ENVIRONMENTAL AUDIT

ENVIRONMENTAL RISK MANAGEMENT AT RETAIL FUEL OUTLETS

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EPA Victoria
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Victoria 3006 AUSTRALIA

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EXECUTIVE SUMMARY

This report presents the findings of an audit of environmental risk management at service stations and other businesses that engage in the retail sale of petroleum products (collectively referred to as retail fuel outlets (RFOs)). The audit assessed standards of underground petroleum storage systems and management of environmental risks by operators of service stations.

Currently a comprehensive guidance document covering all environmental risks for the industry is unavailable. In the absence of such a document, the audit was conducted against environment protection regulations, State environment protection policies, relevant codes of practice, Australian Standards, and EPA Victoria and EPA NSW guidance documents. Since this audit was conducted EPA Victoria has released the *Guidelines on the Design, Installation and Management Requirements for Underground Petroleum Storage Systems* February 2003 (the Guidelines), which provides practical guidance for activities involving underground systems but does not cover above ground infrastructure or surface water protection.

Findings are based on information gathered at 22 RFOs, which were selected to represent a broad variety of operators throughout rural and metropolitan Victoria. Relationships between standards of risk management and types of operators or locations of sites have been reported.

EPA Victoria does not specifically regulate retail fuel outlets, however EPA will take enforcement action against the owners and operators of RFOs that cause or allow breaches of the Environment Protection Act 1970 or subordinate legislation as detailed in the Guidelines.

Old steel tanks without cathodic protection were generally believed to present the greatest risk of developing leaks. The audit found that these were in use at one-third of the sites audited.

The majority of RFO's used inventory control as the sole means of leak detection to prevent soil and groundwater contamination and there were many different methods of inventory control, of varying accuracy, being used. The Guidelines, released by the EPA since this audit was conducted, state the standard of leak detection that is required for underground petroleum storage systems and provide details on measures that can meet this standard.

High risks to surface water as a result of inadequate spill management provisions were identified, for example:

- operators at two sites stated that they washed effluent from forecourt cleaning into stormwater systems;
- five sites did not have spill kits or any other method for preventing spills on the forecourt from entering stormwater systems;
- at 16 sites the only protection for surface water was a spill kit. These varied in spill containment capacity and at five of the 16 sites staff had not been trained in how to use the kit; and
- four of the 22 sites demonstrated appropriate disposal of spill kit wastes (that is, material used to clean up the waste was disposed of as a prescribed waste).

Companies that operated a large number of RFOs were generally found to understand environmental risks and legal liabilities better than single site operators.

Overall, rural sites were found to have a lower standard of environmental risk management than metropolitan sites.

The findings of this audit contributed to the development of the Guidelines and provide a basis for EPA and the retail petroleum industry in determining future programs for minimising environmental impacts of the industry.

The following table identifies the environmental hazards associated with RFOs, and their potential causes, and summarises the varying standards of risk management that were observed. The third column of the table describes best practice, as determined by literature review and discussions with representatives of the industry, and the fourth column describes the different practices observed at sites audited. The relevant detail is contained in Section 5 of this report.

Summary of Environmental Risk Management

Environmental Hazard	Potential causes of hazards	Best practice for managing potential causes	Practices Observed
Soil and groundwater contaminated by petroleum products	UPSS constructed of materials having potential to develop leaks	Double skinned fibreglass underground storage tanks with flexible lines that have joins only at the tank and the bowsers and have sumps beneath the joins.	**Best** practice was demonstrated at some sites. **Good:** Fibreglass tanks with fibreglass lines. **Basic:** Steel prevented from corroding by cathodic protection that was regularly checked for effectiveness. **Poor:** Steel without cathodic protection or with cathodic protection that was not regularly checked.
	UPSS lacking design elements for minimising potential to develop leaks	Bowsers operated by pressure pumps.	**Best** practice was demonstrated at some sites. **Good:** Suction pumps with sumps beneath them and regularly inspection for leaks. **Basic:** Suction pumps regularly inspected for leaks. **Poor:** Suction pumps without sumps or with sumps that were not regularly inspected.
	Inadequate leak detection equipment or systems	System that detects a release of 0.76L/hour (18L/day) with greater than 95% confidence and less than 5% chance of a false positive (USEPA standard).	**Best** practice was demonstrated at some sites, being: (1) Statistical inventory analysis that meets USEPA standards; and (2) Automatic tank gauge with continuous statistical leak detection combined with interstitial monitoring and ground monitoring wells. **Basic:** Inventory control computed daily and analysed for trends over a month or several months. **Poor:** Inventory control analysed only daily or only monthly.

Environmental Hazard	Potential causes of hazards	Best practice for managing potential causes	Practices Observed
Surface water contaminated by petroleum products	Spills during fuel delivery	Dip and fill points clearly marked in standard Australian product colour codes.	**Best** practice was demonstrated at most sites. **Basic:** Labels securely attached to or near dip and fill points in Australian product colour codes but with colours wearing off. **Poor:** Labels not in Australian product colour codes or not securely attached to or near dip and fill points.
		UST design incorporating overfill protection.	**Best** practice was demonstrated at some sites. **Poor:** USTs without overfill protection.
		Fill point spill containment of 15 litres per fill point.	**Best** practice was demonstrated at some sites. **Poor:** Fill points not surrounded by spill containment.
	Spills during vehicle filling	Clearly marked emergency stop buttons in console areas.	**Best** practice was demonstrated at some sites. **Basic:** Emergency stop button in console area but not clearly marked. **Poor:** No emergency stop button in console area or site staff not aware of its location.
		Spill kits containing absorbent pillows, booms and granules easily accessible to site staff.	**Best:** Comprehensive spill kit easily accessible to site staff. **Basic:** Some type of absorbent material accessible to site staff. **Poor:** Spill kit unavailable or site staff unaware of its location.
		Vehicle filling area graded to drain to spill containment device.	**Best** practice was demonstrated at some sites. **Good:** Graded away from stormwater drains to allow clean up with spill kit. **Poor:** Drains directly to stormwater.

Environmental Hazard	Potential causes of hazards	Best practice for managing potential causes	Practices Observed
Surface water contaminated by petroleum products (continued)	Spills during vehicle filling (continued)	Non-latching triggers on bowser hose nozzles.	**Best** practice was demonstrated at some sites. **Poor:** Latching triggers on diesel hoses.
		Diesel drips cleaned regularly enough to prevent movement to stormwater system.	**Best** practice was demonstrated at some sites. **Poor:** Diesel drips allowed to accumulate and to wash into stormwater system.
	Inadequate surface water management	Canopy covering entire vehicle filling area, including area that hoses extend to.	**Best** practice was demonstrated at some sites. **Basic:** Canopy covers bowsers but not the area that hoses extend to. **Poor:** Canopy does not cover all bowsers.
		Line drains or change of surface gradient divert clean stormwater away from vehicle filling area.	**Best** practice was demonstrated at some sites. **Poor:** Site graded to allow clean stormwater to flow over vehicle filling area and into stormwater system.
		Grated drains inspected and cleaned regularly to maintain clear of litter, soil and debris.	**Best** practice was demonstrated at some sites. **Basic:** Cleaned when the need noticed. **Poor:** Litter, soil and debris allowed to build up in drains.
	Spill due to collision with bowser	Vehicle collision protection that prevents impact with bowsers.	**Best** practice, being protection of bowser sides as well as ends, was not found at any sites. **Basic:** Bowsers protected at ends. **Poor:** Bowsers not protected.

