



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

FINAL REPORT

UNIDO PROJECT : MP/SYR/96/121

UNIDO CONTRACT : 97/085/VK

BWI KP AEROFILL REF : 51310E

GASTON BANNA & SONS

CFC REPLACEMENT PROJECT

CONTENTS

- 1.0 Resume of Project Key dates.
- 2.0 Report on installation commissioning and acceptance phases.
- 3.0 Appendices.
 - 3.1 Pressure Test Certificates LPG Installation.
 - 3.2 Basic Safety Training Presentation Notes.
 - 3.3 Certificate of Acceptance (Copy).
 - 3.4 General Views of the Installation.
 - 3.5 Site Plans (3 Sheets)

1.0 Resume of project key dates.

<u>Event</u>	<u>Date</u>
1.1 Contract award to BWI KP Aerofill	14 April 1997
1.2 Contract signed by BWI KP Aerofill and returned to UNIDO	12 May 1997
1.3 Joint visit to site by Mrs M Sanchez of UNIDO and R.L. Russell of BWI KP Aerofill. Basic guidelines established.	22/23 July 1997
1.4 Technical Guidelines and proposed layouts for project completed and sent to UNIDO for approval.	24th Dec 1997
1.5 Equipment despatched to Latakia Syria.	End Dec 1997
1.6 Notification of Equipment arrival at site.	Mid Feb 1998
1.7 First visit to site by project installation team to install equipment and supervise connection of principal services. First round of training sessions.	15-31 July 1998
1.8 Visit to site of commissioning team and of UNIDO representative for start up, continuation of training and acceptance trials.	13-15 Oct 1998

Section 2.0 Report on Installation, Commissioning and acceptance phases.

2.1 First Visit 15th - 31st July

2.1.1 Inspection of equipment.

The installation team of Mr R Sidhu and Mr K Shilham arrived on site on July 15th.

The first task was to unpack the equipment and confirm that all the equipment supplied had arrived in good condition. A number of items, mostly small, were found not to be on the packing list, but arrangements were made to ship them urgently and through the good offices of Mr Michael Banna the items were cleared rapidly through customs and arrived on site without causing undue delay to the installation programme.

2.1.2 Filling Line and Gas House

The filling line and gas house were positioned without significant problem. However the electrical supply to the Test Bath heaters was inadequate and there were severe supply voltage fluctuations (down to 315v).

To circumvent this limitation in the short term the number of heater elements in service was reduced by about 35%.

This would affect the bath "warm up" period but not the running load once the water was up to temperature.

2.1.3 LPG Storage and Pipework

Until relatively late in the life of the project the situation with regard to the supply and storage of LPG was uncertain.

The final solution was to import the gas in returnable cylinders.

Designs for a suitable storage compound were produced as part of the Guidelines and the pipework was prefabricated in accordance with these plans. Some modifications to the pipework were necessary during the installation phase and local specialist welders were utilised to carry out the modifications. Following the installation phase the entire pipework system and the destench column were purged with nitrogen to

- a) create an inert atmosphere inside the system in preparation for the first charging of the system with LPG and
- b) to test the system prior to filling with LPG. The test pressure was 11 bar.

A small number of screwed connections were found to be leaking but the leaks were soon stopped by tightening the appropriate joints.

Once the system was considered leak free it was left pressurised overnight for a period of 12 hours and as there was no evidence of pressure drop during this period the system was charged with LPG in readiness for the commissioning of the filling line.

2.1.4 Plant Safety Systems (Gas Detection and Ventilation)

The safety systems for the propellant filling room and tank farm and their integrated control panel were installed and tested without problem.

The gas detectors were calibrated and Project Counterpart staff received "hands on" training in the operation and regular inspection regimes relevant to the panel. Because of the previously mentioned voltage fluctuations it was necessary to make some adjustments to the gas detection battery "back-up" system charger circuit to ensure correct operation.

(This phenomenon was first noticed in Sudan where similar conditions exist although in the case of Banna & Sons it was not necessary to fit a larger capacity charging unit).

2.1.5 Initial runs of the plant.

As small quantities of gas, product, cans and other components were available, it was possible to run the entire system and carry out initial training in line operation, size changeover and safety systems.

By building up a stock of some 500 of filled and crimped cans on the existing semi automatic equipment it was possible to run the line at about 50 can per minute.

The following day a larger quantity of some 2,500 cans was prepared and gas filled on the line at 55 cans per minute.

The filling accuracy was within the customers standard tolerance band.

2.1.6 Conclusions to the visit

A number of actions and modifications were planned for the second visit.

These were:

- a) To fit a gas pressure switch to the system to shutdown the line in the event of low gas pressure and to indicate the fault on the Gas Manager Control Panel. This proved to be necessary because of the high output of the filling machine relative to the small capacity of the gas cylinders.
- b) Some pipework fittings necessary for the connection of the second propellant pump into the system did not arrive in time for that pump to be installed during the visit. This work was scheduled for the next visit.

2.2 Second Visit 13th-15th October 1998

2.2.1 Persons Present

For KP Aerofill:	R. Sidhu, R L Russell
For UNIDO:	Mrs M Sanchez
For Gaston Banna & Sons:	Mr Michael Banna

2.2.2 Objectives.

- 1.1 Complete outstanding installation work : install second MK6 pump, propellant pressure switch and recalibrate two gas detectors.
- 1.2 Carry out acceptance trials to the extent that available materials allow and to the satisfaction of UNIDO Representative Mrs M Sanchez and the 'Project Counterpart' Gaston Banna and Sons and obtain a signed Certificate of Acceptance.

2.2.3 Proceedings

- 3.1 The outstanding installation work was carried out by R. Sidhu on the 13/10 and with the arrival of a new bottle of calibration gas on the 14/10 the two gas detectors in the LPG cylinder compound were recalibrated and the alarm levels reset at 10% of LEL.
There had been reports that one of these detectors had been giving fluctuating signals and on the night of the 14th the sensor located near to two MK6 pumps went into alarm mode without apparent gas leakage being detected.
Both compound sensors were recalibrated and the alarm levels set at 20%: a very faint smell of LPG could be detected at the pump sealing gland of one of the pumps and as a precaution the gland nut was fractionally tightened. To date no further problems of this nature have been experienced.
- 3.2 The acceptance trials were limited in duration because of the small number of prefilled and crimped cans available; Banna only have semi-automatic Pamasol product filler and crimper and these cannot match the output of the M16 gasser which was set to fill 40gm of LPG at 38 cpm.
Mr Banna is now convinced that he must increase his filling and crimping capacity but no decision is expected to be made for some considerable time.

The gasser filled consistently at 38-40gms although Mrs Sanchez was concerned when a filling head with no can under it discharged gas onto the machine base . It turned out that the injection pressure was set too high causing the injection nozzle servo-piston to open prematurely. The head pressure was adjusted to a lower setting and no recurrence of the problem has occurred.

- 3.3 The day following the trials R. Sidhu returned to site to repeat the training exercises in plant operation and safety systems maintenance, supervising exercises carried out by the key Banna staff.

2.2.4 Conclusions.

- 4.1 The test and acceptance trials although limited in duration because of the small number of cans available and the relatively low output rate of the existing product filling and crimping equipment versus the new propellant filling and leak testing equipment, indicate that the line runs consistently in terms of filling accuracy and output rate.
- 4.2 The Project Counterpart technical and operating staff have a background in aerosol manufacture and readily absorbed the information given in the training sessions.

