Municipal Limits - (f).

For major conflagrations and disaster situations, all resources have to be mobilised. KPT has prepared a comprehensive proposal for setting up a well equipped fire fighting unit for Keamari Oil Installations Storage Area - (a) (with requisite equipment, necessary fire fighting materials, latest technology and well trained personnel, ready to go into instantaneous action when required). Similar set ups will have to be arranged by refineries at Korangi - (c), by PACO at Pipri Storage Terminal - (d), Port Qasim at their proposed transit storage - (e), and Civil Aviation Authority at Karachi Airport - (g).

2. There is, however, a need to establish a coordinating body which should devise measures, systems, controls and monitor for avoidance of and tackling major oil conflagrations. As this essential coordination is between various government and non-government organisations, it is best if such a body is vested in a government organisation. Accordingly, a fire monitoring and control cell is proposed to be set up under the Ministry of Communications, Ports and Shipping Wing, Karachi and charged by the Federal Government.

a)- Name of Cell

A special cell designated as "Karachi Hazardous Storage Fire Monitoring and Control Cell" (KHSPM&C) is to be set up at Karachi under the directions of the Director General Ports and Shipping, Ministry of Communications.

b)- Scope of KHSPM&C Cell

The cell would be responsible for drawing up measures, rules and regulations and their implementation for the control and monitor for the avoidance of and tackling major oil conflagrations of the hazardous storage in the Karachi area and coordinate between various government and non government organisations.

## Annexure A

The main areas and the organisations responsible are as under:

1. Keamari Oil Installations Storage Area - KPT
2. Karachi Harbour Area including Port Installations at East and West Wharves, Keamari Groyne, TPX, Manora and other storage areas - KPT
3. Storages and installations at Korangi Refineries - NRL/PRL
4. Storage/Tankage at Proposed PARCO Terminal at Pipri - PSO/PARCO
5. Harbour Area/Port Installations and proposed tank farms for transit at Port Qasim - PQA
6. Strategic Areas within Karachi Municipal limits - KMC
7. Karachi Airport including installations - CAA

### c)- Legal Aspects of the KHSFM&C Cell

The Director General, Ports and Shipping Wing, Ministry of Communications will be the Chief Fire Controller and Chairman of the Advisory Committee. The Fire Controller under the DG, will be head of the Monitoring and Control Cell with three sections (inspection, regulation and training) and secretarial staff.

### d)- Charter of Duties

- i. To devise measures, systems, controls and monitoring for avoidance of and tackling major oil conflagrations in the Karachi area.
- ii. To draw up regulations monitoring and control of normal fires, arrange periodical inspections to ensure that each agency is carrying out its responsibilities within its jurisdiction. In case of default, penalties prescribed by the Federal Government would be imposed.
- iii. To arrange training facilities, both locally and abroad to staff/skilled personnel of various fire fighting set ups in Karachi and help in acquiring latest methods and techniques for fighting fires and to keep abreast with the developments in technology in consonance with the international practices on continuous basis.
- iv. To advise the agencies on training requirements; latest developments in fire fighting materials, equipment and techniques; and new measures, systems and control strategies for handling fires during major conflagrations and disaster situations.
- v. Updating of safety rules and regulations and coordinating inter agency liaison, regarding fire prevention and fire fighting of hazardous storages in Karachi area.
- vi. To take all such measures germane to the progressive objectives of the fire monitoring cell.