Environmental Hazard	Potential causes of hazards	Best practice for managing potential causes	Practices Observed
Air pollution by petroleum vapours	Vapour emissions during fuel transfer	Stage 1 vapour return system (VRS) used during all deliveries, that is vapours displaced from underground storage tank returned to tanker.	**Best** practice was demonstrated at many sites. **Poor:** Stage 1 VRS not available.
		Stage 2 VRS, that is vapours displaced from vehicle fuel tank returned to underground storage tank, fitted to bowsers.	Stage 2 VRS was not available at any of the premises audited.
Land or water pollution by waste	Inappropriate and/or illegal disposal of wastes.	Used contents of spill kits disposed of to appropriately licensed sites in accordance with EPA transport certificate system and the required paperwork maintained.	**Best** practice was demonstrated at some sites. **Poor:** Disposal as general garbage.
Land, groundwater or surface water pollution by petroleum products or waste	Lack of understanding of environmental risks and environmental risk management	Membership of one or more appropriate industry group.	**Best** practice was demonstrated at some sites. **Basic:** Regular communication with member of appropriate industry group. **Poor:** No way of obtaining information updates regarding retail petroleum industry.
	Incompetence of staff delegated responsibility for managing environmental risks	Formal training program and documented procedures for activities with potential for environmental impact.	**Best** practice was demonstrated at some sites. **Good:** Documented procedures and/or substantial verbal training. **Poor:** Insubstantial or verbal training.

CONTENTS

1. INTRODUCTION

As a result of a concentrated spate of pollution incidents at service stations during August and September 2000, the EPA's Team Audit undertook a review of the retail petroleum industry.

This report presents the findings of the review, which examined the standards of underground petroleum storage systems and management of environmental risks by operators of retail fuel outlets (RFOs) including service stations and other businesses engaging in retail sale of fuel.

Findings are based on information gathered at a sample of 22 RFOs, which were selected to represent a broad variety of operators throughout rural and metropolitan Victoria.

2. TERMS OF REFERENCE

The terms of reference for this audit were:

- To assess environmental risks posed by RFOs;
- To determine the standard of environmental risk management at a sample of retail fuel outlets throughout metropolitan and rural Victoria; and
- To recommend strategies for improving the environmental performance of retail fuel outlets.

Whilst this audit was principally concerned with management of risks associated with underground petroleum storage systems (UPSS), potential impacts resulting from all aspects of RFO operation have been investigated.

3. SCOPE

The scope of this audit was to gather information relating to both physical infrastructure and management systems at RFOs in order to evaluate the environmental risks posed by operation of these facilities and to identify possible mechanisms to minimise these risks. The scope included:

- the identification of environmental hazards relevant to RFOs and associated workshops;
- a determination of industry best practice;
- an environmental performance assessment at RFOs, of various organisational structure, throughout rural and metropolitan Victoria, against industry best practice;
- a review of individual sites' management systems for minimising the risk of environmental impacts caused by RFOs;
- an assessment of any actual or potential impacts on beneficial uses of the air, surface water or groundwater environments; and
- making recommendations for improved environmental performance by RFOs.

The scope of this audit did not include:

- the collection of any samples of air, water or soil at any RFO sites;
- integrity testing of underground petroleum storage systems;
- assessment of the effectiveness of leak detection methods;
- review of pollution incidents at RFOs; and
- assessment of tanker driver competence.

4. APPROACH AND METHODOLOGY

4.1 Methodology

The audit was conducted during the period May to August 2001.

Identification of environmental hazards associated with RFOs and determination of industry best practice were achieved by a desktop study and discussions with members of the industry and representatives of industry groups. The desktop study reviewed past incidents at RFOs, international standards and the documents listed in Section 4.3, Compliance Criteria.

This research provided the basis for an audit protocol against which the selection of RFOs was audited.

Sites were selected from internet telephone directories and lists provided by WorkCover and members of the industry.

The selected sample consisted of 22 RFOs, which represented approximately equal numbers from metropolitan Melbourne and rural areas. The sample also contained approximately equal representation of RFOs carrying signage of companies that own oil refineries (oil majors) and companies or individuals independent of the oil majors.

Information was obtained via site inspections conducted to assess any actual or potential impacts on beneficial uses of land, air, surface water or groundwater.

Management systems for minimising the risk of environmental impacts were determined via interviews with staff on site and consultation with representative/s of the operator.

Information required to complete the audit protocol, that could not be obtained whilst on site, was gathered from the relevant operator at a later stage.

4.2 Hazard Identification

The hazards identified as relevant to this audit are:

- Soil and groundwater contaminated by petroleum products;
- Surface water contaminated by petroleum products; and
- Air pollution by petroleum vapours.

Potential causes of these hazards:

- UPSS constructed of materials having potential to develop leaks;
- UPSS lacking design elements capable of minimising potential to develop leaks;
- Inadequate leak detection equipment or systems;
- Spills during fuel delivery;
- Spills during vehicle filling;
- Vapour emission during fuel delivery;
- Inappropriate and/or illegal disposal of wastes;
- Lack of understanding of environmental risks and environmental risk management by RFO operators; and
- Lack of knowledge in staff delegated responsibility for managing environmental risks.

4.3 Compliance Criteria

RFOs need to be managed to minimise environmental risks and meet the requirements of the *Environment Protection Act* 1970.

At the time of this audit a comprehensive guide to environmental risk management at retail fuel outlets was not available to the industry as a whole. Since then the Guidelines for the Design, Installation and Management Requirements for Underground Petroleum Storage Systems has been released and is intended to be made available to all members of the industry. This guidance document does not address surface water and air pollution risks.

In the absence of comprehensive guidance, this audit assessed performance against 'industry best practice' based on a range of documents from industry groups and regulatory agencies in other jurisdictions.

Specific documents audited against were:

(a) Australian Institute of Petroleum Code of Practice for *The Design, Installation and Operation of Underground Petroleum Storage Systems* (UPSS) 1998 (CP4).

(b) Australian Institute of Petroleum Code of Practice for *Pipeline and Underground Tank Identification* 1995 (CP5).

(c) Australian Institute of Petroleum Code of Practice for *The Control of Water Effluents from Service Stations* 1992 (CP1).

(d) Environment Protection Authority New South Wales Environmental Guideline, *Surface Water Management on the Forecourt Areas of Service Stations 1992*.

(e) EPA Victoria Publication 462 *Waste Control at Motor Vehicle Repair and Service Premises – Best Practice Environmental Management* (July 1995).

(f) EPA Victoria Publication 395a * *Instructions for Completion of Waste Transport Certificates* (August 1999).

(g) EPA Victoria Publication 347 *Bunding Guidelines* (December 1992).

(h) EPA Victoria Publication 377a *Collection and Reclamation of used Tyres* (June 1995).

(i) Australian Standard 1940 – 1993 *The Storage and Handling of Flammable and Combustible Liquids*.

(j) *Dangerous Goods (Storage and Handling) Regulations* 2000.

(k) *State Environment Protection Policy (Waters of Victoria)* 1988.

(l) *State Environment Protection Policy (Groundwaters of Victoria)* 1997.

