British Antarctic Survey

Oil Spill Contingency Plan

Halley V Research Station

RH Downie and JR Shears

2nd Edition
2003

British Antarctic Survey,
High Cross, Madingley Road,
Cambridge, UK  CB3 0ET
# OIL SPILL CONTINGENCY PLAN
## HALLEY V RESEARCH STATION

## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Introduction</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Aim of the oil spill contingency plan</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Legal requirements and guidelines for oil spill contingency planning in Antarctica</td>
<td>1</td>
</tr>
<tr>
<td>1.3</td>
<td>BAS policy on oil pollution</td>
<td>1</td>
</tr>
<tr>
<td>1.4</td>
<td>The scope of the oil spill contingency plan</td>
<td>2</td>
</tr>
<tr>
<td>1.5</td>
<td>How to use the contingency plan</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Background Information</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Halley V Research Station</td>
<td>3</td>
</tr>
<tr>
<td>2.2</td>
<td>Physical layout of the station</td>
<td>3</td>
</tr>
<tr>
<td>2.3</td>
<td>The area covered by the oil spill contingency plan</td>
<td>3</td>
</tr>
<tr>
<td>2.4</td>
<td>Fuel storage facilities at Halley V</td>
<td>4</td>
</tr>
<tr>
<td>2.5</td>
<td>Risk of fuel spills at Halley V</td>
<td>5</td>
</tr>
<tr>
<td>2.6</td>
<td>The likely movement and fate of fuel spills</td>
<td>7</td>
</tr>
<tr>
<td>2.7</td>
<td>The classification by BAS of fuel spills</td>
<td>7</td>
</tr>
<tr>
<td>2.8</td>
<td>Resources at risk</td>
<td>8</td>
</tr>
<tr>
<td>2.9</td>
<td>Priorities for protection</td>
<td>8</td>
</tr>
<tr>
<td>2.10</td>
<td>General spill response strategy</td>
<td>9</td>
</tr>
<tr>
<td>2.11</td>
<td>Training and Exercises</td>
<td>9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Actions and Operations</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Roles and responsibilities of personnel</td>
<td>10</td>
</tr>
<tr>
<td>3.2</td>
<td>Action plans</td>
<td>11</td>
</tr>
<tr>
<td>3.3</td>
<td>Clean-up response</td>
<td>12</td>
</tr>
<tr>
<td>3.4</td>
<td>Health and safety</td>
<td>15</td>
</tr>
<tr>
<td>3.5</td>
<td>Communications</td>
<td>17</td>
</tr>
<tr>
<td>3.6</td>
<td>Environmental monitoring</td>
<td>18</td>
</tr>
<tr>
<td>3.7</td>
<td>Waste disposal</td>
<td>19</td>
</tr>
<tr>
<td>3.8</td>
<td>Termination of oil spill response</td>
<td>19</td>
</tr>
<tr>
<td>3.9</td>
<td>Final Report</td>
<td>20</td>
</tr>
</tbody>
</table>
## Section 4. INFORMATION AND DATA DIRECTORY

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Contact details</td>
<td>21</td>
</tr>
<tr>
<td>4.2</td>
<td>Oil spill response clothing and equipment held at Halley V Research Station</td>
<td>23</td>
</tr>
<tr>
<td>4.3</td>
<td>Halley V Research Station Facilities</td>
<td>24</td>
</tr>
<tr>
<td>4.4</td>
<td>Spill Report Form</td>
<td>25</td>
</tr>
<tr>
<td>4.5</td>
<td>Flubber Overspill Procedure</td>
<td>31</td>
</tr>
<tr>
<td>4.6</td>
<td>BAS oil spill response structure</td>
<td>32</td>
</tr>
<tr>
<td>4.7</td>
<td>Action plan 1 - Base Commander</td>
<td>39</td>
</tr>
<tr>
<td>4.8</td>
<td>Action plan 2 - Operations Manager</td>
<td>40</td>
</tr>
<tr>
<td>4.9</td>
<td>Action plan 3 - Environmental Officer</td>
<td>41</td>
</tr>
<tr>
<td>4.10</td>
<td>Action plan 4 - Head of Technical Services</td>
<td>42</td>
</tr>
</tbody>
</table>
AMENDMENT PROCEDURE

Amendments to the Halley V Oil Spill Contingency Plan will be issued as necessary by the BAS Environmental Office. The OSCP will be updated online, and a notification sent to those on the distribution list informing them of the update. Existing copies of the OSCP must be destroyed, and replaced with the updated version. Confirmation must be provided to the Environmental Office that this has been completed.
LIABILITY LIMITATIONS

This document is produced for internal management purposes by the British Antarctic Survey (BAS). Its publication and/or sale do not constitute endorsement of any of the companies or products mentioned herein. The BAS do not accept any responsibility or legal liability for any actions undertaken, on the basis of the advice in this document, by individuals not employed by the BAS, or by organisations or companies not contracted to the BAS in the field of oil spill response. Any liability of the BAS to its own employees or to companies contracted to it will be limited to that under UK Health and Safety legislation or contractual agreement.
<table>
<thead>
<tr>
<th>Copy No.</th>
<th>DISTRIBUTION LIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Operations Manager, BAS Cambridge</td>
</tr>
<tr>
<td>2.</td>
<td>Base Commander's Office, Halley</td>
</tr>
<tr>
<td>3.</td>
<td>Base Commanders’ Office, Cambridge (Halley BC)</td>
</tr>
<tr>
<td>4.</td>
<td>Environmental Manager, BAS Cambridge</td>
</tr>
<tr>
<td>5.</td>
<td>Head of Technical Services, BAS Cambridge</td>
</tr>
<tr>
<td>6.</td>
<td>Halley Logistics Co-ordinator</td>
</tr>
<tr>
<td>7.</td>
<td>BAS Library</td>
</tr>
<tr>
<td>8.</td>
<td>Head, Polar Regions Unit, FCO</td>
</tr>
</tbody>
</table>

Also available on BAS intranet site (Manuals) at [http://basweb.nerc-bas.ac.uk/information/manuals/index.html](http://basweb.nerc-bas.ac.uk/information/manuals/index.html)
Section 1

INTRODUCTION
1. INTRODUCTION

1.1 AIM OF THE OIL SPILL CONTINGENCY PLAN

The aim of this Oil Spill Contingency Plan (OSCP) is to describe the procedures that will be used by the British Antarctic Survey (BAS) to enable a timely, effective and co-ordinated response effort in the event of an oil spill at Halley V Research Station, Brunt ice Shelf, Coats Land, Antarctica.

1.2 LEGAL REQUIREMENTS AND GUIDELINES FOR OIL SPILL CONTINGENCY PLANNING IN ANTARCTICA

The Protocol on Environmental Protection to the Antarctic Treaty (1998) contains stringent and comprehensive regulations to prevent and combat pollution. Article 15 of the Protocol requires Antarctic Treaty Consultative Parties (ATCPs) to provide for prompt and effective response action to incidents with potential adverse effects on the Antarctic environment, and to establish contingency plans for emergencies. The UK has enacted domestic legislation to enforce the provisions of the Protocol through the Antarctic Act, 1994, and the Antarctic Regulations, 1995.

The Council of Managers of National Antarctic Programmes (COMNAP) has adopted a set of recommended guidelines for oil spill contingency planning to help national operators comply with the requirements of the Environmental Protocol. These guidelines have been used to help develop the Halley V OSCP.