Report prepared by R L Russell

Dated: 4th January 1999



3.1

**PRESSURE TEST CERTIFICATES
TRAINING INSTALLATION**

PRESSURE TEST CERTIFICATE

BWI KP AEROFILL REF: 51310E

CUSTOMER: UNIDO (FOR GASTON BANNA & SONS,
ALEPPO, SYRIA)

TYPE OF TEST: COMPRESSED GAS

MEDIUM: NITROGEN

TEST PRESSURE: 11 bar

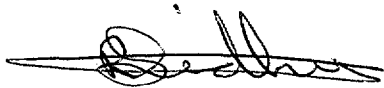
DURATION: 12 HOURS

DESCRIPTION OF PLANT: LPG PIPEWORK AND DEODORISATION
COLUMN

DRAWING REF: X029-97-047/B

DATE OF TEST: 28-29/07/98

TEST CONDUCTED BY: R. SIDHU

SIGNATURE: 

OLD PARK PRO GAS (UK) LTD

SITE LOCATION: BWI KP AEROFILL

CUSTOMER:

BWI KP AEROFILL,
33-35 Clayton Road,
Hayes,
Middlesex,
UB3 1RU.**SOUNDNESS TEST
CERTIFICATE No. 403**

INSTALLATION DETAILS: DESTENCHING COLUMN.

GAS TYPE: AEROSOL PROPELLANT.

NEW OR EXISTING: NEW.

METER TYPE: N/A.

INSTALLATION VOLUME: 3 FT³MINIMUM LEAK DETECTABLE/M³ OF PIPE: NONE

PERMITTED LEAK RATE: NONE

PRESSURE GAUGE TYPE: MS4 RANGE 0-300 PSIG

PRESSURE TEST MEDIUM: NITROGEN

TEST PRESSURE: 295 PSIG

LET-BY TEST PERIOD: N/A

STABILISATION PERIOD: 30 MINUTES

SOUNDNESS TEST PERIOD: 1 HOUR

ANY EXISTING POTENTIAL HAZARDS? NO

MAXIMUM PRESSURE DROP ALLOWABLE: NONE

RESULTS

ACTUAL PRESSURE DROP(IF ANY): NONE

CALCULATED LEAKAGE RATE (IF ANY): NONE

PASS: YES

SIGNED  POSITION ENGINEER.

COMPANY OLD PARK PRO GAS (UK) LIMITED.

DATE NOVEMBER 1997.

BASIC SAFETY TRAINING PROGRAMME

1. Overview of Training Programme

Safety is everybody's business from Manager to Line Operative.

Create a culture of interest, team spirit and a focus on the common goal.

Create a team responsible for setting up procedures teaching the people who will operate them and monitoring and modifying procedures as and when required.

Suggestions for the Plant Operating Safety Team

Site Safety Officer -
Site Training Officer -
Site Fire Officer -
Site Engineer -
Trainers -

The team will probably have an interest in other areas as well as the Aerosol Plant.

The Company may have a structure in place.
Discuss with the team

REVIEW BAMA FEA REQUIREMENTS

BASIC TRAINING

INDUCTION TRAINING

LINE OPERATIVES

FORK LIFT OPERATIVES

PROCESS (MIXING) OPERATIVES

TANK FARM STAFF

QUALITY CONTROL STAFF

STOCK AUDIT STAFF

LINE MECHANICS (INCL. TANK FARM)

ELECTRICAL ENGINEERS

MANAGERS

SECURITY

FIRE FIGHTERS

L.P.G PROPERTIES

What do we know about L.P.G. A.K.A. BUTANE/PROPANE or HYDROCARBON PROPELLANT?

- It is a liquifiable gas stored under pressure in the liquid phase. But with vapour in the top of the tank.
- If spilt or leaked to the open air it will boil off rapidly to vapour.
- It is colourless and has a distinctive smell when delivered to site. After treatment it has only a very slight smell.
- It is non toxic but has Narcotic, Anaesthetic Properties.
- It is heavier than air but lighter than water.
- As a vapour it is highly flammable but only over a limited range of gas air mixtures. About 2% to 10% of gas in air.
- When boiling off from liquid to vapour it removes heat from surface in contact - "cold burns" to skin

How do we handle L.P.G.?

- Store and transfer in closed pressurised system 2-4 bar in liquid phase.

Vessels	}	All must be suitable for pressure and anti static fire safe.
Pipework	}	
Valves & Fittings	}	

- All electrical equipment to be suitable for flammable (Hazardous) area operation. Ex rated for main power systems "Intrinsically Safe" for low voltage (8-9v) non sparking control circuits.
- All of the storage and pipework are electrically continuous (bonding strips across flanged joints, for example) and the whole system is earthed.
- Tanker must be connected to earth before any other connections to it are made.
- The connecting hoses are anti static and pressure resistant. Special L.P.G. Hoses.

FILLING LINE

- Propellant filling takes place in an external room separated from the main room and designed to be explosion resistant (walls and roof).
- During the filling process there is an escape of liquid propellant every time a can is filled. This occurs every time the nozzle adaptor lifts off the valve and is a function of the valve type in terms of quantity of gas lost.
- There is also the possibility of gas loss for other reasons such as faulty or damaged can and/or valve or leaking propellant filling head.
- How do we deal with this potential hazard?
- First by ventilation to dilute and remove the vapour from the room. Two systems are used, one to remove the gas from the immediate Propellant Filler Area, the second to draw air from the floor of the room. (Gas is heavier than Air).
- These systems are two speed and the extraction can be increased by 100% if necessary.
- This action is automatic and is controlled by a system of Gas Detectors installed in the room. If any detector signals a gas concentration of more than 20% of the lower flammable limit (LFL) of the gas that is 20% of 2% gas in air, so still well below the flammable range, then the fans are automatically switched to high speed and audible and visual warnings are given.

If the gas level continues to rise indicating an escalating problem then at 40% of the 'LFL' the line is automatically stopped and gas safety shut-off valves are closed limiting the potential gas leakage to what is in the end of the pipework.

- For the ventilation system to operate effectively the room doors must be closed. Time switches are fitted to each door so that if the door is not closed and latched within say 11 seconds the line will stop.
- Further refinements include air flow switches to monitor the actual flow rate in each system and not merely the fact that the motors are switched on.

- SCRAP CANS WHICH ARE LEAKING

Rejects from the line should be placed in a suitable metal container (not plastic) and removed to an outside designated area where they may safely be emptied.

- Packed filled stock should be transferred from the filling hall to the finished goods area at regular intervals to ensure that there is no major hazard concentration in the filling area.

3.3

CERTIFICATES OF ACCEPTANCE

CERTIFICATE OF ACCEPTANCE

UNIDO CONTRACT 97/085

KP Aerofill Reference 51310E

We, GASTON BANNA & SONS LTD, declare that the equipment supplied under the agreement with UNIDO by BWI KP AEROFILL is successfully erected and commissioned.

Issued by (name) : MICHEL G. BANNA

Date : 23.11.98

I have observed and declare on behalf of the company that:

The delivery has been in accordance with the Agreement Terms of Reference of Project No. **MP/SYR/96/121**.

The installation and commissioning is successfully performed.