4.4 Environmental Risk Classification

In determining the urgency with which recommendations need to be addressed, a qualitative risk assessment has been undertaken and hazards ranked according to the following criteria.

HIGH ENVIRONMENTAL RISK

- Infrastructure that lacks effective controls to prevent leaks or spills to the environment.
- Management systems that are incapable of preventing or detecting leaks or spills to the environment.

MODERATE ENVIRONMENTAL RISK

- Operational arrangements that inadequately define responsibilities for environmental risk management.
- Management systems that do not provide for obtaining information pertaining to industry standards and regulations.

LOW ENVIRONMENTAL RISK

- Technical non-compliances with recommendations in publications that are not legally binding and that have a low probability of resulting in a threat to the environment.

Each individual site was assessed against the above criteria and site-specific results communicated to the relevant operators. General findings only have been documented in this report.

5. FINDINGS

In this section, general findings relating to this audit are presented.

It should be noted that CP4-1998 only applies to UPSSs installed after 1 January 1999. None of the tanks at RFOs included in this audit were installed after this date. At one of the RFOs audited, the pumps were installed in 2000.

Unless otherwise specified, the acts, regulations, guidelines and other publications referred to in this section are current.

5.1 Description of Typical RFO

Most RFO site's consisted of a paved forecourt, several bowsers and a shop (Figure 5.1-1). They also accommodated a number of underground storage tanks (USTs) up to 90,000 litres in capacity, which sat beneath the forecourt. The USTs had pipes running to the bowsers, to fill points, to vapour recovery outlets and to vents. The UST and associated pipes were collectively referred to as the underground petroleum storage system (UPSS).

Fill points were either located directly above the tanks or connected by pipes from each tank on the site to a central fill point, the latter were referred to as remote fill points. Newer sites had a fill point spill containment box in which all fill points and the vapour recovery outlet sat. These were able to contain a spill of approximately 15 litres per fill point.

Vent pipes rose three to six meters above the ground and were connected to the UST to release excess vapour and prevent pressurisation of the tank.

The USTs had a dip point in which a dipstick was kept for measuring the volume of product, these were located directly above the tanks and in some cases were scattered about the site.

Product was dispensed from bowsers by a suction system for which the pump was located in the bowser or by a pressure system in which case the pumps sat directly above the USTs.

The manifest box held information such as site plans and operator contact details that may be required by emergency services. It was most commonly located on the outside wall of the shop.

Site staff at RFOs most commonly consisted of console attendants and site managers. These staff served customers, read the tank dipsticks (commonly referred to as 'dipping the tanks'), in some cases carried out leak detection measures, and would be responsible for management of minor spills that emergency services did not attend.

Some sites sold unleaded petrol (ULP), leaded or lead replacement petrol (super), premium unleaded petrol (PULP) and diesel, others sold only two or three of these products.

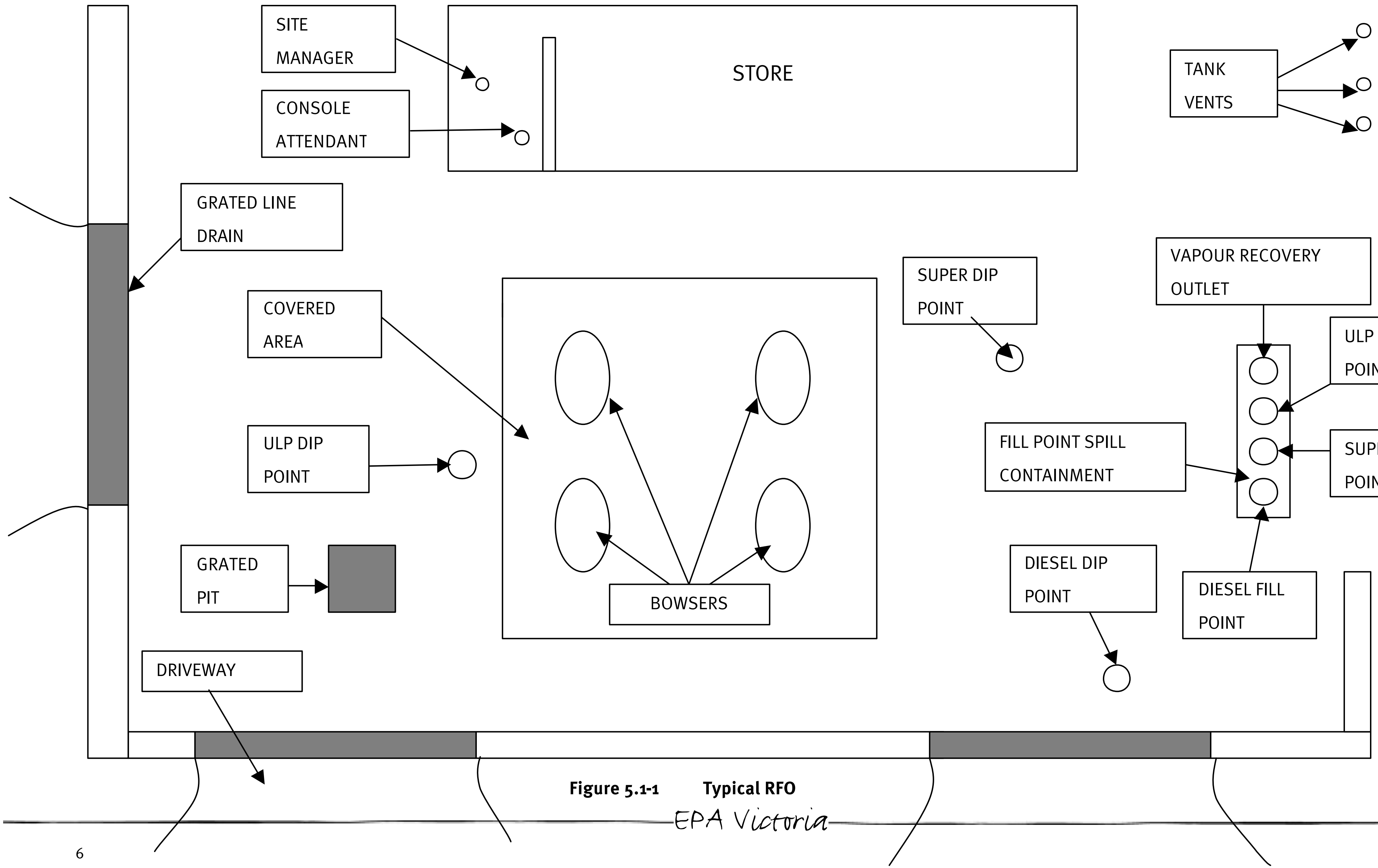

Figure 5.1-1 **Typical RFO**

5.2 Registration of RFOs

1. A register of all currently operational RFOs in Victoria was not readily available.

5.3 Ownership and Operational Structure

For the purpose of this report, RFOs have been grouped with respect to operational structure, that is the characteristics of the company responsible for day-to-day environmental risk management. These groups are shown in Table 5.1.

2. There was great variety in the ownership and operational structures of the RFOs audited as demonstrated by Table 5.2.

3. Operators of one S/S Independent RFO did not know what components of the RFO they owned (for example land, UPSS, pumps) and what they were responsible for.