1.3 BAS POLICY ON OIL POLLUTION

The BAS generally prohibits any deliberate discharge into the sea of oil or oily mixtures from either its research vessels or stations. The BAS also makes every effort to prevent accidental oil spills through careful attention to fuel management and transfer operations, and by maintaining storage facilities and pipelines to a high standard. Nevertheless, the BAS recognises that even with the best precautions, accidents can still happen and oil spill contingency procedures are required.

The BAS views an oil spill which might occur from its stations and vessels as extremely serious and will seek to minimize the environmental impact as far as possible. Given the severe operational and climatic restraints of operating in Antarctica, any spill response by the BAS will seek to complement and make use of natural processes whenever possible.
1.4 THE SCOPE OF THE OIL SPILL CONTINGENCY PLAN

This plan describes the response procedures to be used at Halley Research Station in the event of an oil spill resulting from:

- refuelling operations during BAS ship to shore (transit tank) transfer;
- transport of fuel (drummed or bulk) between the ice shelf edge and Halley;
- failure of bulk fuel storage tanks or flubbers;
- failure of pipes, valves, joints, small fuel storage tanks, vehicle fuel & oil tanks and fuel drums at the station;
- refuelling of day tanks and vehicles.

1.5 HOW TO USE THE CONTINGENCY PLAN

Background information and outline plans (Section 2)

This contains a description of Halley V Research Station and its facilities and the area covered by the contingency plan. The probability, size, type, movement and fate of oil spills are predicted. The resources at risk around the station are examined, and the priority for protection is established. Finally, the general BAS strategy for oil spill response and the training of spill response personnel is outlined.

Actions and operations (Section 3)

This describes the emergency procedures to be followed when a spill occurs, and is set out in the expected chronological order of events.

Sections describe the roles and responsibilities of personnel, the initial assessment, and reporting requirements. Advice is given on the best practicable clean-up response, health and safety requirements, communications (including public relations), environmental monitoring, waste disposal and the termination of an oil spill response. Finally, instructions are given for preparing the final spill report.

Information and data directory (Section 4)

This contains contact points within the BAS and outside organisations, a list of oil spill equipment held at Halley V Research Station, and relevant facilities plans. The action plan flow diagrams are included at the end of this section, for ease of reference.
Section 2

BACKGROUND INFORMATION
2. BACKGROUND INFORMATION

2.1 HALLEY V RESEARCH STATION

Halley V Research Station (Lat. 75° 35'S, Long. 26°06'W – February 2005 position on moving ice) is located approximately 12 km from the seaward edge of the floating Brunt Ice Shelf, Coats Land. The ice shelf flows at approximately 850 metres per annum. It is the fifth Halley station to be built on the Brunt Ice Shelf, and became fully operational in February 1992.

Studies at Halley V principally focus on atmospheric research. The station operates throughout the year with a maximum population of 65 in the summer and an average of 15 over winter.

Mid-summer average temperature is -5°C and in winter the monthly mean temperatures are in the region of -30°C. Prevailing winds are from the east-north-east. Mean annual wind speed is 13 kts and an extreme maximum of 80 kts has been recorded. In winter (May-August), the sun does not rise above the horizon for 105 days.

2.2 PHYSICAL LAYOUT OF THE STATION

Section 4.3 shows the physical layout of the station and the facilities plans. The Laws, Piggott and Simpson buildings and the CASLab are located on platforms on steel legs, which are jacked up annually to keep them clear of accumulating snowfall. A summer accommodation building (Drewry Building) and garage are mounted on skis so that they can be towed out of accumulating snow each year.

There are also several large aerial and radar arrays for atmospheric research, as well as fuel, waste and supply dumps and storage containers around the station.

Halley V is due to be decommissioned and removed in 2009/2010, once Halley VI is built. A new OSCP will be prepared for Halley VI.

2.3 THE AREA COVERED BY THE OIL SPILL CONTINGENCY PLAN

The OSCP covers BAS activities at Halley V (see Section 4.3) station, as well as the chosen cargo relief point at the ice shelf edge (which varies from year to year), and the route between that point and the station along which fuel is transported.
2.4 FUEL STORAGE FACILITIES AT HALLEY V

2.4.1 Bulk Fuel Storage

Bulk fuel at Halley is stored in 10 x 20,000 litre rectangular double-skinned steel tanks mounted on skis. The moveable bulk fuel tanks are sited on snow ramps outside the station perimeter (see Section 4.3). They are refilled annually from 4 x 6000 litre transit tanks, which are filled with AVTUR during station relief from the RRS *Ernest Shackleton* at the ice-edge and towed to the station. Due to the weight of these tanks on sea ice, they are never filled beyond 5000 litres. Avery Hardall dry-break valves are fitted to refuelling hoses to eliminate any spillage.

Bulk fuel is also stored in 2 x 20,000 litre flubbers. The flubbers are located in an ARMCO service tunnel which runs between the Laws and the Simpson buildings, approximately 30 metres below the snow surface. The flubbers are made from flexible 2-ply polymer laminate, and are located in polymer laminate lined ice bunds securely fixed to the ARMCO steel tunnel. They are refilled four times a year from the bulk fuel tanks.

Operating procedures and risk assessments have been produced by BAS for refuelling activities at Halley Station, and are available on the BAS intranet (Halley Station Procedures).

2.4.2 Small Fuel Storage Tanks

<table>
<thead>
<tr>
<th>Tank</th>
<th>Fuel</th>
<th>Capacity (litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drewry Building generator day tanks (x 2)</td>
<td>AVTUR</td>
<td>560 litres each</td>
</tr>
<tr>
<td>Drewry Building boiler tank</td>
<td>AVTUR</td>
<td>1200</td>
</tr>
<tr>
<td>Garage day tank</td>
<td>AVTUR</td>
<td>3800</td>
</tr>
<tr>
<td>Waste oil tank (garage)</td>
<td>Lubes and oily wastes</td>
<td>1200</td>
</tr>
<tr>
<td>Laws Building day tank</td>
<td>AVTUR</td>
<td>1500</td>
</tr>
<tr>
<td>Piggott Building day tank</td>
<td>AVTUR</td>
<td>700</td>
</tr>
<tr>
<td>Simpson Building boiler tank</td>
<td>AVTUR</td>
<td>300</td>
</tr>
<tr>
<td>Mobile fuel bowser (twin tanks)</td>
<td>Petrol/’Doo mix’ (petrol/oil 50:1)</td>
<td>400</td>
</tr>
</tbody>
</table>

The welded steel day tanks in garage and the Drewry boiler tank are double skinned.

4
The Laws and Piggott day tanks have no secondary containment, but overfill pipes are connected to empty 205 litre drums, sited on the platform outside. These drums are replaced annually to ensure their integrity.

The Drewry generator day tanks and the Simpson boiler tank have no secondary containment.

The mobile refuelling bowser, generally located at the vehicle refuelling area, is double skinned and has an 800 litre sump.

### 2.4.3 Fuel drum depots

The location of the fuel drum depot is shown in Section 4.3. Lubes and oils are stored inside the garage building.