Before starting the production, the following actions were taken:

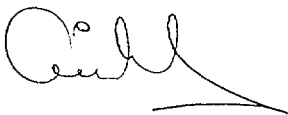
1. The total supply of equipment was inspected and found in accordance with the scope of supply as specified in the purchase agreement.
2. The filling unit output is checked and found to be in accordance with the specified capacity.
3. The control panel and propellant filling room safety systems are functioning properly.
4. No mechanical or electrical failures, which affects the possibility to produce were found, and therefore will not withhold the acceptance certificate.

Cont...

Therefore, in view of fulfillment of the above, I declare herewith that the BWI KP Aerofill equipment is accepted in accordance with the Terms of Reference.

For GASTON BANNA & SONS Ltd:

Name : MICHEL G. BANNA

Signature : 

For UNIDO:

Name :

Signature :

For BWI KP AEROFILL:

Name : R.L. RUSSELL

Signature : 

CERTIFICATE OF ACCEPTANCE

UNIDO CONTRACT : 97/085


KP Aerofill Reference: 51310E

GASTON BANNA & SONS

We, the undersigned, certify herewith that the Equipment and Services detailed in the above Contract and the Appendices have been Supplied, Installed and Tested in accordance with the UNIDO 'Terms of Reference'.

**FOR/
GASTON BANNA**


Name : MICHEL G. BANNA

Signature : 

Date : 23.11.98

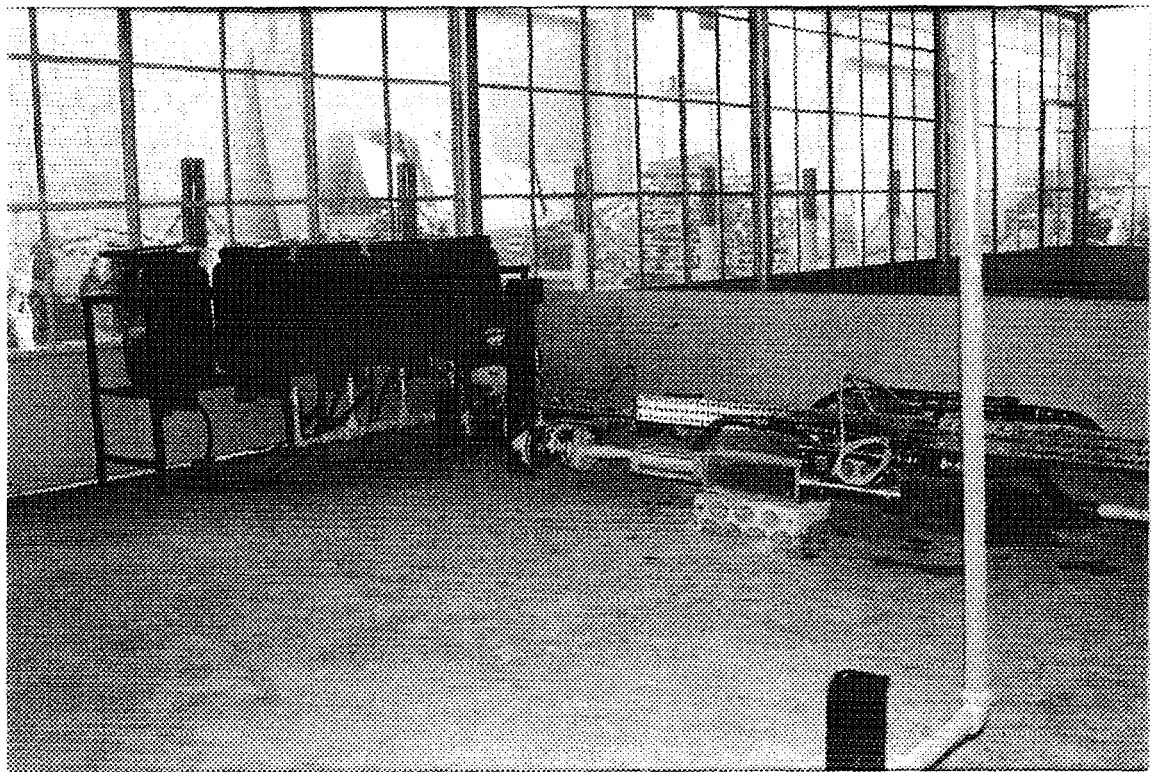
**FOR/
BWI K.P. AEROFILL**

Name : R.L. RUSSELL

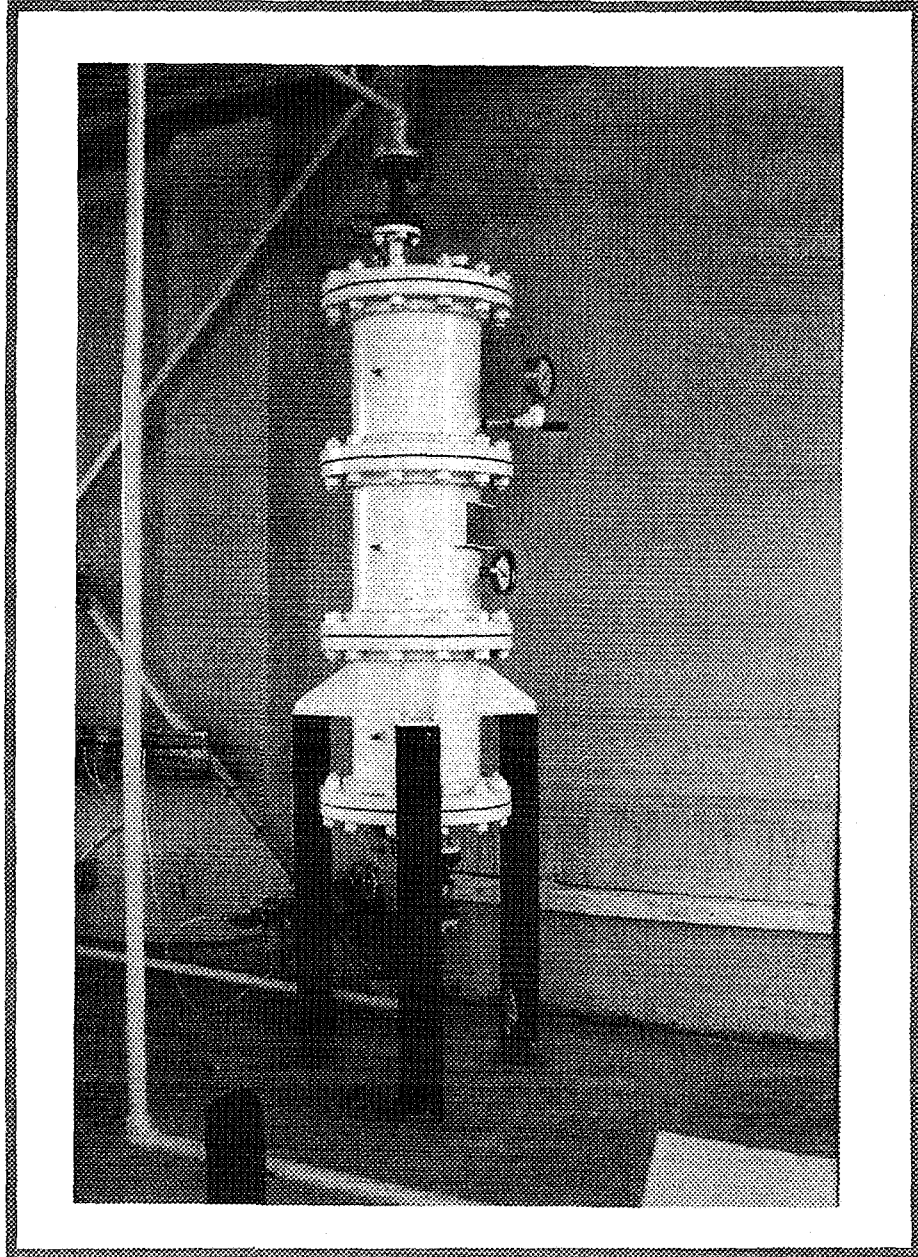
Signature : 