Table 5.1 Operational Structure Groups

Group	Description	Number Audited
Oil Major	Owns a petroleum refinery in Australia and supplies petrol to Victorian RFOs.	3
Multi-site (M/S) Affiliated	Has supporting arrangements and profit share agreements with a particular oil major.	2
Distributor	Transports but do not refine petroleum products and may or may not be affiliated with an oil major.	5
Multi-site (M/S) Independent	Owns more than one RFO and is not affiliated with an oil major.	6
Single-site (S/S) Independent	Owns only one RFO and is not affiliated with an oil major.	

Table 5.2 Operational Structures of Sites Audited

Brand	Land Owner	UPSS Owner	Site Operator	Fuel Supplier	Maintenance Responsibility	No.
Oil Major	Oil Major	Oil Major	Oil Major	Oil Major	Oil Major	2
M/S Independent	M/S Independent	M/S Independent	M/S Independent	Distributor	M/S Independent	2
Oil Major	S/S Independent	S/S Independent	S/S Independent	Distributor	Distributor	2
Oil Major	M/S Independent	M/S Independent	M/S Independent	Oil Major	M/S Independent	2
Oil Major	Leased by Oil Major	Oil Major	M/S Affiliated Franchisee	Oil Major	Oil Major	2
Oil Major	Oil Major	Oil Major	Distributor	Oil Major	Oil Major	1
Oil Major	Oil Major	Oil Major	S/S Franchisee	Oil Major	Oil Major	1
M/S Independent	M/S Independent	M/S Independent	M/S Independent	Oil Major	M/S Independent	1
None	Leased by Oil Major	Private	Commission Agent	Distributor	Distributor	1
M/S Independent	M/S Independent	M/S Independent	Commission Agent	Oil Major	M/S Independent	1
Oil Major	Distributor	Oil Major	Distributor	Distributor	Distributor	1
Oil Major	S/S Independent	S/S Independent	Commission Agent	Oil Major	S/S Independent	1
Oil Major	Leased by Distributor	Private	Commission Agent	Distributor	Distributor	1
M/S Independent	M/S Independent	M/S Independent	S/S Franchisee	Oil Major / Distributor	M/S Independent	1
None	S/S Independent	Oil Major	S/S Independent	Oil Major	Oil Major	1
None	S/S Independent	S/S Independent	S/S Independent	Various	S/S Independent	1
Oil Major	Leased by Oil Major	Private	Oil Major	Oil Major	M/S Affiliated	1

5.4 Site Management

Industry Group Membership

4. The primary means of distributing information to RFO operators is through industry groups such as Australian Institute of Petroleum (AIP), Australian Petroleum Agents and Distributors Association (APADA) or Victorian Automotive Chamber of Commerce (VACC).

5. As displayed in Table 5.3, at 13 of the RFOs audited, operators were members of at least one relevant industry group. Operators of the other nine sites were not members of any relevant industry group.

6. It was found that only four of the 12 M/S Independent and S/S Independent RFOs audited were members of any of the relevant industry groups.

7. Information provided by industry groups is sometimes shared between members and non-members.

Table 5.3 Industry Group Membership for each Organisational Structure

Industry Group Membership	Oil Major	M/S Affiliated	Distributor	M/S Independent	S/S Independent
AIP	3	2		2	
APADA					
VACC					2
AIP & APADA			3		
APADA & VACC			1		
None			1	4	4

Training

8. There was a large variety in the standard of training of RFO staff. Table 5.4 shows that at 13 sites, site staff had undertaken formal training courses before beginning work. At the other nine sites, they had received only verbal explanation of what was required. It should be noted that several of the staff that had not received formal training had many years experience of working at RFOs.

9. It was found that none of the site staff at S/S Independent sites had undertaken formal training.

10. Two site managers used an AIP Training Manual and the associated videos to train new site staff.

Table 5.4 Standard of Training for each Organisational Structure

Formal Training Completed	Oil Major	M/S Affiliated	Distributor	M/S Independent	S/S Independent
Yes	3	2	4	4	0
No	0	0	1	2	6

Documented Standard Operating Procedures

Table 5.5 Use of Documented Standard Operating Procedures by each Organisational Structure

Standard Operating Procedures	Oil Major	M/S Affiliated	Distributor	M/S Independent	S/S Independent	Total
Well Documented	2	0	1	1	0	4
Some procedures documented	0	1	0	1	1	3
No procedures documented	1	1	3	4	4	13
Information not obtained/provided	0	0	1	0	1	2

11. As displayed in Table 5.5, standard operating procedures were provided for staff reference at less than half of the sites audited. Well documented standard operating procedures include tasks such as inventory control, spill clean up, maintenance and inspections.

Fill and Dip Point Markers

12. At fourteen of the sites audited fill and dip point markers were coloured according to the Australian Product Colour Codes. The use of standard markers reduces the risk of product being delivered to the wrong tank where there may not be sufficient space. At seven RFOs audited, non-standard colours were used.

13. Table 5.6 shows that at some sites a yellow marker indicated a PULP tank as consistent with Australian Product Colour Codes while at another site yellow markers indicated a diesel tank. This creates a potential for confusion and delivery of product into the wrong UST.

Table 5.6 Instances of Non-Standard Colours

Description of Non-Standard Colour	Number of Instances
PULP blue rather than yellow	4
Diesel black rather than buff	2
Diesel yellow rather than buff	1

14. At some sites audited, coloured plastic fill and dip point markers were used and at other sites metal markers were used. The metal markers had been painted the relevant colour. At seven of the sites audited, paint from metal markers was significantly worn making the colours difficult to identify. This also creates the potential for delivery of product into the wrong UST.

15. At one site, a fill point marker had become dislodged so there was no permanent identifier at the fill point and the tank could only be identified by default. If a second marker were dislodged, the tanker driver would need site plans to determine the correct UST to fill.

5.5 Infrastructure and Maintenance

UPSS Age

16. Data with respect to the ages of UPSSs at the RFOs audited is presented in Table 5.7. Ages ranged from three years to 40 years. (If there were tanks and lines of different ages at a site, the age of the oldest tank or lines at that site has been reported.)

17. The operators of three sites were unable to provide any information relating to the age of the UPSS. Two of these were S/S Independent sites and the other was a Distributor site.

18. Of the sites for which tank age was known, it was found that at eight out of 10 metropolitan sites, tanks were less than 20 years old compared with three of nine at rural sites.

Table 5.7 UPSS age and Site Location

UPSS Age (years)	Metropolitan	Rural
0-9	5	1
10-19	3	2
20+	2	6
Not known	0	3

Tank and Line Material

UPSS were found to be constructed of different materials, this information is presented in Table 5.8.

19. At five sites, fibreglass tanks with fibreglass or flexible plastic lines were used. Four of these were in metropolitan areas. CP4-1998 states that fibreglass and polyethylene are acceptable materials for UPSSs installed after 1 January 1999.

20. Two fibreglass tanks were at Oil Major sites, the other three were at M/S Independent sites. Four of the five were in metropolitan areas.

21. Steel tanks were used at 15 sites. These tanks were all at least 15 years old. CP4-1998 states that steel is an acceptable material for UPSS

installed after 1 January 1999, providing it has cathodic protection that is regularly checked.

Table 5.8 UPSS Material

Material	Total
Steel tanks and steel lines	15
Fibreglass tanks and fibreglass or polyethylene lines	5
Not Known	2

Cathodic Protection

Cathodic protection is recommended by CP4 for all steel tanks installed after 1 January 1999. It may utilise a sacrificial anode or impressed current. The *Dangerous Goods (Storage and Handling) Regulations* 2000 require that containers and their associated pipework are protected from corrosion.