<table>
<thead>
<tr>
<th>Type of fuel</th>
<th>Maximum number of drums</th>
<th>Maximum quantity of fuel (litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVTUR</td>
<td>2000 (205 l)</td>
<td>4,100</td>
</tr>
<tr>
<td>Petrol</td>
<td>125 (205 l)</td>
<td>25,625</td>
</tr>
<tr>
<td>Other oils and lubes</td>
<td>400 (205, 100 &amp; 25 l)</td>
<td>4400</td>
</tr>
</tbody>
</table>

### 2.5 RISK OF FUEL SPILLS AT HALLEY V

The expected probability, maximum spill size and fuel type for a range of possible scenarios at Halley V is shown in Table 3.
Table 3.

<table>
<thead>
<tr>
<th>SPILL</th>
<th>PROBABILITY</th>
<th>MAX. SPILL SIZE (litres)</th>
<th>FUEL TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collision or grounding of BAS vessel at ice shelf</td>
<td>Very low</td>
<td>600,000</td>
<td>MGO, AVTUR and other petroleum products</td>
</tr>
<tr>
<td>Catastrophic failure of a bulk fuel tank</td>
<td>Low</td>
<td>20,000</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Catastrophic failure of a flubber</td>
<td>Medium</td>
<td>&lt; 20,000</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Failure of fuel line whilst refuelling flubber</td>
<td>Medium</td>
<td>1000</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Loss of transit tank loss through sea-ice</td>
<td>Medium</td>
<td>5000</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of garage day tank</td>
<td>Medium</td>
<td>3800</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of Laws day tank</td>
<td>Medium</td>
<td>1500</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of Drewry boiler tank</td>
<td>Medium</td>
<td>1200</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of garage waste oil tank</td>
<td>Medium</td>
<td>1200</td>
<td>Waste oil and lubes</td>
</tr>
<tr>
<td>Pipeline break or leak during refuelling (ship to transit tank)</td>
<td>Medium</td>
<td>1000</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of Piggott day tank</td>
<td>Medium</td>
<td>700</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of Drewry day tank</td>
<td>Medium</td>
<td>560 (each)</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Rupture/overflow of Simpson boiler tank</td>
<td>Medium</td>
<td>300</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Damaged drum during drum raising</td>
<td>High</td>
<td>205</td>
<td>AVTUR</td>
</tr>
<tr>
<td>Oil/fuel leak from generator</td>
<td>High</td>
<td>20</td>
<td>AVTUR/Lubricating Oil</td>
</tr>
<tr>
<td>During refuelling (vehicles or aircraft) minor spills may occur from drums or bowser</td>
<td>High</td>
<td>5</td>
<td>AVTUR Petrol Lubricating Oil ‘Doo mix’</td>
</tr>
</tbody>
</table>
2.6  THE LIKELY MOVEMENT AND FATE OF FUEL SPILLS

Spills are most likely either at the station itself or during refuelling from ship to shore. Most spills at the station will be of AVTUR, petrol or ‘doo mix’.

Spills in the garage building (e.g. from the garage day tank, waste oil tank, or from vehicles) will be contained in the garage floor sump.

Spills from the flubbers should be contained within the surrounding lined bund. Following a bund failure in 2005, scheduled inspections, remote webcam monitoring and a review of associated risk assessments and procedures for maintaining the bund and flubbers have been instigated.

Small spills inside the buildings will mostly be contained by floors and walls.

Spills outside are likely to seep through the snow very rapidly to an irrecoverable depth. Some fuel will be absorbed at the snow-surface, which may be recovered.

2.7  THE CLASSIFICATION BY BAS OF FUEL SPILLS

Fuel spill incidents within the British Antarctic Survey are classified as follows:

Tier 1  Small local spills that can be dealt with immediately by one person or a dedicated station response team.

Tier 2  Medium spills that require the full resources of the station and assistance from BAS Cambridge.

Tier 3  Large spills which exceed the resources of the station and BAS Cambridge, and which require outside assistance.

Spills may not always fall neatly into the above classes. It is, therefore, important to be prepared to move to the next highest tier from the earliest moments of a spill. It is easier to stand down a response than to escalate it at the last moment.
2.8 RESOURCES AT RISK

2.8.1 Flora and fauna

There are no breeding birds or mammals, or vegetation, at Halley Research Station. Emperor penguins (*Aptenodytes forsteri*) breed along the coast at >Maggies Creek= or >Windy Creek=, approximately 12 -15 km from the station. Very occasionally, small groups of Adélie penguins (*Pygoscelis adeliae*), as well as some emperor penguins, visit the station during the summer and moult in the lee of the buildings. Occasional visits by skuas (*Catharacta sp.*) have been recorded. Wilson’s storm-petrels (*Oceanites oceanicus*) and snow petrels (*Pagadroma nivea*) have also been sighted flying over the station. It is highly unlikely that any fauna would be affected by an oil spill at the station.

2.8.2 Snow blocking areas

Three snow melt-tanks provide the station’s main fresh-water supply. They are located south east of the Drewry building, east-south east of the Laws platform, and beneath the Piggott building. Snow is bulldozed up to the hatches of the former two, where it is then shovelled into the tanks.

**SNOW CATS , SKIDOOS OR CRANES MUST NOT BE USED IN THESE AREAS.**

2.8.3 Scientific monitoring sites

A clean air sector is located to the south east of the station (see Section 4.3). The CASLab is located within this area. Vehicle use in this area is restricted to occasional and essential maintenance work only, and no other fuel is stored or used within this area.

2.9 PRIORITIES FOR PROTECTION

The health and safety of station personnel, and station resources, are paramount during a spill. The fresh water supply therefore has the highest priority for protection.

In the event of a spill in the snow blocking areas, snow for water consumption must be taken from a new and clean location.

All reasonable efforts should be made to protect other station facilities.
2.10 GENERAL SPILL RESPONSE STRATEGY

The general strategy of BAS is:

1. to stop, contain and recover fuel spills at stations;
2. to clean up as much spilled fuel as possible in the first few days after a spill and then leave the rest to natural processes;
3. to remove oily wastes from Antarctica

Long-term, intensive clean-ups are not carried out by BAS because of the severe climatic and logistical constraints of operating safely in Antarctica. At Halley, fuel spilled outside will seep very rapidly through the snow surface and is unlikely to be recoverable.

Halley V Research Station has sufficient materials and equipment stored on base to follow the response strategy for all Tier 1 and Tier 2 spills. Full details of the materials and equipment held on base are given in Section 4.2.

2.11 TRAINING AND EXERCISES

The BAS consider training in oil spill response to be important and necessary. Key staff will attend the Antarctic Oil Pollution Control Course, held by the BAS in conjunction with Oil Spill Response Ltd., before going to Antarctica. Most wintering personnel, staff with fuel handling responsibilities, and further staff likely to be involved in a clean-up at Halley Station, will attend the BAS Fuel Handling and Oil Spill Response Course held during the BAS pre-deployment conference. A list of staff who have attended these courses will be provided by BAS Operations Group to the Base Commander annually.

Oil spill exercises are to be held twice a year as a minimum (once during summer and once during winter) to ensure that all those likely to be involved in any response are familiar with the OSCP, the equipment, PPE and their particular responsibilities. A report of the exercise is to be submitted to the Operations Manager. The Environmental Office maintain a record of exercises undertaken at Halley. In addition, basic training is given to new arrivals at Halley, covering procedures for reporting a spill, health and safety issues, and the use of basic equipment (e.g. absorbents, overpack drums).
Section 3

ACTIONS AND OPERATIONS
3. ACTIONS AND OPERATIONS

3.1 ROLES AND RESPONSIBILITIES OF PERSONNEL

The oil spill response structure within the BAS is shown in Section 4.6. At BAS Cambridge, the response team will consist of the Operations Manager (Team Leader), the Environmental Officer and the Head of Technical Services or their nominated deputies.