Date : 23.11.98

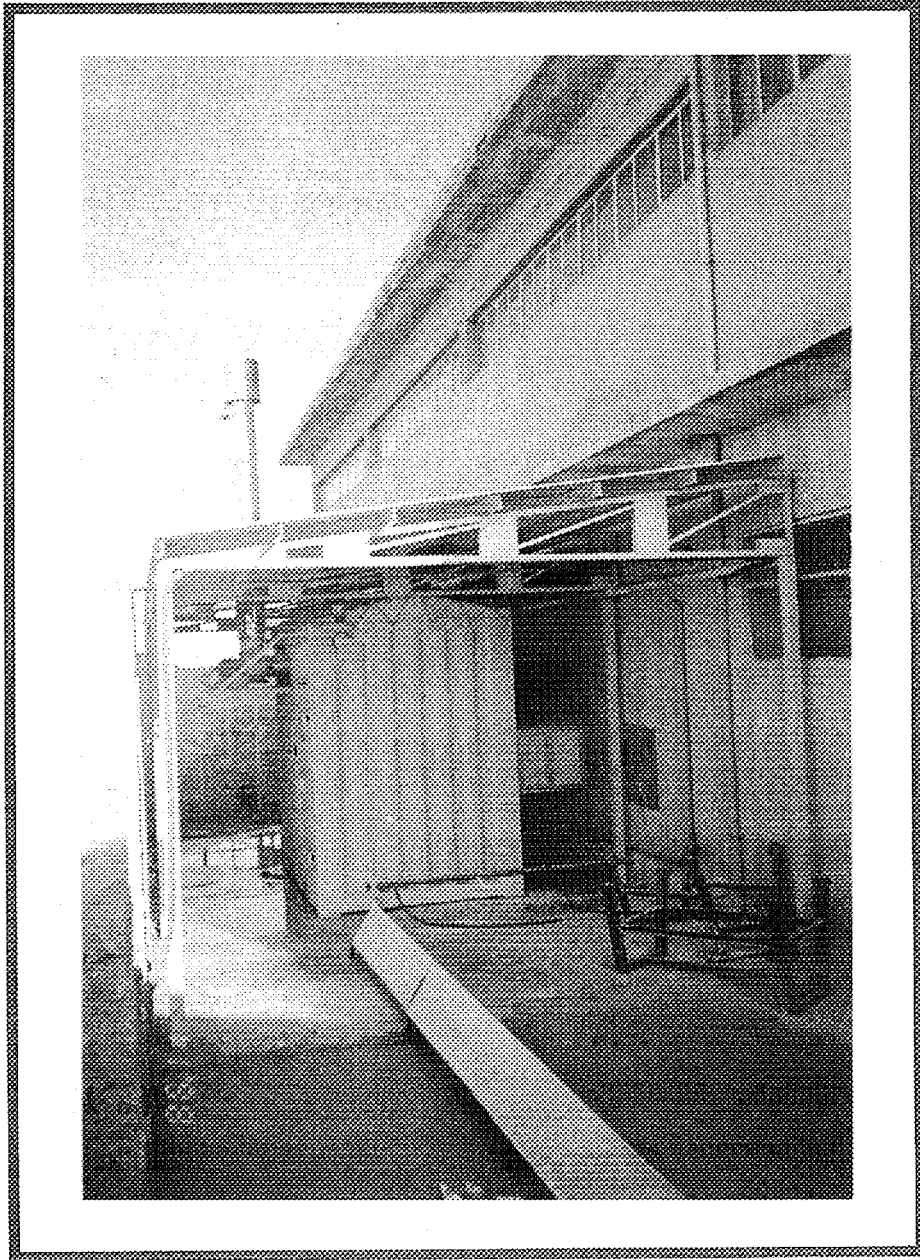
3.4 VIEWS OF THE INSTALLATION



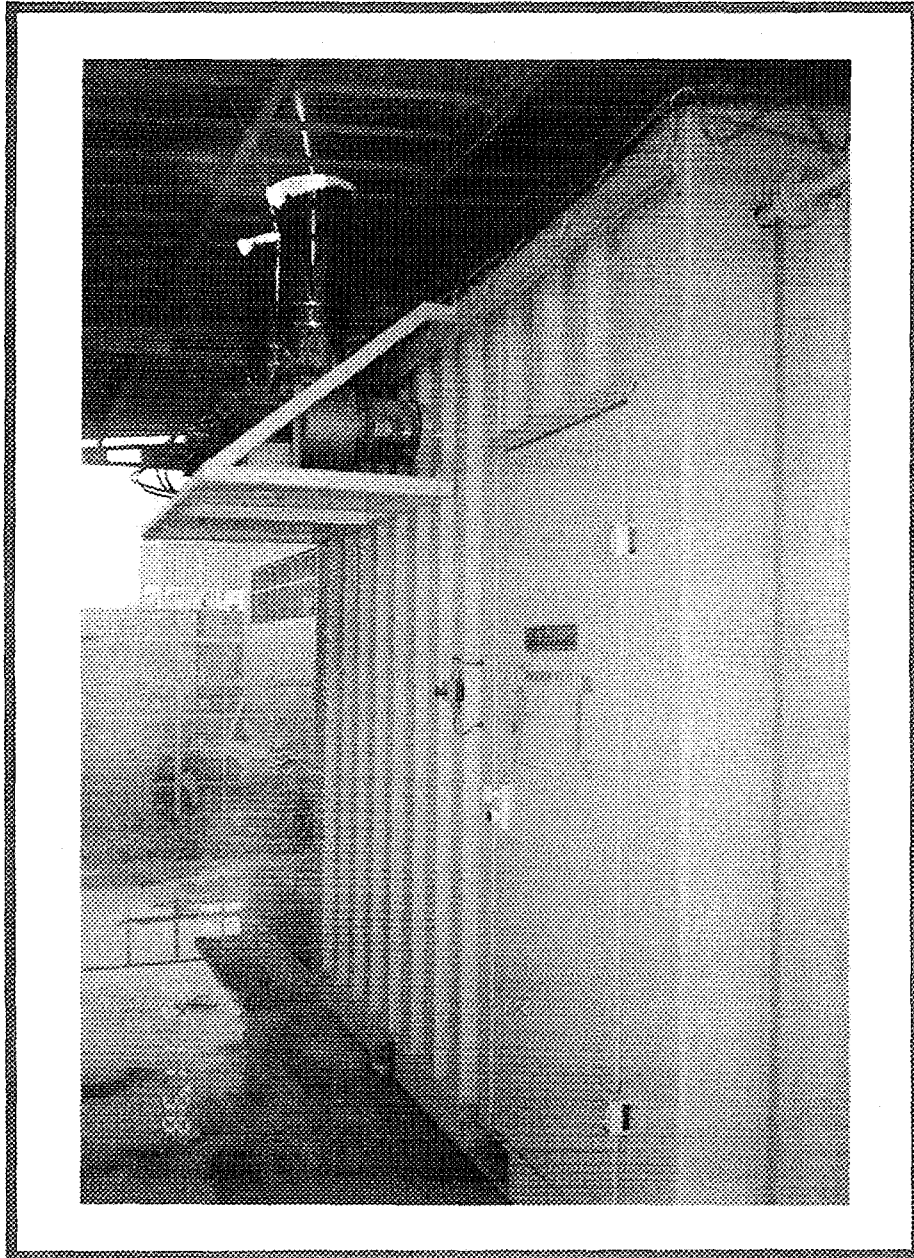
**VIEW OF L.P.G. CYLINDER RACK AND PROPELLANT
DELIVERY PUMPS**