22. At six of the 15 RFOs with steel tanks, operators confirmed that cathodic protection was in place.
23. One site, where tanks were 15 years old, used impressed direct current cathodic protection that was checked annually. CP4-1998 recommends that the function of impressed current systems installed after 1 January 1999 is checked monthly.
24. At seven of the RFOs with steel tanks, operators stated that the tanks did not have cathodic protection. It is possible that sacrificial anodes were in place and that operators were not aware of them.
25. At two of the RFOs with steel tanks, operators did not know whether tanks had cathodic protection.

Tank Features

26. At three of the sites audited, tanks were double walled fibreglass with an interstitial space.
27. At six sites, operators confirmed that their tanks had overfill protection. Overfill protection is recommended by CP4-1998 for tanks installed after 1 January 1999. In all cases this consisted of a valve that prevented product from flowing into the vent line if the tank was overfilled. Overfill protection is built into the UPSS and not visible once the system is installed, therefore, operators may not be aware of it.

Pump Types

Two types of pumps for moving product from UST to vehicle were found during the investigation. Suction pumps, which are housed within the petrol bowser and pressure pumps, which sit above the UST. Pressure pumps have lower environmental risks as they enable the operation of line leak detectors and any leaks that develop within the pump drain into the UST.

28. Suction pumps were used at 19 of the RFOs audited. Many of the operators did not know the age of these pumps. Of the pumps for which age was known, the newest was installed six years ago and the oldest 16 years ago.
29. Pressure pumps were used at three sites, the oldest had been in operation for seven years.
30. The numbers of rural and metropolitan sites that had sumps beneath the bowsers is presented in Table 5.9. At six of the sites with suction pumps, an impervious sump had been installed under the pumps to catch drips. CP4-

1998 recommends that at Class A and B sites (as defined in CP4-1998), sumps are installed for any pumps installed after 1 January 1999.

Table 5.9 Presence of a under pump sumps at sites with suction systems

Sump Status	Metropolitan	Rural
Present	4	2
Not Present	2	6
Info Not Obtained	2	3

Maintenance

31. Eleven of the RFOs audited had a regular maintenance program where pumps were routinely checked for example for calibration, leaks. Three of these sites were Oil Majors, three were Distributor, one was M/S Affiliated and four were M/S Independent sites. At nine other sites, maintenance was conducted on an 'as needs' basis. (Maintenance information was not provided for the other two sites). Notably none of the S/S Independents undertook regular pump maintenance.

5.6 Leak Detection and Product Loss Investigation

Inventory Control Methods

Inventory control, also referred to as stock reconciliation, was the primary method of leak detection at all except two of the RFOs audited.

Inventory control involves calculating the difference between the volume of fuel that theoretically should be in each tank and the actual volume of fuel in each tank. This difference is referred to as the variance. Theoretical volume is determined by subtracting daily sales and adding daily deliveries to the volume in the tank on the previous day. Actual volume is determined either by reading the level of product on a dipstick ('dipping the tanks') or taking a reading from an automatic tank gauge. If the actual volume is less than the theoretical volume, a loss is recorded.

An unexplained loss identified using inventory control can provide an immediate indication of a potential leak in a UPSS. A loss is not evidence that a UST is leaking. Losses can also be caused by shrinkage, theft and human error in transcription of delivered amounts or meter readings.

Analysing variances for trends of product loss or gain over time should enable the identification of potential leaks. Statistical Inventory Analysis (SIA) is a sophisticated method for analysing trends in variances and is documented in CP4 as an acceptable method of leak detection.

Once a potential leak has been identified, it should be investigated to determine whether it is an actual leak.

The effectiveness of inventory control depends on the accuracy of data used.

32. All but one of the RFOs audited undertook some form of inventory control for tanks containing product. The RFO that did not conduct inventory control was an S/S Independent site in a rural area.

33. One RFO did not use inventory control as its primary means of leak detection, it had an automatic tank gauge that undertook

continuous statistical leak detection (CSLD) of the UPSS.

34. Fourteen sites used inventory control as the only means of leak detection and statistical analysis was not undertaken. This is not sufficient according to CP4 (note: CP4 applies only to UPSS installed after January 1999).

35. At the sites audited, two different methods for calculating theoretical stock were used. These were

    1. TS = YAS – S + D

    2. TS = YTS – S + D

    Where:

    TS = Theoretical Stock

    YAS = Yesterdays Actual Stock

    YTS = Yesterdays Theoretical Stock

    S = Sales

    D = Deliveries

    US EPA Publication *Doing Inventory Control Right For Underground Storage Tanks* recommends method 1. The second method may result in errors accumulating over time.

36. At four of the RFOs audited, Statistical Inventory Analysis (SIA) was used. Two of these were M/S Affiliated sites in metropolitan areas, one was a Distributor site in a rural area and one was an M/S Independent site in a rural area. CP4 lists SIA as an acceptable method of leak detection.

37. There was large variety in the accuracy of inventory control at the 17 sites, where inventory control was conducted but SIA was not used.

38. At the two sites where the actual stock was only determined weekly, stock could only be reconciled on a weekly basis. At others, stock was reconciled daily for the days that the site was operational. CP4 recommends, for tanks installed after 1 January 1999, that stock is reconciled on every day that product is added to or taken from a tank.

39. At 17 sites, including those that conduct SIA, monthly summaries were completed and variances were analysed to look for trends of product loss or gain over time. At the other three sites that conducted inventory control (all S/S Independent), daily/weekly variation was calculated but this data was not examined for trends over time. CP4-1998 recommends that for tanks installed after 1 January 1999, monthly summaries are completed and trends of product loss or gain over time are tracked.

40. At almost all RFOs using inventory control, reconciliation was completed for each product (that is ULP, LRP, PULP and diesel) rather than for each tank. This means that the presence of a leak in one tank may have been masked by data from other tanks. CP4 recommends that reconciliation be completed for each individual tank except where tanks are manifolded. Eleven of the sites audited had two or more tanks for some products. It should be noted that at two of these sites, multiple tanks were manifolded together so it would have been impossible to reconcile each tank separately

Unacceptable Variance

41. There was a wide variety in the variance at which further investigation was initiated. This trigger point was commonly referred to as the unacceptable variance. At some RFOs audited the unacceptable variance was defined as an absolute volume of product over a period of time whereas at other RFOs it was defined as a per cent of throughput. At three of the RFOs audited, operators were not able to quantify a level of unacceptable variance. The different variances considered unacceptable and the number of sites that adopted each value are presented in Tables 5.10 and 5.11.

Table 5.10 Unacceptable Daily Variance

Unacceptable Daily Variance	Equivalent Hourly Variance	Number of RFOs Adopted by
100L	4.2 L/hour	1
200L	8.3 L/hour	4
250L	10.4 L/hour	1
500L	20.8 L/hour	2
1000L	41.7L/hour	1
1% throughput	-	2
2% throughput	-	2
5% throughput	-	1
500L or 1%		1
Not specified/not reconciled daily		7

*One RFO considered 2% to be an unacceptable variance for diesel and 3% to be an unacceptable variance for petrol.