The roles and responsibilities of the key response personnel are:

**Operations Manager**

1. Overall control of the response team;
2. Organises environmental, technical, administrative and logistical support for the response team;
3. Informs and updates the Directorate of any incident;
4. Liaises with Halley Base Commander throughout an incident;
5. Ensures that an actions and communications log is kept at BAS Cambridge;
6. Prepares draft press statements for release by the Directorate;
7. Notifies outside agencies (e.g. FCO), as appropriate;
8. Decides when to terminate a response action;
9. Files log, reports and photographic/video material of incident with Registry, BAS Cambridge;

**Environmental Manager**

1. Advises on best practicable clean-up techniques, the ecological resources most at risk and likely environmental impact;
2. Contacts appropriate outside bodies for information and assistance regarding clean-up (e.g. Oil Spill Response Ltd.);
3. Authorises expenditure on clean-up equipment and disposal of oily wastes;
4. Advises the Operations Manager on the environmental content of press statements;
5. Devises and coordinates scientific monitoring studies;
6. Organises review meeting on oil spill response within 6 months;
7. Organises oil spill response courses for staff in the UK;
8. Reviews and updates the Halley OSCP as and when required.
3.2 ACTION PLANS

Action plans have been developed for the key personnel who would be involved in an oil spill at Halley V. Plans have been produced for the following people:

Head of Technical Services

1. Advises on emergency fuel management and the integrity of oil storage facilities and pipelines;
2. Procures emergency spare parts for fuel tanks and pipelines, as necessary;
3. Contacts BAS Technical Officers, outside companies and agencies for information and assistance regarding technical services;
4. Reviews fuel management, storage and transfer system after an incident so as to prevent a similar spill in the future;
5. Authorises expenditure on technical services.

Health and Safety Advisor

1. Advises on Health and Safety issues as they arise during exercises or incidents;
2. Reviews and provides advice upon appropriate PPE for oil spill response at Halley.

Base Commander (BC)

1. Initial control of emergency shutdown and response team, until Operations Manager notified;
2. On-site control of the response team throughout an incident;
3. Ensures that an incident and communications log is kept on base;
4. Initial notification and classification of the spill;
5. Responds to actions requested by BAS Cambridge via Operations Manager;
6. Prepares situation reports for BAS Cambridge;
7. Stands down the station response team at the end of an incident;
8. Liaises with the Environmental Officer to replace consumables used during the response;
9. Ensures that equipment is cleaned and that replacement parts are ordered;
10. Prepares a final report on the spill;
11. Organises the station response exercises (minimum once during the summer and once during the winter).
3.3  CLEAN-UP RESPONSE

3.3.1  Emergency shutdown

Once a spill has been discovered it is to be reported immediately to the BC. Spill response then becomes the BC’s responsibility. He/she must first ensure the health and safety of personnel. If safe to do so, the BC must order any emergency shutdown measures needed to stop or minimise further spillage.

When extremely volatile fuels, such as petrol, are spilled in a confined area (e.g. indoors, the tunnels or flubber chambers), there may be a risk of fire or explosion. In such circumstances, explosion and fire prevention are the top priority. In unventilated areas fuel fumes can also affect breathing and cause nausea. No clean-up is to be attempted until the spill area is safe.

3.3.2  Rapid initial assessment

The BC must carry out a rapid initial assessment of the situation. He/she must check the:

- risk of fire or harm to human health;
- probable quantity of fuel spilled;
- type of fuel;
- location of the spill;
- probable source and cause.

3.3.3  Station response team

If safe to do so, and after consulting the BAS risk assessment on oil spill response as well as undertaking an on site risk assessment, the BC must mobilise the station oil spill response team. He/she will decide on the most appropriate response strategy in consultation with BAS Cambridge as necessary. It is the duty of the team to protect:

1. Health and safety.
2. Station facilities.
3. Threatened resources.
The team will operate under the direct supervision of the BC. Job-specific tasks are shown below. Other trained base personnel will be called upon by the BC as necessary.

**Facilities Engineer or Mechanical Services Technician**

1. Carries out emergency shutdown measures as instructed by BC.
2. Checks generators to ensure that the spill will not cause disruption of fuel supply to the engines on line.
3. If spill directly affects engines on line they must be shut off until problem is resolved.
4. If spill does not affect engines on line then the Facilities Engineer is to proceed to spill site and assist with clean up operations.

**Plumber**

1. Checks the integrity of the pipes, valves and tanks, and makes repairs as necessary.
2. Assist with clean-up operations (e.g. set up pump if required).

**Electrician**

1. Checks integrity of electrical supplies and equipment in spill area.
2. Set up temporary electrical supplies if required.
3. Set up auxiliary lighting if required.

**Radio Operator**

1. Maintains actions and communications log in consultation with BC.

**Base General Assistant**

1. Distribute spill response clothing as required.

**Met Assistant**

1. Responsible for photo/video record of spill and clean-up.
2. May be responsible for snow/water sampling if instructed by Environmental Officer.

**Doctor**

1. Remains on stand-by for any health problems or emergencies associated with the clean-up.
Other tasks are not permanently allocated - staff are assigned tasks on site by the BC as required.

3.3.4 General clean-up advice

- Although each oil spill is different, general common advice is given below. Section 4.5 contains a specific procedure for removing spilled fuel from the flubbers in the service Tunnels at Halley, and should only be used in consultation with BAS Technical Services.

- Ensure oil spill equipment is in a known and accessible location. Rapid Response kits are kept next to all day tanks. Further equipment and PPE is stored in the laundry room on the Laws Building, and in the waste management container. Oil spill response equipment is not to be used for any other purpose without the permission of the Environmental Manager, BAS Cambridge.

- If the spill occurs indoors or underground, the area must be considered a confined space. Access must be controlled and only allowed after a careful assessment of the risk posed by fumes, lack of oxygen, risk of fire and the ability to safely evacuate staff in an emergency.

- If a spill occurs, stop or minimise any further spillage. If refuelling, stop immediately. Ensure safety of all personnel. Check for fire and explosion risk. Isolate all possible sources of ignition including electrical equipment that may case sparks or run hot. Close off cut-off valves. If classed as a Tier 1 or Tier 2 spill and there is no risk of fire or explosion, call out station clean-up team. Ensure safety equipment is worn (over-suits, rubber gloves, goggles and breathing apparatus where required). Notify BAS Cambridge as soon as practicable. If classed as a Tier 3 spill, stop or minimise any further spillage, monitor situation and await instructions from BAS Cambridge.

- The site of a spill should be considered a potentially dangerous area - where practical, it should be cordoned off with the use of hazard tape and access should be allowed only to those involved in the spill response.

- Outdoors, contaminated snow can be shovelled into empty 205 litre drums which have had their tops removed with the use of a nibbler. Allow the snow to melt and decant off fuel. In winter, any waste drums containing a mixture of fuel and snow or water are likely to freeze. To prevent drums from splitting use only those in good condition. Do not fill completely.
• Indoors, absorbent pads should be spread on spilled fuel or oil which cannot be pumped or manually removed. Oil soaked absorbents must be picked up and put into empty 205 litre drums.