Annexure A

- e)- The cell will operate under the policy guidance of an advisory committee to be headed by its chairman and comprising of members from various organisations/government agencies and departments.
1. Chairman of the Advisory Committee - Director General Ports and Shipping, Ministry of Communications.
  2. Representative of Ministry of Petroleum.
  3. Representative of Ministry of Industries.
  4. Representative of Karachi Port Trust.
  5. Representative of Port Qasim Authority.
  6. Representative of Oil Companies Advisory Committee.
  7. Representative of Mollasses/Edible Oil Storage Companies.
  8. Representative of Industrial/Chemical Storage Companies.
  9. Representative of Karachi Metropolitan Corporation.
  10. Representative of Civil Aviation Authority.
  11. Representative of Pakistan Navy.
  12. Representative of National Refinery/Pakistan Refinery.
  13. Representative of PARCO/PSO
  14. Representative of Civil Defence.
  15. Member/Secretary - Fire Controller (Incharge of KHSFM&C Cell).

f)- Organizational Set up, Financing and Budgeting

- i. Cell will be headed by "Fire Controller", an officer in Grade 18/19 with minimum 10 years experience in fire fighting. He will be assisted by the following staff:

- Fire Inspector - Grade 17) for inspection and surveillance.
- Assistant Law Officer - (Grade 17) - for guidance and control of safety rules and regulations.
- Training Officer - (Grade 17) - for arranging training programmes.

Secretariat Staff

- |                    |   |        |
|--------------------|---|--------|
| - Office Assistant | - | 1 No.  |
| - Steno Typist     | - | 1 No.  |
| - Senior Clerk     | - | 1 No.  |
| - Junior Clerk     | - | 1 No.  |
| - Peons            | - | 3 Nos. |
| - Sweeper          | - | 1 No.  |

Appendix A

ii. The following equipment will be required to set up the cell.

Staff car/jeep	-	250,000/-
Office equipment	-	100,000/-
VHF Communications Sets 4 Nos.	-	<u>250,000/-</u>
	Rs.	<u>600,000/-</u>

iii. The annual recurring expenses for working of the cell including salaries, benefits and office/other running expenditures will be Rs.400,000/-.

iv. The initial cost of Rs.600,000 and running expenses of Rs.400,000/- per annum will be borne by the Federal Government.

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FIRE FIGHTING AND CONTROL MEASURES AT THE PORT OF KARACHI AND OIL INSTALLATIONS AREA

1. The Port of Karachi has an integral fire <sup>prevention</sup> preservation and control system, with a central fire station at N.M. Road and five sub-fire stations as under:
  - a. Central fire station at N.M. Road. Headquarters with VHF base station, radio fire alarm receiving station and equipment to fight major fires.
  - b.
    - i. Sub fire station at TPX With VHF station,
    - ii. Sub fire station at M.I. yards radio fire alarm and equipped to fight up to 'A' class fires.
    - iii. Sub fire station at Keamari Groyne
    - iv. Sub fire station at Manora.
    - v. Sub fire station at C-Group storage area.
2. The whole Port Area, including TPX and Groyne storage areas is also provided with fire cover through ring main system including more than 1000 fire hydrants and pumping stations, thus sea water is immediately available within 200 ft of any location of fire.
3. For fire preservation and control on board the ships and for augmenting the fire prevention capability in the shore based installations, KPT has a specially equipped fire fighting floatilla comprising of a fire fighting float and two modern VSP harbour tugs fitted with fire monitors.
4. Fire fighting in the Port bonded/security area and at oil piers is the responsibility of KPT, where a modern fire fighting system exists and this responsibility is being adequately discharged without any problems.
5. The Keamari Oil installation storage area (KOISA) is situated away from the Port installations and has been under the administrative control of Karachi Metropolitan Corporation which is presently responsible for fire fighting in the area and also receives relevant dues/taxes from KOISA. Despite this the normal fires are attended by the Karachi Port Fire Service as an obligation in the interest of national security.
6. In 1971 War, when the KOISA was attacked by the enemy, fire broke out in the oil storage tanks of different companies and about 150,000 tons of oil was destroyed. The fire fighting arrangements were inadequate as these could not cope with putting out of fires in those tanks.
7. As recommended by various expert committees and as discussed/agreed at various forums, the KOISA is a vital strategic

ANNEXURE-B

installation of immense national and economic importance and hence should have a comprehensive and effective fire fighting cover comprising a live, viable and fully equipped fire fighting set-up, ready to go into instantaneous action during major fire/conflagration.