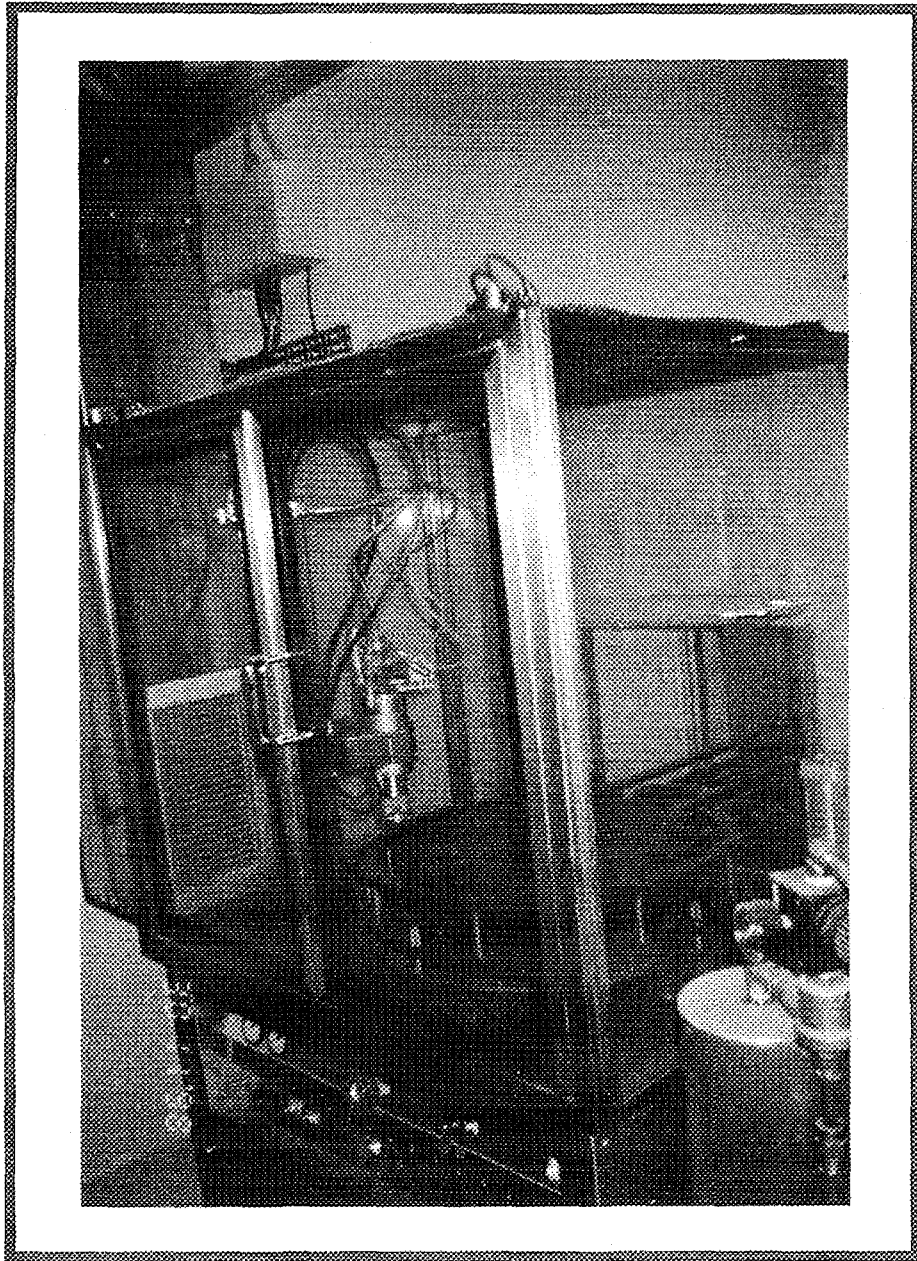
THREE COMPARTMENT DEODORISING COLUMN



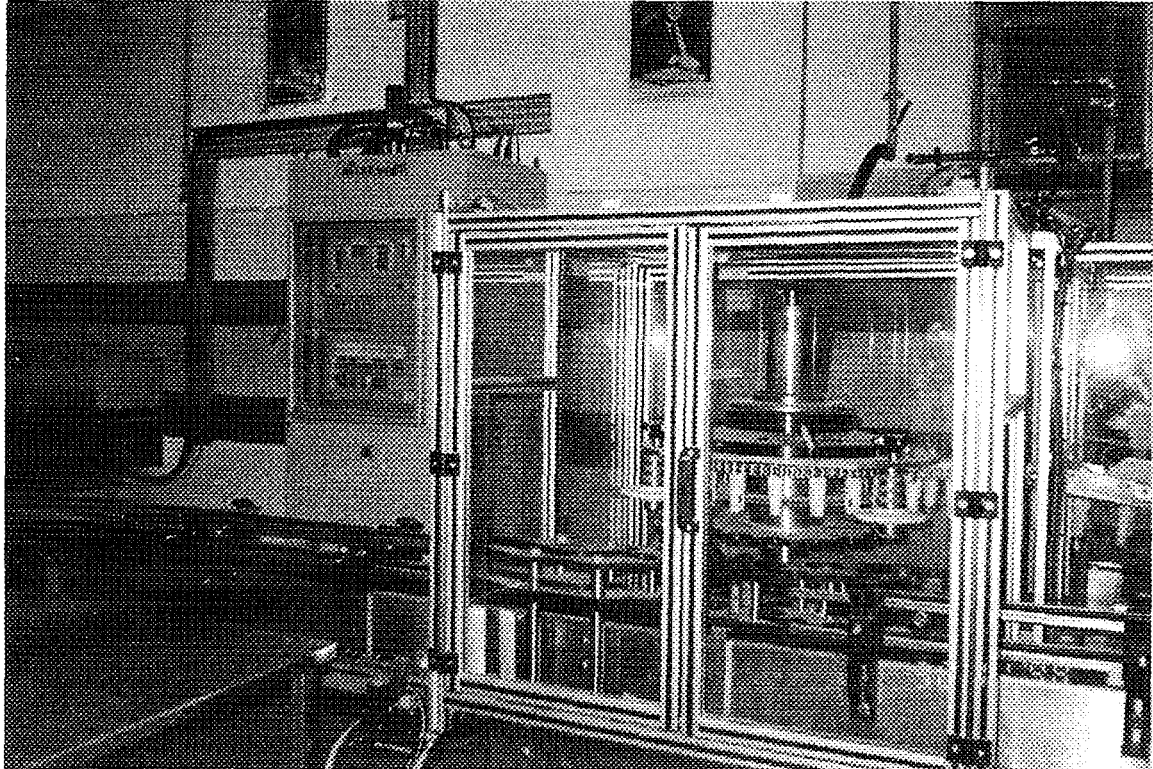
**VIEW OF GAS FILLING ROOM SHOWING PROPELLANT
SUPPLY PIPEWORK AND VENTILATION DUCTS**



