

THE INSTITUTE OF PETROLEUM
OFFLOADING PROCEDURES
FOR SPLIT COMPARTMENT DELIVERIES
OF PETROL BETWEEN
SERVICE STATION TANKS

THE INSTITUTE OF PETROLEUM

OFFLOADING PROCEDURES FOR SPLIT COMPARTMENT
DELIVERIES OF PETROL BETWEEN SERVICE STATION TANKS

December 2001

Published by
The Institute of Petroleum, London
A charitable company limited by guarantee

Copyright © 2001 by The Institute of Petroleum, London:
A charitable company limited by guarantee. Registered No. 135273, England

All rights reserved

No part of this book may be reproduced by any means, or transmitted or translated into a machine language without the written permission of the publisher.

ISBN 0 85293 353 3

Published by The Institute of Petroleum

Further copies can be obtained from Portland Press Ltd. Commerce Way,
Whitehall Industrial Estate, Colchester CO2 8HP, UK. Tel: +44 (0) 1206 796 351
email: sales@portlandpress.com

CONTENTS

	Page
Foreword	vii
Acknowledgements	viii
1 Introduction	1
1.1 Background	1
1.2 Legislation	1
1.3 Procedures for split compartment deliveries	1
2 Site trials of procedures	3
2.1 Methodology	3
2.2 Conclusion	3
Annex A - Offloading procedures for split compartment deliveries between tanks	5
A.1 General	5
A.2 Safety considerations	5
A.3 Initial procedure	5
A.4 Procedure for tankers fitted with air-operated bottom loading adaptors with tank-top activation	6
A.5 Procedure for tankers fitted with manually operated bottom loading adaptors	6
Annex B - Referenced publications	9

FOREWORD

This Institute of Petroleum publication provides an industry agreed procedure for the offloading of petrol from a road tanker compartment to more than one service station storage tank should this be necessary.

Although it is hoped and anticipated that this publication will assist all those involved in split compartment deliveries, the Institute of Petroleum cannot accept any responsibility, of whatever kind, for damage or loss, or alleged damage or loss, arising or otherwise occurring as a result of the application of the procedures contained herein.

Suggested revisions are invited and should be submitted to the Technical Department, Institute of Petroleum, 61 New Cavendish Street, London W1G 7AR, UK.

ACKNOWLEDGEMENTS

This publication has been prepared by the IP Service Station Panel in conjunction with the HSE Petroleum Enforcement Liaison Group (PELG). Much of the drafting was undertaken by Mr P Monger (Petrol Retailers Association).

Technical input for this publication was requested from representatives of the following companies and organisations. It should be noted that several companies have a policy not to perform split compartment deliveries.

Association of UK Oil Independents (AUKOI)
Berry & Co.
Conoco Ltd.
Esso Petroleum Company Ltd.
Health & Safety Executive (HSE)
Kuwait Petroleum (GB) Ltd.
Petrol Retailers Association (PRA)
Shell U.K. Oil Products Ltd.
Tesco
Texaco Ltd.
Total Oil GB Ltd.
United Kingdom Petroleum Industry Association (UKPIA)
Veeder-Root

INTRODUCTION

1.1 BACKGROUND

Petrol road tankers have progressively become larger as weight limits have been raised. At the same time the networks of retail petrol filling stations have been rationalised concentrating sales in fewer higher throughput sites. To improve operational efficiency, underground storage tanks at these new sites and road tanker compartments have been increased in capacity. However, there are still many stations where the underground tanks have not been replaced.

In many cases the underground storage capacities for particular petroleum products at these sites are inadequate to receive the contents of a full compartment on the latest road tankers. To avoid deliveries by road tankers with part-full compartments (which would increase the number of road tanker journeys with consequential environmental penalty), the contents of compartments may be split between two or more underground storage tanks. Traditionally the procedure for making these split deliveries has required dipping of a compartment during unloading in order to stop the delivery at some pre-agreed volume.

1.2 LEGISLATION

European Directive 94/63/EC required member states to introduce controls on emissions of petrol vapours. Under this requirement the dipping of new road tankers when carrying petrol will no longer be permitted, although a derogation was included exempting new tankers built before 1.1.2000. The Directive has been

enacted in UK legislation through an additional set of regulations under the Environmental Protection Act. These have been supplemented by guidance from the Secretary of State on the implementation of the legislation and published in PG1/14(96).

Clause 24 of the Guidance states that dip testing should not be performed while the vapour hose is connected, but it permits an exception in the case of split compartment deliveries where it can be safely undertaken to the satisfaction of the Petroleum Licensing Authority. At the drafting stage it was understood that this meant that vapours would not be emitted from any compartment openings on top of the road tanker. It was also understood by the Department of the Environment, Transport and Regions that the practising of split compartment deliveries could lead to some emission of vapour from petrol filling station vent pipes. As this had been happening with pre-Stage 1 deliveries, it was not seen as a matter of concern.