8. Based on above and as advised by the Ministry of Communications the Karachi Port Trust has prepared a comprehensive plan for fire fighting arrangements at Keamari Oil Installations storage area, comprising interalia two fire stations (one at each end of the oil installation area), fully equipped with fire fighting appliances/equipment and manpower to tackle major oil conflagrations. In addition a closed ring main sea-water system with hydrants and a pumping station has been proposed.
9. For updating of existing facilities and augmenting further for a comprehensive fire cover to Keamari Oil Installations Area, KPT will require an initial cost of Rs.4.0 crores and an annual operating expenses of Rs.42 lakhs. The initial cost is proposed to be met by KPT from its own development fund. Initial cost and operating expenses are proposed to be recovered through a levy of Rs.7.50 per m/ton of oil storage, payable by the various allottees/lessees of the plots in KOISA, based on their storage capacities.

(FAROOQUE A. CHAUDHRY)  
PROJECT MANAGER (EAST)  
R&D DIVISION  
K.P.T.



ANNEXURE-B

FIRE FIGHTING ARRANGEMENTS AT KEAMARI: OIL INSTALLATION STORAGE AREA (KOISA)

General

KOISA should have two fire stations, fully equipped with fire fighting appliances/equipment and manpower. In addition, a closed ring main sea-water system with hydrants and a pumping station is essentially required. As KPT already has a fire station, at Groyne Area, only one additional fire station will be required and the existing one will be updated to meet the additional requirements.

Appliances/Equipment

The list of additional appliances/equipment is as under:

- |  |        |                |
|--|--------|----------------|
| 1. Fire Tenders (Foam) having capacity of 4500 litres of water and 900 litres of Foam Compound with all necessary Fire Fighting Gear and fitted with a Fire Pump through Power take-off. | 3 Nos. | Rs.60,00,000/- |
| 2. Fire Tenders (Foam & Dry Powder) having a capacity of 900 litres of Foam Compound and 500 Kgs. Dry Powder fitted with a Fire Pump through Power take-off.                             | 1 No.  | Rs.25,00,000/- |
| 3. Trailer Fire Pumps (Large) with all accessories.  | 3 Nos. | Rs.12,00,000/- |
| 4. Foam Monitors having 900 litres Foam Compound capacity.   | 2 Nos. | Rs. 2,00,000/- |
| 5. Light Five Engine fitted with Fire Pump through Power take-off.   | 1 No.  | Rs. 6,00,000/- |
| 6. Tank Master Trailer Units with 2 self contained booster pumps for base injection of Foam.   | 1 No.  | Rs.10,00,000/- |
| 7. Portable bipot Foam Cannons having foam output of 16,200 litres/min at 7 bars.  | 2 Nos. | Rs. 3,00,000/- |
| 8. Towing Vehicles.  | 2 Nos. | Rs. 6,00,000/- |

Contd.....on P/4

ANNEXURE-B

9.	Dry Chemical Mobile Units 250 Kgs. complete in all respect.	3 Nos.	Rs. 5,00,000/-
10.	Staff Car for Fire Officer and Asstt. Fire Officer.	1 No.	Rs. 3,00,000/-

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Rs.1,32,00,000/-  
=====

Essential Stores

The following stores are essentially required as initial stock:

1.	Foam Compound (A.F.F.F.) Aqueous Film Forming Foam.	45,000 lits.	Rs.20,00,000/-
2.	Foam Inline Inductors. (Variable).	12 Nos	Rs. 2,00,000/-
3.	VHF Communications sets (Mobile, Base and Walkie Talkie Sets).	Lumpsum	Rs.11,00,000/-
4.	Radio Fire Alarm System with 20 call boxes.	Lumpsum	Rs.16,00,000/-
5.	Delivery Hose Pipes of 75 feet length complete with male and female coupling (instantaneous)	500 Nos. lentthş.	Rs.10,00,000/-
6.	Dry Chemical Powder ABC type.	5000 kgs.	Rs.15,00,000/-
7.	Misc. Small gear viz. branch pipes, foam branch pipe, spray nozzles etc.	Lumpsum	Rs. 5,00,000/-
8.	High expansion foam generating sets complete with smoke ejectors.	2 Nos.	Rs.10,00,000/-
9.	Office Furnitures etc.	(Estimated)	Rs. 3,00,000/-
10.	Control Room fitting including PABX	(Estimated)	Rs. 1,00,000/-