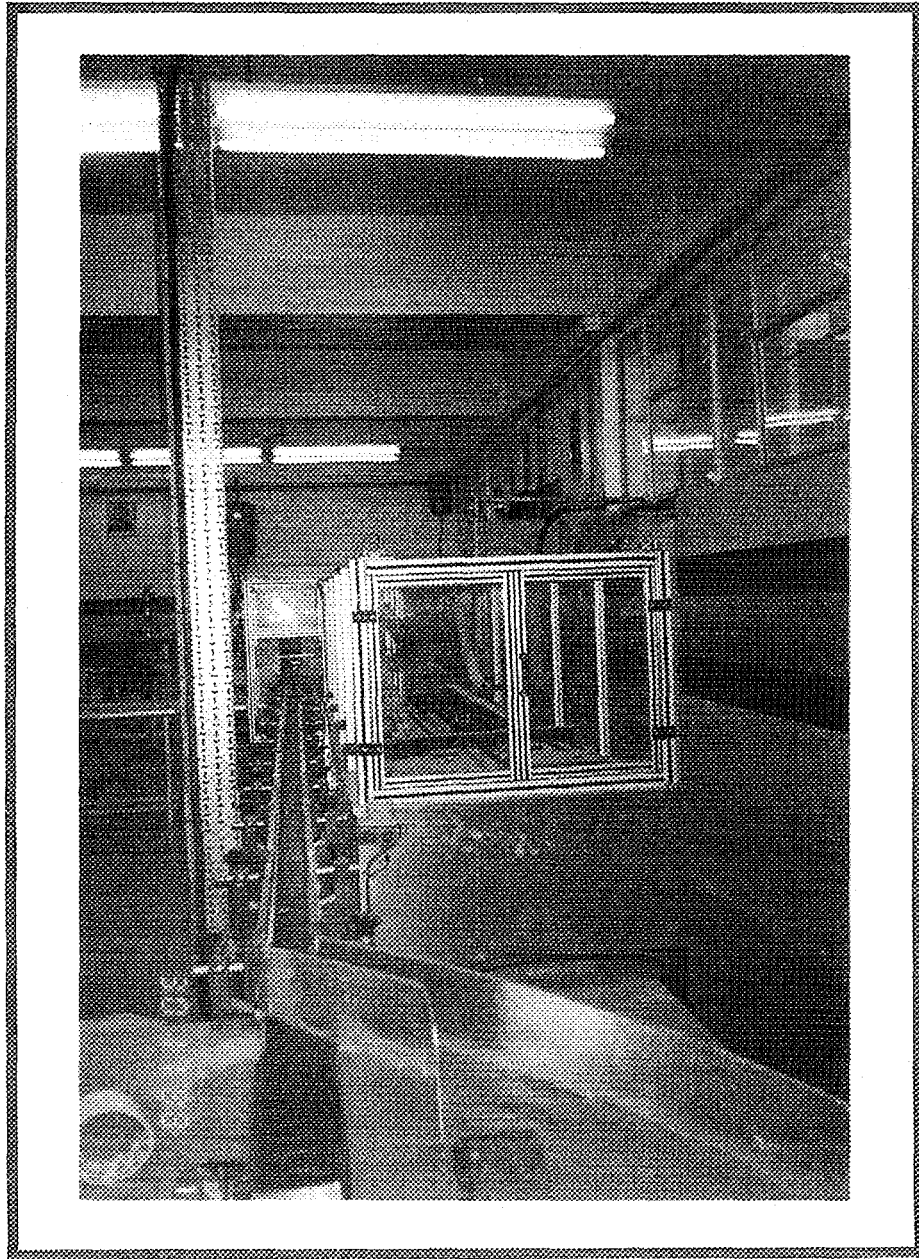
DETAIL OF VENTILATION FANS



DETAIL OF M16 PROPELLANT FILLER

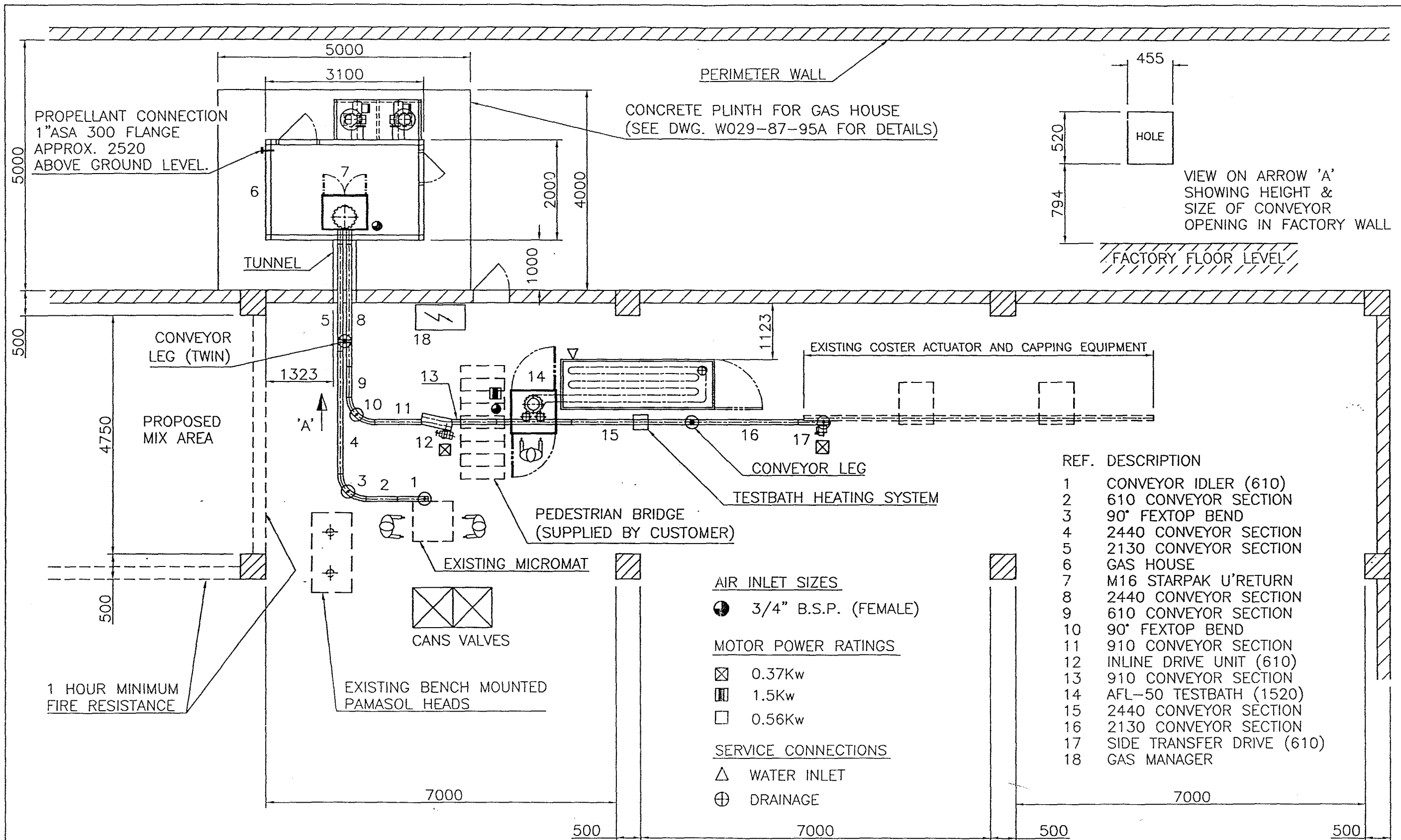


**VIEW OF TEST BATH TURRET SHOWING
"GAS MANAGER" CONTROL PANEL
IN BACKGROUND**

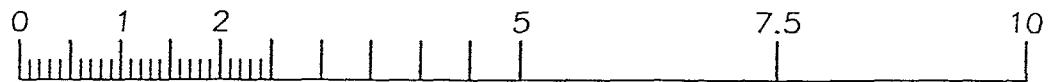


GENERAL VIEW OF LINE FROM OUTFEED TABLE END

3.5 SITE PLANS (As installed)