Table 5.11 Unacceptable Monthly Variance

Unacceptable Monthly Variance	Equivalent Hourly Variance	Number of Service Stations Adopted by
200L	0.28L/hour	1
600L	0.83L/hour	1
0.5% throughput	-	3
0.7% throughput	-	1
1% throughput	-	3
Statistical Inventory Analysis	-	4

42. The US EPA requires that leak detection methods are able to detect a loss of at least 0.76L/hour. It was found that at nine sites the unacceptable daily variances adopted were larger than this.

Measurement of volume of product in tanks

43. Automatic Tank Gauges (ATGs) were used to measure the volume of product in tanks at two of the RFOs audited. One was a metropolitan Oil Major site and the other was an M/S Independent site in a rural area. A daily gauge reading was taken for inventory control calculations. ATG readings were compared with manual tank dip readings every day at one site and once a week at the other.

44. At 20 of the RFOs audited, tank dipping was the sole method used to determine the volume of product in tanks. Tanks were dipped daily at 18 of these sites and weekly at the other two. Both of the sites that dipped tanks weekly were S/S Independent; one was in a rural area and the other in a metropolitan area.

45. There was wide variety in the methods used by site staff to dip tanks. Some of these methods are described below.

    - Pull dipstick out, read and record product level.
    - Pull dipstick out, wipe, lower, pullout and then read and record product level.
    - Pull dipstick out, wipe, lower, pullout and read product level, repeat two or three times and record average product level.

    Readings could be affected by movement of fuel in the tank and creep up the dipstick if it was not wiped before reading.

46. A number of different methods for recording product levels that lay between two increments on the dipstick were found. One method required an estimate of the exact reading between increments on the dipstick whilst others rounded to the nearest increment. The dipstick increments ranged from 100 litres to 500 litres. Errors are introduced when different methods are used for measuring the volume of product in the same tank.

Measurement of Volume of Product Delivered

47. Different methods were used to determine the volume of product delivered. One was to take the volume from the delivery docket, which stated the amount loaded into the tanker at the depot. The other was by dipping tanks before and after deliveries and taking the difference of these two measurements.

Measurement of Volume of Product Sold

48. Some pumps had electronic and mechanical meters to record the volume of product passing through them and hence the volume of product sold. Other sites only had mechanical meters. Operators stated that electronic meters are more accurate as mechanical meters sometimes underestimate the volume of product sold.

Inventory Control Data

49. Figures 1A to 1D in Appendix 1 show histograms of monthly variance as a percentage of

throughput for all sites audited. It is apparent that the greatest proportion of variances is between 0 and –1 per cent.

50. Figures 2A to 2D in Appendix 2 show histograms of daily variance (in litres) between theoretical and actual stock for each product for all sites. It can be seen that the usual daily variance is within 100 litres. The histograms show that the distribution of variances is slightly skewed to the left. This means there is a higher proportion of product loss than product gains, to some extent these can be attributed to shrinkage caused by temperature change, and evaporation.

51. Appendices 3 to 6 present histograms of daily variance (in litres) between theoretical and actual stock for each product for each site individually. Comparing these figures to those in Appendix 2 demonstrates the relative accuracy of inventory control for each site. Those sites with a large proportion of variances within 100 litres have more accurate inventory control than those sites for which variances are spread across a greater range.

52. Variances can be caused by errors in reading the product level on dipsticks. Increments on dipsticks were 100, 200 or 500 litres, therefore, errors due to inaccuracies in dipping would be in the order of hundreds of litres. For most sites, the majority of daily variances were within 900 litres, therefore, it can be concluded that inaccurate dipstick reading is a large contributor to inaccurate inventory control.

53. Variances can also be caused by errors in recording deliveries, which are usually thousands of litres and therefore the most likely cause for errors of this magnitude. Another potential for variance is in the reading and recording of bowser meters. These errors may be hundreds or thousands of litres.

54. The data for Site #3 was the most inaccurate. This was an M/S Affiliated site in a metropolitan area that was subject to SIA. For ULP, the vast majority of daily variances were greater than 900 litres positive or negative. The SIA status for this product was a PASS for the three-month period that the data related to. An investigation into the effectiveness of SIA methodologies was beyond the scope of this audit.

Leak Detection Methods other than standard Inventory Control

55. Six of the RFOs audited used leak monitoring systems considered adequate by CP4-1998. These methods were:
    - automatic tank gauging (ATG) with continuous statistical leak detection (CSLD) combined with mechanical line leak detection (MLLD) and interstitial monitoring at a site operated by an M/S Independent;
    - ATG with CSLD and MLLD at an Oil Major site;
    - statistical inventory analysis (SIA), used at two Oil Major sites, a distributor site and an S/S independent. Both the distributor and the independent were operating under Oil Major systems.

56. One site had a monitoring well in the tank pit that was inspected for the presence of product every six months.

57. At the three sites that had pressure pump systems, there were leak detectors associated with all lines. If a leak was detected, the dispensers would be stopped from functioning until the leaking line had been repaired. These were a three-year old M/S Independent site in a rural area and two seven-year old Oil Major sites in metropolitan areas.

58. A number of site operators believed that the presence of water in the bottom of a tank could indicate that it was leaking.

59. One site owner stated that if the UPSS at his RFO was leaking, a hydrocarbon odour would be present. This is not considered a satisfactory leak detection measure.

Checking Tanks for the Presence of Water

The presence of water in the bottom of tanks may or may not indicate a leak depending on the level of the water table relative to the UST. The frequencies with which tanks were checked for water are presented in Table 5.12. Water finding paste applied to the bottom of the dipstick was the most common method of checking for water, some automatic tank gauges have the capacity to detect water.

60. All, except two, of the RFOs audited periodically checked their tanks for the presence of water. Nine out of 10 metropolitan sites checked for the presence of water more often than once a fortnight. Six out of 12 rural sites checked for the presence of water less frequently than this.

Table 5.12 Frequency of Checking for Water and Site Location

Frequency	Metropolitan	Rural	Total
Continuously	0	1	1
Every Day	3	1	4
Every Week	5	3	8
Every 2 Weeks	1	1	2
Every Month	0	1	1
Every 2 Months	0	1	1
Every 6 Months	0	2	2
Every 12 Months	0	1	1
Never	1	0	1
Information not obtained	0	1	1

5.7 Forecourt Material and Condition

61. At 21 of the RFOs audited the forecourt surface was made of concrete. The other RFO was an S/S Independent site in a rural area and the forecourt surface was made of asphalt.

62. At five rural and three metropolitan RFOs, there were significant cracks in the forecourt surface. These cracks provide a potential pathway for spills on the forecourt surface to enter soil and groundwater. At one of these RFOs, run off from the vehicle filling area was found to drain into the ground through a crack in the forecourt. This was an M/S Independent site in a metropolitan area. At a rural site, spillage during UST filling would drain straight to a forecourt crack.

5.8 Protection of Surface Water

Stormwater management

63. Six sites had canopies that did not cover the entire vehicle filling area and one site did not have a canopy at all. The other fifteen sites had canopies that adequately covered vehicle filling areas.

64. One reason provided for canopies not adequately covering diesel bowsers was the difficulty of constructing structurally sound canopies tall enough for trucks to drive under.