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Rs.93,00,000/-  
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ANNEXURE-B

Fire Station Building/Premises

- Plot/premises 2000 sq yards	=	on KPT's land
- Fire station building 50'x40' and double storey = 4000 sq.ft.	=	Rs. 16,00,000/- #=====

Ring Main System and Pump House

- Providing, laying & jointing 10" dia. pressure pipes 16,200 ft at Rs.600/- per lft	=	Rs.97,20,000/-
- -ditto- however 6" dia. 6100 lft at Rs. 400/- per lft.	=	Rs.24,40,000/-
- Provision of 150 No hydrants at Rs.5000 each	=	Rs. 7,50,000/-
- Cost of pump house building, pumps & other facilities.	=	Rs.25,00,000/- -----
Total		Rs.1,54,10,000/-

Office Equipment/Computerisation

The fire stations should be equipped with modern office appliances and 2 PCs (computers) for monitoring and control.

Rs. 5,00,000/-  
=====

Manpower

The manpower/staff required for operations, secretarial services, inspection/maintenance and stores along with annual costs is as under:

A. Operations Staff

1. Asstt. Fire Officer	1	Rs. 50,000/-
2. Fire Station incharges at Rs.40,000/- per annum each.	4	Rs.1,60,000/-
3. Telephone dum wireless operators at Rs.36,000/- per annum each.	4	Rs.1,44,000/-
4. Leading Fireman, at Rs.18,000/- per annum each.	10	Rs.1,80,000/-

ANNEXURE-B

5. Firemen Drivers at Rs.18,000/- per annum each.	18	Rs.3,24,000/-
6. Firemen at Rs.12,000/- per annum each.	48	Rs.5,76,000/-
7. Engine Drivers at Rs.18,000/- per annum each.	4	Rs. 72,000/-
8. Cleaners at Rs. 12,000/- per annum each.	4	Rs. 48,000/-
		-----
		Rs.15,51,000/-
		=====

B. Secretariat Staff

1. Steno Typist at Rs.24,000/- per annum.	1	Rs. 24,000/-
2. Senior Clerk at Rs. 24,000/- per annum.	1	Rs. 24,000/-
3. Peons at Rs.12,000/- per annum each.	2	Rs. 24,000/-
4. Sweepers at Rs.12,000/- per annum each.	2	Rs. 24,000/-
		-----
		Rs. 96,000/-
		=====

C. Inspection & Maintenance Staff

1. Chargeman (Workshop) at Rs. 30,000/- per annum.	1	Rs. 30,000/-
2. Mechanic at Rs.24,000/- each.	1	Rs. 24,000/-
3. Helper (Mechanic) at Rs.12,000/- per annum each.	1	Rs. 12,000/-
4. Plumber at Rs.24,000/- per annum each.	1	Rs. 24,000/-
5. Khalasy at Rs.12,000/- per annum each.	3	Rs. 36,000/-
		-----
		Rs.1,26,000/-
		=====

Contd....on P/7

ANNEXURE-B

D. Stores Cell

1. Stores Keeper at Rs. 30,000/- per annum.	1	Rs. 30,000/-
2. Khalasy at Rs.12,000/- per annum each.	2	Rs. 24,000/-
		-----
		Rs. 54,000/-
		=====

E. Total Annual Manpower Cost

A + B + C + D	Rs.18,30,000/-
	=====

Replenishment of Equipment/Stores

For effective operation of the system, replenishment of stock and spares for repair/maintenance of appliances/equipment will be about Rs. 23,00,000/- per annum.