3.3.5 Communications and initial notification

Once the station response team have been mobilised, the BC must open a logbook of actions and communications. The logbook is to be kept up to date throughout the incident.

The BC must inform the Operations Manager, BAS Cambridge, of a spill as soon as possible. Initial notification should be by satellite telephone followed by fax to BAS Cambridge, and by e-mail if necessary.

The initial notification should be completed on the oil spill report form (Section 4.4). Notification must not be delayed if some of the required information is not available.

The Operations Manager will provide immediate notification to, and assess the incident with, the Environmental Officer and the Head of Technical Services. After responding to the initial notification, the Operations Manager will then alert the Head of Administration and the Director.

When remedial action is well underway, the Operations Manager will advise the Head of Polar Regions Unit at FCO as necessary.

3.4 HEALTH AND SAFETY

The health and safety of station personnel is paramount during an oil spill.

Emergency spill response actions should not be undertaken in periods of extreme weather conditions or darkness unless the situation has been fully assessed by the BC and deemed safe.

3.4.1 Fire and explosion

One of the major risks to heath and safety during a fuel spill is that of fire or explosion. Before commencing any clean-up operation, the risk of fire or explosion must be assessed. Sources of ignition must be eliminated. Periodic reassessment of risks should be carried out during protracted operations.
3.4.2 **Inhalation of hydrocarbon fumes**

Inhalation of hydrocarbon fumes can cause headaches and nausea, and may affect critical judgement. If there is any risk to the health and safety of the response team, they should not approach the site of the spill until the vapours have dissipated. The Station Breathing Apparatus may be used by staff trained in their use. BAS does not advocate the use of respirators, the correct fitting of which cannot be guaranteed and which may lead to a false sense of security and well-being.

To avoid the build-up of fumes inside the station, clean-up personnel should avoid entering the station buildings in oiled clothes. The BC must set up an emergency drying room and establish a cleaning rota to ensure that rooms used by the response team are washed daily.

3.4.2 **Slips and Trips**

Spilled fuel increases the risks of slips and falls. Correct protective footwear, good ‘housekeeping’ and limiting the spread of contamination will help to reduce these risks.

3.4.3 **Skin irritation by fuel**

Fuel and oil can be a skin irritant. Severe reactions can lead to dermatitis. When fuel comes into contact with the skin, it also increases the risk of cold-induced injuries (frostbite). Clean-up personnel must wear the correct PPE and change out of contaminated clothing as soon as possible. Showers must be taken at the end of the working day.

3.4.4 **Contamination of drinking water by fuel**

Drinking water would have to be highly contaminated by hydrocarbons for harm to occur. This is highly unlikely since very low concentrations of hydrocarbons alter the taste of water and make it completely unpalatable.
3.4.4 Advice on health effects

The Station Doctor is to advise the BC on likely health effects of a fuel spill. If symptoms attributable to the spill occur, the doctor is to inform the BAS Medical Unit immediately, who will provide instructions and advice.

Care must be taken to avoid slips, trips and accidents from manual handling of the equipment. The BC and Doctor must also pay attention to signs of exhaustion or stress amongst the response crew.

3.4.5 Material Safety Data Sheets

The Material Safety Data Sheets for AVTUR, petrol, paraffin and all lubricating oils used at Halley are held in the BC’s Office at Halley and in Room 143 (Technical Services) at BAS Cambridge.

3.5 COMMUNICATIONS

3.5.1 Emergency communications centres

The radio room will be used as the on-site communications centre at Halley V. It will be manned by the BC during situation reports. Field clean-up team members should carry hand-held radios.

If the spill is classified as Tier 2 or 3, then an emergency response centre will be set up at BAS Cambridge. It will be manned by the Operations Manager, Environmental Officer and Head of Technical Services.

3.5.2 Initial and situation reports

The BC is to give the Operations Manager at BAS Cambridge initial notification by phone or the best means practicable as soon as possible after the event. It should also be reported through the online Accident, Incident, Near Miss and Environment reporting system at the first opportunity. The BC should then provide regular situation reports, which should follow the same format as the initial notification (Section 4.4). Generally, situation reports are to be filed at approximately 3, 6, 12, and 24 hour intervals after the initial notification. After 24 hrs, situation reports are to be sent every 24 hrs until otherwise agreed by BAS Cambridge and the BC.

All communications are to be recorded in the incident log books maintained on station and at BAS Cambridge.
3.5.3  Staff information and public relations

A Tier 3 spill will concern staff and is likely to attract public and media attention. The Head of Administration and Logistics Division is responsible for ensuring that all staff are aware of a Tier 3 oil spill. A staff notice is to be prepared as soon as practicable after initial notification has been received at BAS Cambridge.

In the event of a major oil spill, liaison with the media will be co-ordinated by the Head of Press, PR and Education Section who will be briefed regularly by the BAS Cambridge response team. No unauthorised BAS personnel are to contact or talk to the media.

The Operations Manager is responsible for preparing draft press statements. Advice on environmental issues will be provided by the Environmental Manager. All statements must be checked and approved by the Director or his approved deputy before release.

3.6  ENVIRONMENTAL MONITORING

The environmental monitoring of an oil spill is the responsibility of the Environmental Manager, in liaison with the Operations Manager and the BC. Where available, specialist scientific expertise on station or at BAS Cambridge will be made use of.

3.6.1  Photographic and video record

A comprehensive digital photographic record of the spill and its subsequent clean-up is to be kept by the BC. Digital photographs of the incident and clean-up should be included in each situation report. Images and videos as appropriate are to be submitted by the BC in his/her final report on the oil spill to the Operations Manager. Any personal film which is used will be replaced by BAS.

3.6.2  Sampling of snow, ice and water

The Environmental Manager will advise the BC if the sampling of snow, ice or water is required to monitor the impact of the spill.
3.7 WASTE DISPOSAL

3.7.1 Storage of waste fuel and water

Disposal of waste fuel and oil must follow the instructions given in the BAS Waste Management Handbook. Allow for expansion and do not overfill drums. Watch out for pinhole leaks. Full drums should be stored in the outgoing waste dump designated for waste fuel.

Fuel soaked absorbents (booms and/or pillows), must be picked up and put into empty 205 litre drums which have had their tops removed with a nibbler. Heavy drums are difficult to handle - do not overfill. Seal drums with steel plates. Paint an orange ring around the drum. Label the drum ‘WASTE ABSORBENTS CONTAMINATED BY FUEL’, with the appropriate hazard markings and hazard stickers. Contaminated clothing must be disposed of in empty 205 litre drums and sent for disposal in the UK. Paint a yellow ring around the drum. Seal the drums with steel plates. Label the drum ‘WASTE CLOTHING CONTAMINATED BY FUEL’, with the appropriate hazard markings and hazard stickers.

3.7.2 Transport and disposal of waste

At the first available opportunity drums containing recovered fuel and other wastes from the clean-up should be sent out on BAS vessels to the UK for disposal. The BC must prepare a Bill of Lading (BOL) before the waste is removed.

3.8 TERMINATION OF OIL SPILL RESPONSE

The termination of an oil spill response is to be decided by the Operations Manager in consultation with the BC, the Environmental Officer and the Head of Technical Services.