NSW EPA Environmental Guideline, *Surface Water Management on the Covered Forecourt Areas of Service Stations*, recommends that the vehicle filling area should be protected from entry of external surface waters by a minimum two per cent change in grade or a combination of a minimum two per cent grade change and a grated drainage system. AIP Code of Practice for *The Control of Water Effluents from Service Stations* 1992 (CP1) does not provide guidance for management of stormwater with respect to the vehicle filling area.

65. Three sites had grated line drains to divert stormwater away from the covered vehicle filling area. One of these pumped wastewater from washing the vehicle filling area through an oil-water separator and discharged to stormwater. Use of such an oil-water separator does not make discharge to stormwater acceptable.

66. At 17 sites water from the entire forecourt including the vehicle filling area discharged to stormwater via grated drains or side entry pits.

67. At two of the RFOs visited run off from the vehicle filling area drained to soil and/or grassed areas. Both of these were in rural areas.

68. At eight of the RFOs visited it was noted that on-site stormwater drains needed cleaning as they contained sediment and/or litter. CP1 recommends that stormwater drains are inspected weekly for the presence of litter and sediment and cleaned if required.

Drainage Plans

69. None of the RFOs audited had drainage plans in the manifest on site as required by the *Dangerous Goods (Storage and Handling) Regulations* 2000. One RFO had drainage plans kept in the site office, but not in the manifest. This was an Oil Major site in a metropolitan area.

Emergency Stop Buttons

70. At 18 of the RFOs audited, emergency stop buttons to cut off flow from the bowsers were present in the console area.

71. Staff at two of these 18 sites were not aware of the location of the emergency stop button and had not been trained in its use. Both of these sites were in rural areas. One was a Distributor site and one was an S/S Independent site.

72. The four sites that did not have an emergency stop button had to go to the fuse box to switch off pumps. All these sites were in rural areas. Two were Distributor sites and two were S/S Independent sites.

Spill Kits

73. There was significant variation in the standard of spill kits observed at the RFOs audited. Data regarding spill kits is presented in Table 5.13. Twelve sites had a standard spill kit that contained absorbent granules, booms and pads for blocking drains, gloves and anti-static bags for disposing of contaminated materials. Five sites had some limited means of cleaning up spills such as a bag of kitty litter, a commercial absorbent material or sand. Five sites did not have equipment for cleaning up spills. *Dangerous Goods (Storage and Handling) Regulations* 2000 require that any premises where dangerous goods are stored and handled must have equipment and materials to contain and clean up any reasonable foreseeable spills or leaks.

74. Table 5.13 shows that the standard of spill kits in Distributor and S/S Independent sites was lower than at the other sites.

Table 5.13 Presence of Adequate Spill Kits for each Organisational Structure.

Spill Kit Status	Oil Major	M/S Affiliated	Distributor	M/S Independent	S/S Independent
Present	2	2	2	5	1
Minimal	1	0	1	1	2
Not Present	0	0	2	0	3

Fill Point Spill Containment

75. At 10 of the RFOs audited, UST fill points were located in spill containment boxes, this data is presented in Table 5.14. Fill point spill containment devices are recommended by AS1940, *Dangerous Goods (Storage and Handling) Regulations* 2000 and CP4-1998. All fill point spill boxes observed were metal and had a capacity of approximately 15 litres per UST fill point.

76. Seven out of 10 metropolitan sites audited had fill-point spill containment devices compared to three out of 12 at rural sites.

77. Fill point spill containment boxes were not present at any S/S Independent sites audited, this data is presented in Table 5.15.

Table 5.14 Presence of Spill Box and Site Location

Spill Box Status	Metropolitan	Rural
Present	7	3
Absent	3	9

Table 5.15 Presence of Spill Box for each Organisational Structure

Spill Box Status	Oil Major	M/S Affiliated	Distributor	M/S Independent	S/S Independent
Present	2	2	1	5	0
Absent	1	0	4	1	6

78. At all sites that did not have fill point spill containment devices, tanks were at least 20 years old.

Vehicle Filling Area Spill Containment

79. A dedicated vehicle filling area spill containment device was present at only one of the sites audited. This was a three-year-old M/S Independent site in a rural area. *Dangerous Goods (Storage and Handling) Regulations* 2000 require that in each area that a dangerous good is handled, provision is made for spill containment.

80. At five other sites, run off from the vehicle filling area drained to stormwater via line drains across the sites' driveways. This provided a capacity to create temporary spill containment with approximately 100-litre capacity by blocking the outlet of this drain in the case of a spill.

Vehicle Collision Protection

81. At three of the RFOs audited, petrol bowsers were not protected from vehicle collision as required *by Dangerous Goods (Storage and Handling) Regulations* 2000. These sites were all in rural areas. At the other 19 sites, bowsers were protected from vehicle collision at their ends but not their sides.

Supervision of Tank Filling

82. At five sites, staff were trained/instructed to watch/supervise tank filling to ensure that tanker drivers were in constant attendance of the shut-off valve. Two of these sites were Oil Majors, and three were S/S Independent. Operators of other sites believed it was the responsibility of tanker drivers' to supervise tank filling. At many sites it was not possible for site staff to supervise tank filling as deliveries are sometimes made when the site is closed (that is unattended) or the UST filling area is not visible from the console area. Assessment of tanker driver competence was beyond the scope of this audit.

5.9 Management of Emissions to Air

Vapour Recovery Systems (VRS)

Stage One VRS consist of a second line between tanker and UST that carries vapours from the UST to the tanker when product is being deposited in the UST. This reduces emission to air of vapours displaced from the UST during filling.

83. One rural RFO had stage one VRS. Nine out of 10 RFOs in metropolitan areas had a stage one VRS as was required by the *Environment Protection (Storage and Transfer of Volatile Organic Liquids) Regulations* 1984. These regulations lapsed in 1994 and have not been replaced. CP4 recommends that for tanks installed after 1 January 1999, VRS are used where required by an authority. There is currently no requirement in Victoria for the use of VRS, however, such devices may be necessary to meet air quality standards prescribed in *State Environment Protection Policy (Air Quality Management)* 1999.

84. At two of the RFOs audited, USTs were filled during the course of the visit. At one RFO, a vapour recovery hose was in place and no significant odours were detected. At the other RFO, the tanker driver acted against procedures and did not connect the vapour recovery hose; significant odours were detected.

85. The efficiency of VRS was not monitored at any of the RFOs audited. Two tanker drivers stated that if vapour recovery lines were blocked, they would get 'blow-back' when they disconnected the tank filling hose. A literature review revealed that in Germany, vapour recovery and tank fill lines must be fitted with flow meters. The measured flow rate of product entering the UPSS must be within a certain percentage of the measured flow rate of vapour leaving the UPSS.

86. Stage two VRS (that is vapour is recovered during vehicle filling) were not present at any of the RFOs audited.

5.10 Waste Management

Used Contents of Spill Kits

87. Inappropriate disposal of used contents of spill kits (that is prescribed wastes) was identified during the audit. In some cases these wastes were disposed of as general garbage, buried in the ground or taken home by staff to use as compost.

88. The spill kits at many RFOs contained a commercial hydrocarbon-absorbing product.

This product had been marketed to them as a product that could be disposed of with general garbage after it had been used to absorb petrol, diesel and oil. This practice is a contravention of the *Environment Protection (Prescribed Waste) Regulations* 1998.