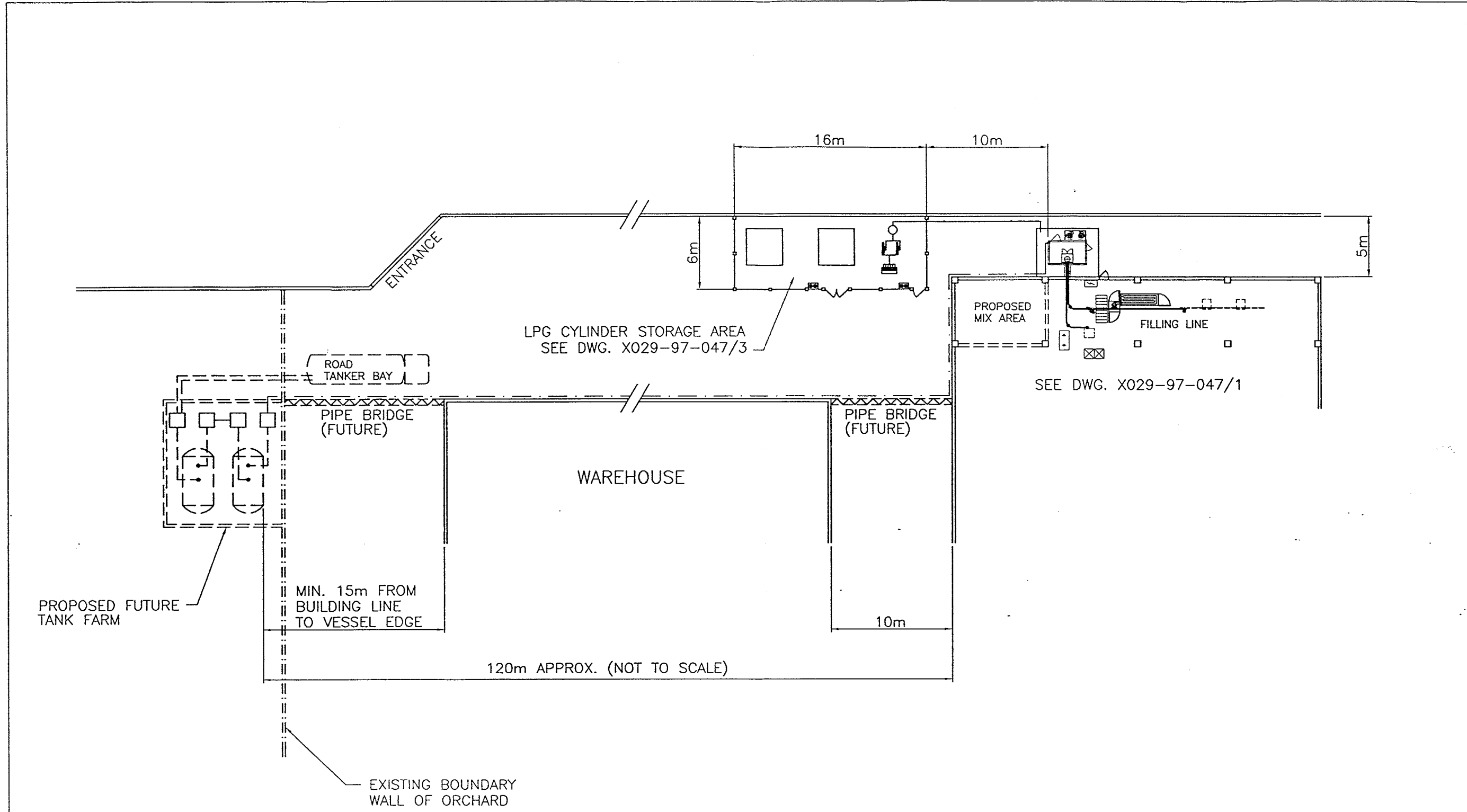
SCALE - METRES



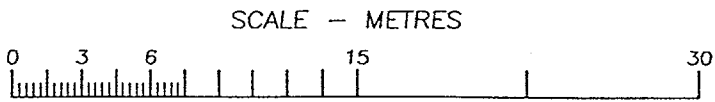
MODIFICATION			DESCRIPTION: LINE LAYOUT - GASTON BANNA	ADDITIONAL SHEET SIZES
ISS.	DATE	SIG.		
B	10.09.97	DFB	DRAWN: DFB	-
C	24.10.97	DFB		-
D	20.11.97	DFB		-
E	01.12.97	DFB		-
				-
			DATE: 27.08.97	
			SCALE: SEE DWG.	
			DRG. No. X029-97-047/1	
				ISSUE SHEET E 1/3