1.3 PROCEDURES FOR SPLIT COMPARTMENT DELIVERIES

This publication contains procedures for splitting the delivery of the contents of a road tanker compartment between different storage tanks at petrol filling stations to take account of the need to carry out the operations safely and prevent petroleum vapour escaping from the road tanker. These procedures have been subjected to trials of split compartment deliveries and modified where necessary to minimise the risk of vapour emissions other than from the filling station vent pipe.

Users of this publication should note that an alternative procedure for performing a split-compartment delivery involving the use of a portable flow meter can also be adopted. The flow meter can be connected between the bottom loading adaptor and the delivery hose. The accuracy of such devices should be checked at regular intervals.

Users of this publication should note that in the UK, Schedule 12 of the Carriage of Dangerous Goods by Road Regulation prohibits split compartment deliveries of driver controlled deliveries.

Note: In addition, where it is known that the vapour balancing equipment at a site is faulty, the site should not be receiving any deliveries of petrol until the fault is rectified.

2

SITE TRIALS OF PROCEDURES

2.1 METHODOLOGY

Two trials of the procedures contained in this publication have been carried out by industry representatives, one of which was witnessed by representatives of Local Authorities. Each trial was conducted on a normal fuel delivery to the site comprising diesel and two grades of petrol. Following discharge of the contents of the diesel compartment, split deliveries were made from each of two compartments containing petrol. On completion of the split deliveries the remainder of the petrol on board was delivered in the conventional manner.

For each trial a device was fitted in place of the compartment dip cap in order to indicate whether vapour was flowing out of the compartment or air into it. The device was a 60 mm x 50 mm rectangular section tube made of clear plastic mounted horizontally on a standard dip cap with a hole at the top. One end of the tube was closed off and the other was fitted with a lightweight flap horizontally pivoted at the top. The flap responded readily to flows into and out of the compartment dip tube.

For each trial the delivery was made to the site by a 38 Te road tanker, fitted with standard tank equipment.

2.1.1 Trial 1

Diesel deliveries were completed first, followed by the first half of each of two compartments, one premium unleaded, the other 4-star leaded petrol. During these part deliveries the dip tube caps on the relevant

compartments were replaced by the flow monitoring device; no outward flows were observed, only inward. To supplement this monitoring, vapour concentration readings were taken adjacent to relevant dip caps; nil vapour levels were recorded.

Following deliveries of the first halves of these two compartments, delivery of the remaining product was completed with all dip caps in place in the normal manner without difficulty.

2.1.2 Trial 2

The deliveries and monitoring observations were the same as for the first test except no vapour concentration readings were taken. No outward flows were observed from the relevant compartment dip tubes. However, it was noted that there were leaks in the convoluted bellows connections between the compartment vapour vent valves and the coaming vapour manifold running along the top of the tank. Like the dip tubes, the flows at these leak points were only inwards.

2.2 CONCLUSION

The observations made during these two tests confirm that:

- (a) Split compartment deliveries can be made with the road tanker compartment open to atmosphere during the first half of the delivery, and without vapour emissions from the road tanker.

- (b) If the procedures contained in this publication are followed, split compartment deliveries can be carried out without compromising the safety of petrol filling stations.

Note: Any additional vapour emissions will take place through the vent pipe(s) of the petrol filling station.

ANNEX A

OFFLOADING PROCEDURES FOR SPLIT COMPARTMENT DELIVERIES BETWEEN TANKS

A.1 GENERAL

These procedures apply to offloading from one road tanker compartment to different storage tanks that are either located at the same service station, or at different service stations.

These procedures are intended to be an addition to the normal offloading procedures adopted by the delivery company and the service station operator.

In all cases the procedure in Section A.3 should be followed.

In the unlikely event that more than one compartment is to be split at the service station, the procedure should be to deliver any diesel first then to complete the first part of each split before proceeding with the remainder of the delivery.

A.2 SAFETY CONSIDERATIONS

These procedures require access to the top of the tanker during the delivery. The operator of the tanker has a statutory obligation to provide a safe place of work. A risk assessment of the application of these procedures to the operator's particular equipment and circumstances should be undertaken. Consideration should be given to providing protection to those accessing and working on top of the tanker. It should be noted that, for safety reasons, some operators prohibit access to the top of tankers for dipping purposes. These

procedures are not applicable in these circumstances.

A.3 INITIAL PROCEDURE

- (a) With the footvalve in the open position check the quantities in all compartments before the commencement of any offloading. After quantities have been checked ensure that footvalves are returned to the closed position.
- (b) Carry out all the pre-delivery checks as required by the procedures for normal deliveries up to the point where the vapour hose is to be connected.
- (c) Connect the vapour hose to the tanker end first, then to the service station connection.
- (d) The split deliveries should be carried out next before any other petrol deliveries. This enables the driver to give his full attention to the procedures required and avoids loss of vapour.
- (e) Wherever possible the smaller portion of a split should be discharged first. This helps avoid the problems of vapour locks arising from low head in the tanker compartment. Where the compartment is to be split equally the underground storage tank with the largest ullage space should be filled first.