It is the responsibility of the BC to stand down the station response team. All personnel involved in the response to a Tier 2 or Tier 3 spill must be given a medical check-up by the Station Doctor. The BAS Medical Unit will provide advice.

Equipment must be washed and cleaned by the response team before being put into storage. First remove as much oil as possible using absorbent pads. Arrangements for the repair and replacement of damaged or used equipment are to be made with the Environmental Manager at BAS Cambridge at the earliest opportunity.
3.9 FINAL REPORT

The BC is to prepare a final report on the spill at the end of the incident. The report should describe the:

- time (GMT) and date of spill;
- estimated quantity of fuel lost (litres);
- type of fuel;
- source and cause;
- location and extent of spill (map);
- resources affected;
- environmental impact;
- response action taken;
  - stopping or minimising spill (technical work carried out to fuel tanks or pipelines);
  - clean-up (number of personnel, techniques used, amount of oil/water collected (litres));
  - environmental monitoring (photographs, video, visual inspection, water and soil samples);
- effectiveness of response action;
- health of station personnel, if affected by spill incident;
- estimated quantity of usable fuel remaining;
- final classification of spill (Tier 1, 2 or 3);
- post-spill evaluation of contingency plan, and suggested amendments if necessary;
- further action.

The final report and accompanying digital photographs are to be entered on the AINME system within one month of the end of the incident.
Section 4

INFORMATION AND DATA DIRECTORY
4. INFORMATION AND DATA DIRECTORY

4.1 CONTACT DETAILS

Contact details are available in the Operations Emergency Contact List. This list is held centrally at BAS by the Operations Manager, who updates it as and when required. It is available (password protected) on the BAS Operations Group Intranet pages. Paper copies are also provided to all BAS stations and vessels.

4.1.1 British Antarctic Survey (BAS)

Initial notification of an oil spill must be made to BAS Cambridge by the BC. First contact is the Operations Manager, at BAS or at home.

<table>
<thead>
<tr>
<th>BAS Cambridge Response team</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>1st contact</strong> Operations Manager</td>
</tr>
<tr>
<td>2nd contact Head of Operations Group</td>
</tr>
<tr>
<td>2. <strong>1st contact</strong> Environmental Manager</td>
</tr>
<tr>
<td>2nd contact Head of Environmental Office</td>
</tr>
<tr>
<td>3. <strong>1st contact</strong> Head of Technical Services</td>
</tr>
<tr>
<td>2nd contact Head of Building Section</td>
</tr>
</tbody>
</table>

Advice on health and safety

<table>
<thead>
<tr>
<th>Contact</th>
<th>Health and Safety Adviser</th>
</tr>
</thead>
</table>
4.1.2 The British Antarctic Survey Medical Unit (BASMU)

The BAS Medical Unit will provide medical advice on health care required as a result of an oil spill. The Unit can be contacted by the Operations Manager or BC.

<table>
<thead>
<tr>
<th>The British Antarctic Survey Medical Unit (BASMU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
</tr>
<tr>
<td>Medical Adviser - BAS</td>
</tr>
</tbody>
</table>

4.1.3 The British Antarctic Survey Falkland Islands Office

The BC must fax copies of Bills of Lading (BOLs) to the Falkland Islands office detailing the disposal of oily waste in the UK. See instructions in the BAS Waste Management Handbook.

<table>
<thead>
<tr>
<th>The British Antarctic Survey Falkland Islands Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
</tr>
<tr>
<td>The BAS Representative, BAS Falkland Islands Office</td>
</tr>
</tbody>
</table>

4.1.4 Polar Regions Unit, Foreign & Commonwealth Office

The Operations Manager, BAS, is to inform the Head of Polar Regions Unit of a Tier 2 or Tier 3 oil spill occurring from BAS activities at Halley.

<table>
<thead>
<tr>
<th>Foreign &amp; Commonwealth Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
</tr>
<tr>
<td>Head, Polar Regions Unit</td>
</tr>
</tbody>
</table>

4.1.5 Oil Spill Spill Response Ltd (OSRL)

In the event of a Tier 2 or Tier 3 spill, BAS Cambridge may contact OSRL for information and advice on the best practicable clean-up techniques. Contact with OSRL will normally be made by the Environmental Manager.

<table>
<thead>
<tr>
<th>Oil Spill Spill Response Ltd (OSRL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact</td>
</tr>
<tr>
<td>Duty Manager</td>
</tr>
</tbody>
</table>
4.2 Oil spill response clothing and equipment to be held at Halley V Research Station

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drizit rapid response kits (located next to day tanks)</td>
<td>4</td>
</tr>
<tr>
<td>Ready mix sealant</td>
<td>20</td>
</tr>
<tr>
<td>Absorbent pillows/ cushions</td>
<td>35</td>
</tr>
<tr>
<td>Absorbent pads (pack of 25)</td>
<td>10</td>
</tr>
<tr>
<td>Absorbent mats (box of 125 or roll dispenser)</td>
<td>1</td>
</tr>
<tr>
<td>Flat bottom dustpans</td>
<td>10</td>
</tr>
<tr>
<td>Shovels</td>
<td>10</td>
</tr>
<tr>
<td>Empty, topped fuel drums (rotate annually)</td>
<td>20</td>
</tr>
<tr>
<td>Microchem 3000 disposable chemical suit</td>
<td>40</td>
</tr>
<tr>
<td>Insulated PVC gauntlets</td>
<td>30</td>
</tr>
<tr>
<td>Goggles</td>
<td>10</td>
</tr>
</tbody>
</table>
4.3 Halley V Research Station Facilities
4.3.1 Drewry Building
4.3.2 Garage
4.3.3  Laws Building
4.3.4 Sub-surface fuel storage facilities
4.3.5 Simpson Building

[Diagram of Simpson Building with labels and measurements]

LEGEND:
1. Meteorological office
2. Meteorological laboratory
3. Beta laboratory
4. Utilities
5. Storage
6. Electronics workshop
7. Boundary layer laboratory
8. Corridor
9. Shed porch
10. Platform
11. Stairs
4.3.6  Piggott Building
### 4.4 OIL SPILL REPORT – HALLEY V

**URGENT**  
To: Operations Manager, BAS  
Fax: 0044 1223 462840

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1. | Initial Report 9  
Situation Report 9 (Hr ....) |
| 2. | Date :  
Time (GMT = local time + 3hrs) : |
| 3. | Type of fuel and estimated quantity / revised estimate of quantity of fuel spilled (litres): |
| 4. | Source and cause: |
| 5. | Location, area covered and movement of spill (attach map if possible): |
| 6. | Weather conditions: |
| 7. | Resources at risk and environmental impact : |
| 8. | Response action (include actions to stop or minimise spill, clean-up techniques, no. of personnel involved, quantity of fuel recovered, environmental monitoring / samples taken) |
| 9. | Classification / revised classification of spill: |
| 10. | Useable bulk fuel remaining (litres): |
| 11. | Advice requested from BAS Cambridge |
| 12. | Additional comments (continue on separate sheet if necessary) : |

Signature:
4.5. Fubber Overspill Procedure

This procedure was developed during an actual spill at Halley V, in June 2005.

Background Information

Halley Station is powered by diesel generator sets that are fuelled by AVTUR, an aviation fuel that can withstand –60 temperatures, and remain fluid in operation.