Diesel Stains on Forecourt

89. At two of the RFOs audited, it was common practice to apply degreaser to diesel stains and then wash the diesel and degreaser into the stormwater system. CP1-1992 states that for cleaning forecourts, dry cleaning methods are preferred. It also states that quick break detergents are acceptable for general cleaning but the resulting effluent should not be discharged to the stormwater system or the environment.

90. The RFO that pumped vehicle filling area run off through an oil-water separator also applied degreaser to diesel stains. The addition of degreaser presents a risk of significantly reducing the effectiveness of the oil-water separator.

Workshop Wastes

Six of the RFOs audited had associated motor vehicle workshops.

91. At three workshops, waste oil was stored in 44-gallon drums that were not located on an impervious bunded area. This is against the recommendations of EPA Publication 462 *Waste Control at Motor Vehicle Repair and Service Premises – Best Practice Environmental Management* (July 1995).

92. At four of the RFOs audited, waste oil was stored in a UST. Inventory control was not completed for any of these tanks.

93. At one workshop, waste oil was stored in an above ground steel tank. There was significant staining of the soil surrounding the tank. This constitutes pollution of land and is a contravention of the *Environment Protection Act* 1970.

94. At all six workshops audited, waste batteries were not stored in spill trays. This is against the recommendations of EPA Publication 462 *Waste Control at Motor Vehicle Repair and Service Premises – Best Practice Environmental Management* (July 1995).

6. CONCLUSIONS

This audit of a selection of 22 RFOs indicates that there are highly variable environmental management standards across this industry and that under current controls a significant risk to the environment is posed by their operation.

As noted in Section 4.3 of this report, at the time of the audit there was no single guidance document that adequately addressed all environmental risks associated with retail fuel outlets. Guidance for management of most risks was available if industry codes of practice, Australian Standards and EPA Victoria publications were referenced. At many sites the available guidance was not followed, either because operators were unaware of it or because they chose not to.

The extent to which RFOs operated in accordance with available guidance varied. The audit identified examples of the following activities not being undertaken in accordance with guidance:

- Regularly checked cathodic protection for steel tanks;
- Forecourt design that prevented spills from running off site;
- Inventory control procedures that determined variances adequately and complied with product loss investigation triggers;
- Forecourt cleaning procedures that prevented surface water pollution;
- Cut-off switches in console areas that could stop all pumps;
- Provision of adequate spill clean-up kits; and
- Provision of training and standard operating procedures for site staff.

Guidance, aimed at RFO operators, for the management of large spills, for example thousands of litres, was not found during the research for this audit. Spills of this magnitude are most likely when product is being transferred from tanker to UST. None of the sites inspected had infrastructure or equipment capable of containing large spills. Assessment of tanker driver procedures and competence was not within the scope of the audit.

Inappropriate storage of waste oil and waste batteries, by operators of workshops situated on RFO premises, was a common problem.

Overall, rural sites were found to have a lower standard of environmental risk management than metropolitan sites. A smaller proportion of rural RFOs had bowser protection, emergency stop buttons, under pump sumps and fill point spill containment. There were also more old steel tanks found at rural RFOs.

A convenient conduit for information to all RFO operators is currently unavailable and S/S independents and M/S independents will be more difficult to reach because they are less likely to be members of an industry body.

Issues identified at the sites involved in the audit were addressed with the individual sites.

This audit has established a benchmark for environmental risk management in the retail fuel industry. The findings of this audit contributed to development of the *Guidelines on the Design, Installation and Management Requirements for Underground Petroleum Storage Systems* February

2003 and will be used by EPA Victoria to guide future activities and programs aimed at minimising the environmental impacts of retail fuel outlets. Any industry-wide programs will be considered in consultation with industry representatives.

7. GLOSSARY

Term	Definition
Bowser	Plant for pumping fuel from an UPSS to a vehicle or other receptacle, used with a suction pump system.
Cathodic Protection	Method of preventing or reducing corrosion in a metal surface by coating the UST with a dielectric material and attaching either: a) an impressed direct current; or b) sacrificial anodes.
Console attendant	Member of site staff with varying responsibilities including operating cash registers, dipping tanks, and in some cases carrying out leak detection measures and managing minor spills
Covered Forecourt	Area bounded by the canopy perimeter enclosing the vehicle filling area.
Dispenser	Measuring or metering unit for transferring fuel from an UPSS to a vehicle or other receptacle, used with a pressure pump system.
Environment	Any part of the natural or man-made surrounds, above or below ground.
Fill Point Spill Containment Device	A container that is fitted to the fill point of a tank to catch and contain a spill during product or used oil delivery to a tank.
Forecourt	Any part of an RFO site that allows vehicular access, including the vehicle fill area.
Groundwater Monitoring Well	A well or bore that has been installed as part of a groundwater monitoring Leak Monitoring System.
Industry	The retail petroleum industry.
Industry Best Practice	The most effective methods for prevention of pollution by RFOs.
Integrity Test	A test conducted to determine if an UPSS is leaking to the environment, or is not providing containment as originally

Term	**Definition**
	designed.
Interstitial Space	Space between the two walls of double-walled tanks or product piping.
Inventory Control	Performing reconciliation of product or used oil volumes in tanks.
Leak	Any loss of product or used oil from an UPSS because an UPSS was not providing full and continuous containment.
Leak Monitoring	Process provided to detect a leak in an UPSS.
Metropolitan Area	Within metropolitan and outer suburban taxi area according to Melways Map 541.
Oil Major	Any company that operates an oil refinery producing petroleum products and supplying to Victorian retail fuel outlets.
Operator	The occupier of the RFO site, or any person who is responsible for, or has control of, the daily operation of the UPSS.
Owner	Any person who has legal or beneficial ownership rights of the UPSS.
Piping	Includes all pipes, pipe fittings and valves.
Petroleum Products	Fuel or oil containing petroleum hydrocarbons
Prescribed Industrial Waste	As defined in the *Environment Protection (Prescribed Waste) Regulations* 1998.
Retail Fuel Outlets (RFOs)	Any trade, premises or site engaging in the retail sale of petroleum products.
Rural area	Outside of the metropolitan and outer suburban taxi area according to Melways Map 541.
Secondary Containment	Containment that is designed to prevent a leak from an UPSS being released into the environment.
Spill	Any loss of containment of product or used oil from an UPSS during: a) Product or used oil transfer, delivery, or removal;

Term	**Definition**
	b) UPSS operation c) UPSS maintenance or testing d) UPSS repair, re-use or closure.
Stock Reconciliation	See inventory control.
Statistical Inventory Reconciliation Analysis	A method of analysing inventory control data by using statistical methods such that the possible cause of discrepancies can be identified.
Underground Storage Tank (UST).	A completely or partially buried tank.
UPSS	One or more completely or partially buried tank(s) that contain petroleum product or used oil and includes leak monitoring systems, cathodic protection and all product piping to, from or associated with the tanks and up to the inlet port of the dispensers.
Used Oil	Oil that has been used for lubricating or other purposes and has become unsuitable for its original purposes due to the presence of impurities or the loss of original properties.
Vehicle Fill Area	The area surrounding bowsers extending to the furthest point any bowser hose reaches.
Waters	Any water in the environment, including: river, stream, reservoir, tank, billabong, creek, anabranch, canal, drain, spring, swamp, channel, lake, lagoon, natural or artificial water course dam, tidal waters or coastal waters, and underground and artesian waters.