=====

Summary of Finances Required

Capital Cost

- Appliances/Equipment	=	Rs.1,32,00,000/-
- Essential Stores	=	Rs. 93,00,000/-
- Fire Station Building/ premises.	=	Rs. 16,00,000/-
- Ring Main System & pump house.	=	Rs.1,54,10,000/-
- Office Equipment/computer- isation.	=	Rs. 5,00,000/-
		-----
		Rs.4,00,10,000/-
		=====

Operating Cost

- Manpower	=	Rs. 18,30,000/-
- Replenishment/stores	=	Rs. 23,00,000/-
		-----
		Rs. 41,30,000/-
		=====

The setting up of the fire fighting arrangements at Keamari Oil Installation Storage Area will require an initial cost of Rs. 4.0 crores and an annual operating expense of about Rs.42 lakhs.

Recovery of Cost

The cost is recoverable from the beneficiaries i.e. oil companies/refineries and other marketing companies with plots in the Keamari Oil Installations storage area. The annual recoverable cost, based on a 25 years lease period is as under:

A.	Capital Cost of setting up fire fighting facility.	=	Rs. 4,00,00,000/-
	Annual capital cost over 25 years.	=	Rs. 16,00,000/-
	Average annual interest on investment cost at 14%.	=	Rs. 28,00,000/-
	Annual cost for operation.	=	Rs. 42,00,000/-
	Total annual recurring cost	=	Rs. 86,00,000/-

B. There are three methods to recover the above cost:

- through a levy/tax payable by companies based on the area of their plots
- through a levy/tax payable by companies based on the tonnage of liquid POL storage
- a general cess on the POL cargo (both imports and exports handled at the port).

i. Levy Based on Plot Areas

The list of various allottees/lessors of plots in the KOISA is enclosed and the total area = 8,95,040 sq meters.

$$\begin{aligned} \text{Levy per sq. meters} &= \frac{\text{Rs. 86,00,000}}{8,95,040 \text{ sq. m}} \\ &= \text{Rs. 9.61 per s/m} \\ &\text{Say Rs. 10 per s/m} \end{aligned}$$

ii. Levy Based on Storage Capacity

The list of various companies with respective storage capacities in the KOISA is enclosed and the total storage at Keamari = 1,136,751 tons

$$\begin{aligned} \text{Levy per ton storage} &= \frac{\text{Rs. 86,00,000}}{1,136,751 \text{ tons}} \\ &= \text{Rs. 7.56 per ton} \\ &\text{Say Rs. 7.50 per ton storage} \end{aligned}$$

iii. Cess of Liquid Cargo

The liquid cargo (imports and exports) handled at the Port of Karachi during 1988-89 is about 10 million tons.

$$\text{Cess per ton} = \frac{\text{Rs. } 86,00,000}{100,00,000 \text{ tons}}$$

$$= \text{Rs. } 86 \text{ per ton}$$

i.e. the wharfage on oil to be increased by Rs. 0.86 per ton.

C. Recommended Mode of Recovery

As the recovery is to be made from the direct beneficiaries, the alternative B(ii) i.e. a levy payable by the various allottees/lessees of the plots in KOISA and based on the storage capacity is the most equitable solution. Accordingly, a levy of Rs. 7.50 per ton of storage is proposed to be recovered, from various companies in the KOISA area, based on their storage capacity in m. tons.