Due to the location of the base, the snow and ice conditions, and the volumes of the fuel required for a year’s running, rubber fuel ‘Flubbers’ are deployed in tunnel system close to the platform that requires the fuel.

- Each flubber contains 20m$^3$, and there are two in the tunnel system discussed here. The tunnel system is 26m deep, and the flubbers are filled every 3 months.
- The flubbers are filled from a mobile transit tank that connects to a vertical access shaft above the flubber area. The transit tank is capable of holding 6m$^3$.
- Fuel stored in the flubbers is pumped to the station generator daytank each morning of every day.
- The flubbers have AveryHardall valves as removable connections, and a second keyed valve bolted to the fill point. ‘AH’ valves are dry break fittings.
- The underground fuel pump has an enclosed motor, and all lamping in the area is to an explosion proof BS standard.

Post cleanup problems to consider:

- The base has 30 hours of fuel in the platform daytank, therefore the cleanup solution must allow the pumping up of fuel while cleanup is ongoing, or an alternative fuel source to the platform.
- The recovered fuel must be contained and disposed of safely, preferably on site, using existing equipment.
- The Flubber area cleanup resources will be used up completely, leaving limited backup supplies on base to deal with potential future problems.
- The tunnel operatives will be moving about the tunnel in contaminated safety clothing. The melt water supply to the base is adjacent to the tunnel access silo point, indicating the need for a clothes change area local to the spill, or near the tunnel access corridor via the old melt tank area.

METHOD STATEMENT

The first and foremost consideration is always the safety of the station personnel. Any plan of action must consider:

- Air quality in the effected area. All operatives in the tunnel must use BA sets.
- Contact with fuel. Use PPE to protect the operatives from skin contact with the fuel.
• Fire. The ventilation of the area is to be maximised to reduce the risk of fire due to electric equipment.

There were two options considered for the clearance of the bund and the safe remaking of the fuel network. The first method was eventually used.

**Method 1**

Pump out the spilt fuel via an existing surface filling line, and transfer out of the tunnels to a mobile surface storage tank. Once drained, the area can be cleaned and made safe, before reinstating to normal operation.

**Benefits:**

• The spilt fuel is completely removed from the tunnel and contained in a mobile storage system. Disposal can be either by the garage heater, or re-entraining into the generator engine fuel system.
• Pumping can be initiated remotely, removing personnel from possible fire or explosion.
• Surface work is by using fully contained systems and fittings, eliminating further spills or contamination.

**Drawbacks:**

• The base will need to have a working crew on the surface at –45 temperatures, and have a bulldozer running to move the mobile fuel tank. This is possible but not ideal from a cold injury perspective.
• An operative and buddy will be required periodically in the tunnel to inspect the pumping operation, and ensure there are no further spills or equipment failures while pumping.

**Procedure**

• Open the central riser hatch and the Simpson hatch to assist in the ventilation of the tunnel. Access the tunnel via the melt tank silo, but ensure the melt tank access hatch remains closed to avoid freezing of the water pipework in this area.
• Have the vehicle mechanic bring a bulldozer into service and bring an empty transit tank to the central access shaft / fuelling point of the tunnel. Connect the tank to the 28mm Snaploc connection at the top of the shaft. A tank AH to 28mm snaploc adapter can be found atop of bulk fuel container 8 (an aircrew fitting)
• While underground, -Retrieve the pump suction line AveryHardall valve from the flooded flubber, and connect in a spare tank unit into it. This effectively opens the valve. Place the valve in the lowest point of the flooded bund.
• Manipulate manifold valves:
V1 to closed.  
V2 to Open  
V3 to Closed  
V4 to Closed  
V5 to Open.

This will configure the pump to draw from the flubber suction line AH as detailed, and discharge up to the snow surface via the 28mm riser in the central riser shaft.

• Finally check the valve settings, and clear the area.

• Radio the platform, and have the daytank pump-up switch activated upon the platform. Fuel should begin to flow into the surface tank within 10 to 15 seconds.

• Leave an operative on the surface to monitor the tank filling, while the Plumber and Generator Mech re-enter the shaft to inspect the pump and pipework. Reinspect every 15 minutes.
• Once the bund is empty, shut down the pump and remake the flubber AH valve as original. Reset the manifold valves to:
  
V1 Closed  
V2 Open  
V3 Open  
V4 Closed  
V5 Closed

This will return the pump configuration to pump from flubber to the platform daytank.

• Have the Vehicle Mech transfer as much fuel from the transit tank to the garage heater fuel tank. Depot the partially full transit tank on the dump line.

• Make off and seal the vertical riser top fittings.

• Stand down for a day or so, allowing the remaining surface dregs of fuel to evaporate off and clear the tunnel via the extract system.

• Begin the cleanup process, ensuring BA, PPE, and all safety features are fully employed where need be. Contaminated materials are to be stored on location in the supplied poly drums for removal later in the summer season.

**Method 2**

Recover and pump the spilt fuel via a local transfer manifold, directing it back into the empty second flubber in the area.
Benefits:

- The spilt fuel is contained in the tunnel, in an existing storage system. Once tested, the fuel can be re-entrained into the generator engine fuel system.
- Pumping can be initiated remotely, removing personnel from possible fire or explosion.
- Disruption to the pipework will be minimal, and easily remade.
- Surface work in arduous conditions is avoided, effectively bypassing the need for a vehicle, vehicle operators, surface personnel for pumping, and further work later in the season in dealing with stored contaminated fuel.

Drawbacks:

- The pumped flubber will contain potentially contaminated fuel, that will need to be tested etc before use. Contaminants will effectively be contained in the flubber, or be transferred to the platform daytank, where routine maintenance will clear the problem.
- The tunnel operative will need to wade through the full bund into the second flubber area, in order to reconnect the appropriate valve for pumping. The PPE will need to be checked thoroughly for soundness before this is carried out.
- An operative and buddy will be required periodically in the tunnel to inspect the pumping operation, and ensure there are no further spills or equipment failures while pumping.

Procedure

- Open the central riser hatch and the Simpson hatch to assist in the ventilation of the tunnel. Ensure the melt tank access shaft remains closed to avoid freezing of the water pipework in this area.
- While underground, -Retrieve the pump suction line AveryHardall valve from the flooded flubber, and connect in a spare tank unit into it. This effectively opens the valve. Place the valve in the lowest point of the flooded bund.
- Manipulate manifold valves:
  V1 to Open
  V2 to Closed
  V3 to Closed
  V4 to Open
  V5 to Closed

  This will configure the manifold to pump to the flubbers.

- Connect the back flubber AH valve and turn to the open position.
- Disconnect the suction inlet pipe to the manifold, and run a hose from this suction line to the flooded bund.
- Finally check the valve settings, and clear the area.
• Radio the platform, and have the daytank pump-up switch activated upon the platform. Fuel should begin to flow into the back flubber within 10 to 15 seconds.
• Have an operative return to the area within 5 mins to check the pump operation and associated pipework.
• Re inspect every 15 minutes.
• Once the bund is empty, shut down the pump and remake the flubber AH valves as original. Reset the manifold valves to:
  V1 Closed
  V2 Open
  V3 Open
  V4 Closed
  V5 Closed

This will return the pump configuration to pump from flubber to the platform daytank.