BWI KP Aerofill
Aerofill & Spray Equipment

CLAYTON ROAD,
HAYES, MIDDX.
UB3 1RU
ENGLAND

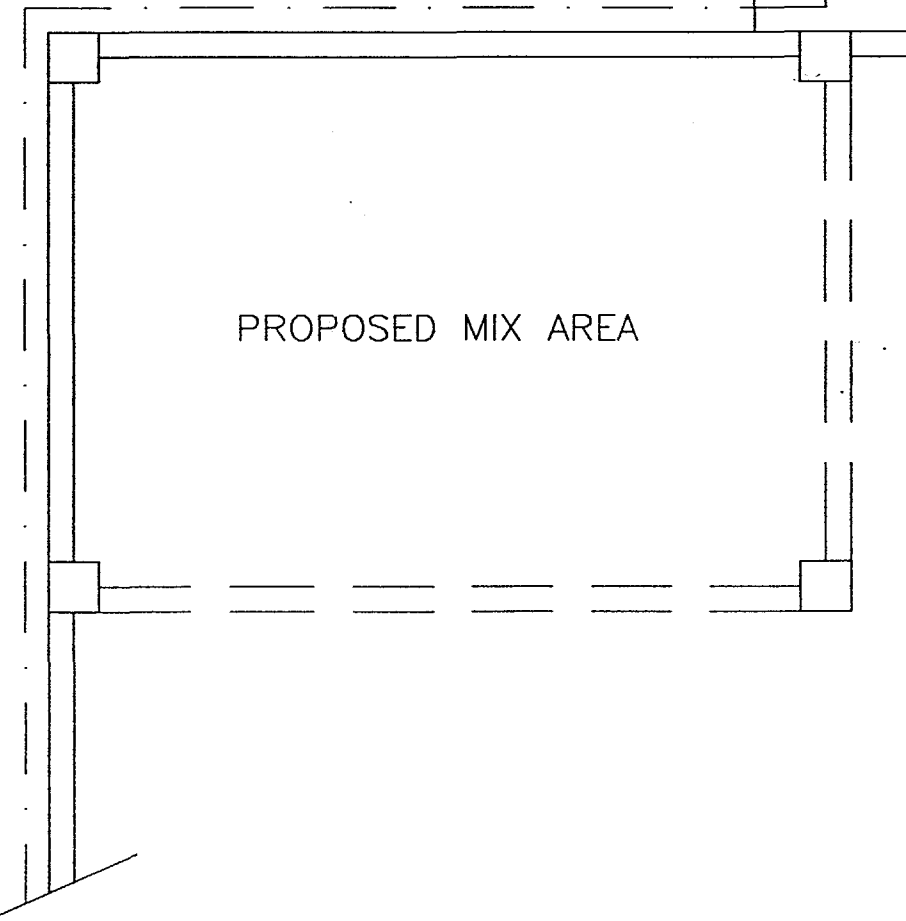
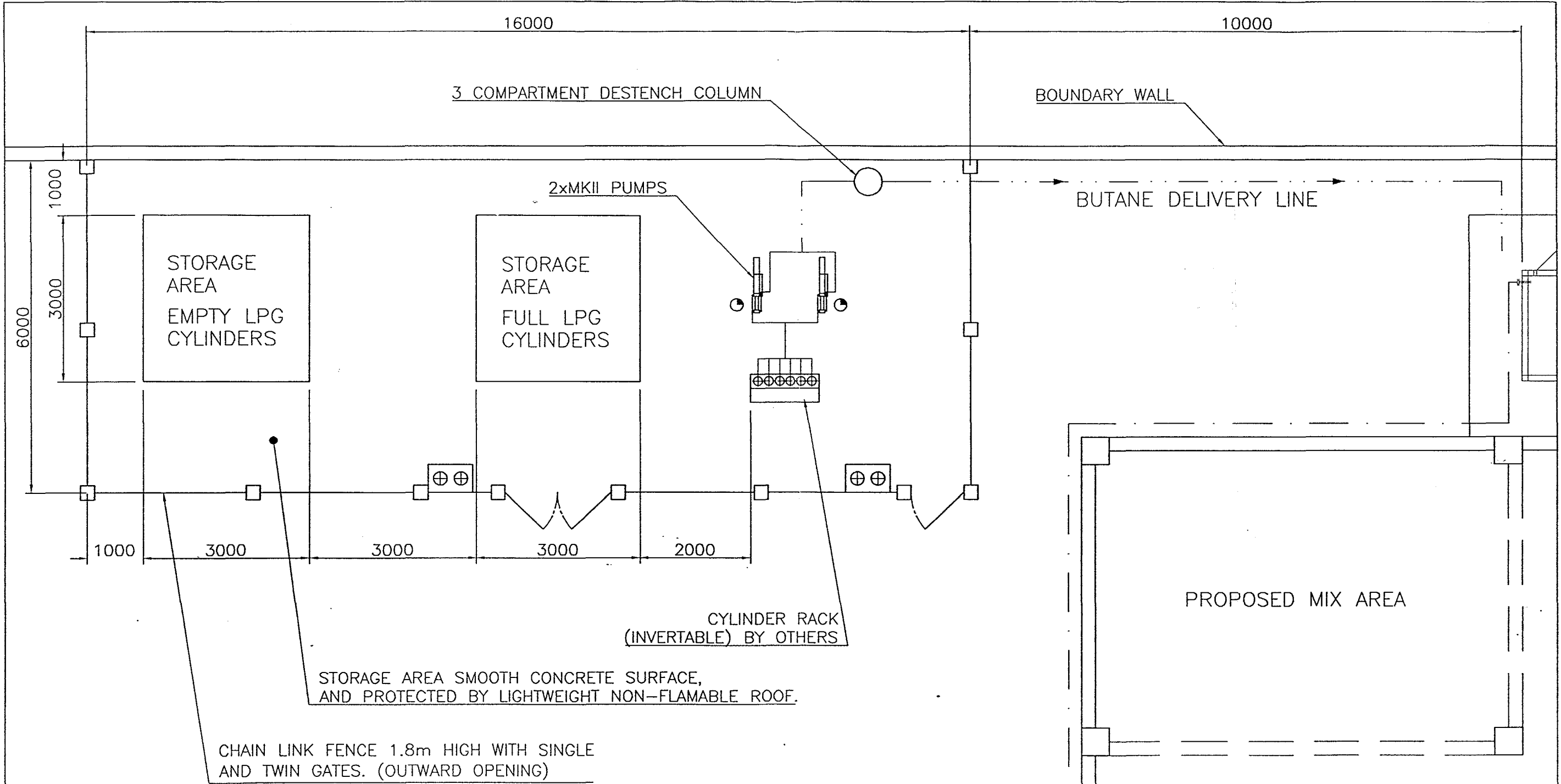


ALL DIMENSIONS IN METRES



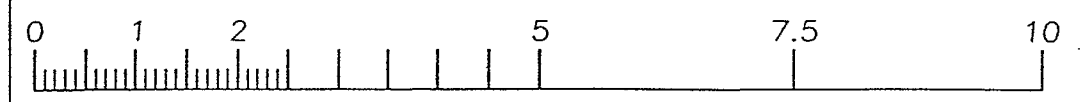
MODIFICATION			DESCRIPTION: SITE BLOCK PLAN - GASTON BANNA	ADDITIONAL SHEET SIZES
ISS.	DATE	SKG.		
B	06.01.97	DFB	DRAWN: DFB	CLAYTON ROAD, HAYES, MIDDX. UB3 1RU ENGLAND
			DATE: 24.10.97	
			SCALE: SEE DWG.	DRG. No. Y029-97-047/2
				ISSUE SHEET B 2/3





- | KEY | DESCRIPTION |
|-----|--|
| | 2x9KG DRY POWDER
FIRE EXTINGUISHERS |
| | AIR INLET 1/4" BSP
8 BAR SUPPLY |

SCALE - METRES



MODIFICATION			DESCRIPTION: LINE LAYOUT - GASTON BANNA	ADDITIONAL SHT SIZES
ISS.	DATE	SIG.		
			DRAWN: DFB	
			DATE: 06.01.98	
			SCALE: SEE DWG.	
			DRG. No. X029-97-047/3	

BWI KP Aerofill <small>Aerosol & Spray Equipment</small>	CLAYTON ROAD, HAYES, MIDDX. UB3 1RU ENGLAND	ISSUE	SHEET
		A	3/3