- (f) Connect the delivery hose to fill point on the appropriate underground tank first, then to the bottom loading adaptor¹⁾ on the tanker compartment. Open the footvalve and the bottom loading adaptor. Check to see that there are no leaks.
- (g) Close the footvalve and bottom loading adaptor once it is clear that the hose connections are liquid tight. The purpose of actions (f) and (g) is to ensure that when the driver accesses the top of the tanker and opens the valves, the hose does not leak.
- (c) Once the required volume has been delivered, release the splitter button, remove the dipstick, replace the dipcap, descend and then shut the footvalve. Removal of the dipstick rapidly and replacing the dip cap at the end of the delivery prevents any possible escape of vapour if pressure starts to transfer from the service station tank.

The remainder of the delivery is "normal", not requiring any special procedures.

Note: The subsequent delivery of the split compartment should follow the normal offloading procedures.

From this point one of two procedures can be used depending on the service equipment fitted to the tanker. If the tanker has air-operated bottom loading adaptors, which can be opened and shut by a "splitter button" on the top of the tanker, it is possible for the driver to complete a split delivery without assistance from the competent person. The procedures for this are set out in Section A.4. If, however, the tanker has manual bottom loading adaptors the procedure requires the assistance of the competent person and is set out in Section A.5.

**A.4 PROCEDURE FOR TANKERS
FITTED WITH AIR-OPERATED
BOTTOM LOADING ADAPTORS WITH
TANK-TOP ACTIVATION**

- (a) The bottom loading adaptor is closed as in A.3 (g). Open the footvalve and access the top of the tanker (see A.2). Using the two stage dipcap, release any pressure in the tank compartment.
(Note that there should not be any pressure since the action of opening the footvalve also opens the compartment vapour vent valve, effectively connecting the compartment vapour space to the underground storage which should normally be at or below atmospheric pressure.)
- (b) Dip the compartment, and using the dipstick and the "splitter button" (which operates the bottom loading adaptor), discharge the required amount.
(Note that the footvalve is open so that the pin of the dipstick interlock, which goes across the dip tube, is withdrawn.)

**A.5 PROCEDURE FOR TANKERS FITTED
WITH MANUALLY OPERATED BOTTOM
LOADING ADAPTORS**

For tankers fitted with manually operated bottom loading adaptors, the driver will require the assistance of the competent person at the service station to operate them. The driver should be satisfied that the competent person is suitably trained in the operation of the bottom loading adaptor and emergency stop button on a road tanker and has a good understanding of the procedures contained in this publication, through a physical demonstration of the required operation. A set of signals or instructions in accordance with the Health & Safety (Safety Signs and Signals) Regulations 1996 should be agreed between the driver and the competent person to ensure that each operation can be carried out safely. A suitable term 'STOP' would satisfy these requirements. The driver should ensure that the competent person is familiar with the means to shut down the tanker systems in an emergency.

- (a) With the bottom loading adaptor closed, open the footvalve and access the top of the tanker (see A.2). Using the two stage dipcap, release any pressure in the tank compartment.
(Note that there should not be any pressure since the action of opening the footvalve also opens the compartment vapour vent valve through an interlock, effectively connecting the compartment vapour space to the underground storage which should normally be at atmospheric or below).

1) The 'bottom loading adaptor' is commonly called an API adaptor or faucet, meaning an adaptor which meets the requirements of API Recommended Practice 1004 *Bottom loading and vapour recovery for MC-306 tank motor vehicles*.

ANNEX A

- (b) Dip the compartment and then instruct the competent person to open the bottom loading adaptor. Discharge the required amount and then instruct the competent person to close the bottom loading adaptor. The dipstick should only be inserted into the compartment for volume checking and then immediately removed as whilst it is in the diptube it will prevent the closure of air-operated footvalves should the emergency stop button be operated.
- (c) Once the required volume has been delivered, remove the dipstick, replace the dipcap, descend and then shut the footvalve. Removal of the dipstick rapidly at the end of the delivery and replacing the cap prevents any possible escape of vapour if pressure starts to transfer from the service station tank.

(Note that the footvalve is open so that the pin of the dipstick interlock, which goes across the dip tube, is withdrawn.)

The remainder of the delivery is "normal" not requiring any special procedures.

Note: The subsequent delivery of the second half of the split compartment should follow the normal offloading procedures.

OFFLOADING PROCEDURES FOR SPLIT COMPARTMENT DELIVERIES OF PETROL BETWEEN SERVICE STATION TANKS

ANNEX B

REFERENCED PUBLICATIONS

The following publications have been referenced in this publication:

PG1/14(96) Secretary of State's Guidance – *Unloading of Petrol into Storage at Service Stations* ²⁾.

²⁾ Available from The Stationery Office Publications Centre, PO Box 276, London, SW8 5DT. Tel: 020 7873 9090. Fax: 020 7873 8200. www.ukstate.com

OFFLOADING PROCEDURES FOR SPLIT COMPARTMENT DELIVERIES OF PETROL BETWEEN SERVICE STATION TANKS