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KARACHI PORT TRUST  
(PORT FIRE SERVICES)  
\*\*\*\*\*

COMPILATION OF PORT STATISTICS:

I. FIRE FIGHTING VEHICLES/APPLIANCES:

1. Fire Tenders (4500 Litres Capacity).	= 10 Nos.
2. Foam Fire Tenders.	= 4 "
3. Foam & Dry Powder Fire Tender.	= 1 No.
4. Fire Tenders (6750 Litres Capacity Water)	= 2 Nos.
5. CO <sub>2</sub> and Dry Powder Fire Tender.	= 1 No.
6. Combination Fire Tender (CO <sub>2</sub> Dry Chemical & Foam)	= 1 "
7. Fire Fighting "SNORKEL"	= 1 "
8. Light Fire Engines.	= 4 Nos.
9. Hose Tender & Towing Vehicles.	= 4 "
10. Special Equipment Carriers.	= 2 "
11. Ambulance. (Nisan)	= 1 No.
12. Jeep for Port Fire Officer.	= 1 "

II. FIRE FIGHTING PUMPS:

1. Heavy Fire Trailer Pumps.	= 4 Nos.
2. Fire Trailer Pumps.	= 26 "
3. Portable Fire Pumps.	= 2 "
4. Submersible Pumps (Petrol Driven)	= 2 "
5. Submersible Pumps (Electrical Driven)	= 2 "

III. DRY CHEMICAL, HALON AND FOAM UNITS:

1. Trailers with 500 Kgs. Halon BCF-1211.	= 2 "
2. Dry Chemical Units 500 Kgs. Trailers	= 2 "
3. Mobile Foam Units.	= 6 "

IV. FOAM INDUCTORS, FOAM BRANCHES AND FOAM GENERATORS:

1. Multiple Foam Set Induction.	= 1 No.
2. In-Line Foam Inductors.	= 10 Nos.
3. Foam Branches No.5	= 2 "
4. Foam Branches No.10	= 17 "
5. Foam Branches No.20	= 1 No.
6. High Expansion Foam Generators (Mini)	= 2 Nos.
7. High Expansion Foam Generators.	= 2 "
8. Elkhart Special Nozzles (Selecto Matic AFFF)	= 6 Nos.

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KARACHI PORT TRUST:  
(PORT FIRE SERVICES)  
\*\*\*\*\*

COMPILATION OF PORT STATISTICS:

V. MONITORS & SPECIAL BRANCHES:

1. Foam Monitors with F.B. 40.	= 2 Nos.
2. Remote Control Monitor.	= 1 No.
3. Portable Ground Monitors (100 GPM)	= 6 Nos.
4. Elkhart Electrical Fog Nozzles(L-205)	= 6 "
5. High Pressure Branch Pipe AWS(Pistol Type) with Foam Attachment.	= 12 "
6. Water Fog Automizer (ZR 300)	= 9 "
7. Mystery Jumbo Nozzle.	= 6 "

VI. LIFE SAVING/PROTECTIVE EQUIPMENTS:

1. Breathing Apparatus Sets(Fenzy) Modle-67-J French Origion,	= 5 Sets.
2. Fresh Air Breathing Apparatus Sets. Fenzy Modle 9325 French Origion.	= 4 "
3. Breathing Apparatus Sets Normal Air.	= 6 "
4. Gas Masks complete.	= 108 Nos.
5. Anti Contamination Protection Clothings.	= 5 Sets.

VII. FIRE FIGHTING FIXED INSTALLATION:

1. Fire Master Pump at Groyne Complex Fire Station (Fixed Installation)	= 1 No.
2. Fire Fighting Pumps at M/S,5-9, Berth No.7, East Wharf) (Fixed Installation)	= 3 Nos.
3. Fire Fighting Pumps at M/S,23-24 West Wharf (Fixed Installation)	= 3 "
4. Fire Fighting Pumps at China Creek Pump House. (Fixed Installation)	= 3 "

VIII. FIRE FLOAT "SABIL".

1. FIRE FLOAT "SABIL". (Self Suff&cient in all respect)	= 1 No.
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N o t e:

Sufficient quantity of Small Gears such as, Adopter, Breechings, Ordinary Branches, Ladders, Collecting Heads, Couplings Suction Hoses & Delivery Hose Pipes are also available.