• Stand down for a day or so, allowing the remaining surface dregs of fuel to evaporate off and clear the tunnel via the extract system.
• Begin the cleanup process, ensuring BA, PPE, and all safety features are fully employed where need be. Contaminated materials are to be stored on location in the supplied poly drums for removal later in the summer season.
# Valve Sequences

## To Fill Daytank

<table>
<thead>
<tr>
<th>Valve</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Closed</td>
</tr>
<tr>
<td>V2</td>
<td>Open</td>
</tr>
<tr>
<td>V3</td>
<td>Open</td>
</tr>
<tr>
<td>V4</td>
<td>Closed</td>
</tr>
<tr>
<td>V5</td>
<td>Closed</td>
</tr>
</tbody>
</table>

## To Fill the Flubber

<table>
<thead>
<tr>
<th>Valve</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Open</td>
</tr>
<tr>
<td>V2</td>
<td>Closed</td>
</tr>
<tr>
<td>V3</td>
<td>Closed</td>
</tr>
<tr>
<td>V4</td>
<td>Open</td>
</tr>
<tr>
<td>V5</td>
<td>Closed</td>
</tr>
</tbody>
</table>

## To Pump To Surface

<table>
<thead>
<tr>
<th>Valve</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Closed</td>
</tr>
<tr>
<td>V2</td>
<td>Open</td>
</tr>
<tr>
<td>V3</td>
<td>Closed</td>
</tr>
<tr>
<td>V4</td>
<td>Closed</td>
</tr>
<tr>
<td>V5</td>
<td>Open</td>
</tr>
</tbody>
</table>

Paul Cousens. 3/6/2005
4.6 BAS OIL SPILL RESPONSE STRUCTURE – HALLEY V RESEARCH STATION

Chief Executive, NERC

Director, BAS

Head of ALD

Operations Manager

Head, Polar Regions Unit, Foreign & Commonwealth Office

Head of Press, PR and Education Section

Head of Environmental Office

Halley Base Commander

OSRL

Environmental Monitoring Team

Station Response Team

BASMU

Head of Technical Services

Technical Officers (BAS and/or Contractors)
4.7 ACTION PLAN 1 - Halley Base Commander

Notification of spill from observer. 3.3.1

Emergency shutdown (if needed) to stop or minimise further spill. 3.3.1

Rapid Initial Assessment;
- Estimated quantity (litres) and type of fuel spilled;
- Location;
- Source and cause;
- Risk of fire or harm to human health. 3.3.2

Mobilise Station Response Team. Aim to contain and recover spill. 3.3.3

Actions & communications log opened on station and maintained. 3.3.5

Initial notification of incident to Operations Manager, BAS Cambridge, by telephone, confirm by fax and e-mail. Supply details requested in the BAS Oil Spill Report Form. 3.3.5 & 4.6

Send situation reports at 3, 6, 12, 24 hrs and then every 24hrs until otherwise agreed. 3.5.2 & 4.6

Remove drums filled with waste fuel contaminated absorbents etc. Send to Falklands for disposal at first opportunity (BOLs required for all wastes). 3.7

Prepare detailed pollution/spill report at end of incident and submit to Operations Manager. 3.9

If Tier 1, use resources on site to clear up. 3.3.4

If Tier 2, respond to actions requested by BAS Cambridge via Operations Manager. 3.1 & 3.3.4

If Tier 3, outside assistance will be required. Monitor situation and await instructions from BAS Cambridge via Operations Manager. 3.3.4

At end of incident, demobilise Station Response Team. Ensure medical check-up for response team and that equipment is cleaned and made ready for storage. 3.8
4.8 ACTION PLAN 2 - Operations Manager

Notification of spill from BC. 3.3.5 & 4.6

Assume overall control of spill response operation. 3.1

Open and maintain actions and communications log. 3.1

If Tier 1, acknowledge notification by fax. 3.3.5

Inform Environmental Officer, Head of Technical Services & Directorate. 3.3.5

File message and final report from BC with registry. 3.9

If Tier 2, immediately assess incident with;
- Environmental Officer
- Head of Technical Services. 3.3.5

Respond to initial notification by telephone and confirm by fax. Check:
- Time (GMT) & date of spill
- Estimated quantity of fuel spilled (litres)
- Type of fuel
- Source and cause
- Location of spill
- Resources under threat/ impact
- Response action
- Useable bulk fuel remaining.

Advise on:
- Technical remedial action
- Clean-up techniques
- Operations(itineraries/pax mvmts)

Information:
- Weather maps (if available). 3.3.5

If Tier 3, immediately set up Emergency Response Centre at BAS – Room 133a. 3.5.1

Mobilise BAS HQ Response Team;
- Environmental Officer
- Head of Technical Services. 3.5.1

Inform Directorate. 3.3.5

Send actions to BC and respond to requests as necessary. Liaise with;
- Environmental Officer
- Information Officer. 3.1

If necessary, contact FCO and any other outside agencies. 3.3.5

Prepare Draft Press Statement. Liaise with;
- Directorate
- Environmental Officer
- Information Officer. 3.5.3

Terminate Response Action when appropriate. Liaise with;
- BC
- Environmental Officer
- Outside Agencies (as necessary). 3.8

File log & BC’s report, photographs and video footage of incident with Registry. 3.9
4.9  ACTION PLAN 3 - Environmental Officer

If Tier 1, provide advice as requested. 3.1

If Tier 2, immediately assess incident with:
- Operations Manager
- Head of Technical Services. 3.3.5

If Tier 3, immediately move to Emergency Response Centre at BAS - Room 133a 3.5.1

Notification of spill from Operations Manager. 3.3.5

Telephone Oil Spill Response Ltd, confirm call by fax;
- Time (GMT) & date of spill;
- Estimated quantity of fuel spilled (litres);
- Type of fuel;
- Source and cause;
- Location of spill;
- Resources under threat/impact;
- Response action taken;
- Spill classification (Tier 2 or 3);
Ask for assistance or advice as appropriate. 3.1

Send actions to BC via Operations Manager and respond to requests for information as necessary to co-ordinate clean-up. Liaise with:
- Operations Manager
- Head of Technical Services. 3.1

Co-ordinate environmental monitoring
- Sampling of water, sediment, flora & fauna
- Chemical analysis of seawater
Liaison with BAS scientific staff & contractors as appropriate. 3.6

Advise Operations Manager on draft press statement. 3.5.3

Advise Operations Manager on termination of response action. 3.8

Co-ordinate removal and disposal of contaminated fuel and oily wastes, including absorbents and clothing. Liaison with:
- Base Commander
- BAS Shipping officer
- Waste disposal contractor, Falkland Islands. 3.7

Organise review meeting on oil spill response within 6 months. 3.1

Revise Oil Spill Contingency Plan as necessary. 3.1
If Tier 1, provide advice as requested. 3.1

If Tier 2, immediately assess incident with:
- Operations Manager
- Environmental Officer. 3.3.5

Send actions to BC via Operations Manager and respond to requests for information as necessary, on fuel management and storage.
Liaise with:
- Technical Officers
- Outside companies and agencies on technical issues. 3.1

Co-ordinate procurement of emergency spare parts and back-up fuel systems as required. 3.1

At end of incident, review fuel storage and transfer systems. Revise fuel management systems to prevent a similar spill in the future 3.1

If Tier 3, move immediately to Emergency Response Centre at BAS - Room 133a. 3.5.1