SOTEAG in Shetland

World Class Marine Environmental Management

A Lifelong Commitment

For more than three decades, SOTEAG (Shetland Oil Terminal Environmental Advisory Group) has monitored the interests of the environment around Shetland's Sullom Voe Terminal and Port and has become a pioneering, world-class model of integrated coastal zone management based on independent scientific monitoring, evaluation and advice.

Into the 21st century, SOTEAG's role remains both relevant and essential – not only to assure the preservation of Shetland's natural heritage, but also to share with the rest of the world its experience of environmentally responsible industrial activity in a relatively pristine environment and distinctive cultural setting.

About Sullom Voe Terminal

The BP-operated Sullom Voe Terminal, at the northern end of the largest of the Shetland Islands, is one of the largest oil and liquefied gas terminals in Europe. Built between 1975 and 1981 and covering more than 500 hectares, its main purpose is to act as a buffer between the producing fields offshore and tankers waiting to ship oil to refineries worldwide. Sullom Voe handles production from more than three dozen oilfields operating both east and west of Shetland. Around 30 different companies have interests in the terminal, which receives production through the Brent and Ninian pipeline systems, and by shuttle tanker from the West of Shetland fields.

Peak throughput in the mid-1980s was 1.5 million barrels of oil a day. Although there has been a steady downturn of North Sea oil production since then, the terminal's activities continue to be sustained by:

- new discoveries in the Atlantic Margin (Schiehallion) and offshore loading by shuttle tanker into Sullom Voe
- new technologies to enhance the life of existing fields (Magnus) in the North Sea. The Magnus Enhanced Oil Recovery Project (MEOR) brought the gas which would otherwise be flared from the Schiehallion and Foinaven fields, into Sullom Voe from the west, and out again to the east for re-injection into the Magnus oil field in the North Sea, in order to prolong its productive life. The gas is also used to provide a clean energy source for the terminal's power station, which provides a third of Shetland's power demand. This clean energy source offsets power that would otherwise be generated in Lerwick using heavy fuel oil.
- new technology to develop early West of Shetland fields (Clair, 1977) through a new pipeline.

Sullom Voe also has facilities for importing and exporting oil worldwide using ship-to-ship transfer.

Who We Are and What We Do

SOTEAG was reconstituted in 1977 from its predecessor, SVEAG – Sullom Voe Environmental Advisory Group (1974-1976). To ensure and strengthen SOTEAG's scientific integrity, an independent Chairman and Secretary were appointed, and the representative organisations broadened to include central and local government, the oil industry, government environmental agencies, local indigenous industries and environmental interest groups (see Table 1).

SOTEAG reports to, and is funded by, the Sullom Voe Association (SVA) Limited, whose partners comprise the Shetland Islands Council (SIC) and the Brent (Shell) and Ninian (BP) North Sea Pipeline Systems. SVA Ltd is responsible for policy relating to the design, construction, commissioning, operation, maintenance, new developments and eventual decommissioning of the Sullom Voe Oil Terminal.

One of SOTEAG's most important functions is to be able to demonstrate to management, the Shetland public and other stakeholders that it can provide early warning of environmental change, and to advise on remedial action, which if neglected or unheeded, could lead to unacceptable environmental consequences.

This is done through sampling, measurement, and analyses of results by objective and unbiased scientific studies. The SOTEAG Monitoring Committee (see Table 2) designs and manages the comprehensive environmental monitoring programmes carried out under contract by scientific institutions throughout the UK.

Every year, this Committee of independent, scientific experts evaluates the results and conclusions of monitoring in discussion with contractors, and recommends to SOTEAG any changes deemed to be necessary in the foreseeable future. This rigorous annual process keeps the monitoring strategy both relevant and cost-effective.

Table 1

EXECUTIVE MEMBERS †

> Independent University Sector (two members and the Executive Secretary, currently with the University of Aberdeen)
> Shetland Islands Council (two elected Councillors)
> Ninian Pipeline System – BP Exploration Ltd, Aberdeen
> Brent Pipeline System – Shell U.K. Ltd, Aberdeen

Representation from the Local Authority and the Oil Industry sectors will remain equal.

ASSOCIATE MEMBERS

> Chairman, Monitoring Committee *ex officio*
> Fisheries Research Services, Aberdeen
> Scottish Environment Protection Agency (SEPA), Aberdeen
> Scottish Natural Heritage (SNH) (Northern Isles)
> Shetland Fishermen's Association
> Shetland Aquaculture
> Shetland Agricultural Association
> Shetland Bird Club

OBSERVERS

> Ports & Harbours, Sullom Voe, Shetland Islands Council
> Director, Infrastructure Services, Shetland Islands Council
> Environmental Technical Authority, Sullom Voe Terminal
> Process Engineering Technical Authority, Sullom Voe Terminal
> Manager, Sullom Voe Terminal Power Station, Fortum O & M Ltd
> Scottish Agricultural College
> TOTAL E&P UK Ltd

† *The Executive members of SOTEAG may speak publicly on behalf of the Group as a whole. All members and observers contribute equally to discussion and no vote is ever taken – all views are recorded in the minutes that provide regular, written advice to the SVA Ltd. Apart from the Secretariat, none of the foregoing receives any remuneration from SOTEAG.*

SOTEAG'S TERMS OF REFERENCE (*REVISED IN 2007*)

"SOTEAG shall examine and advise on the environmental implications of the terminal at Sullom Voe during the construction (including site rehabilitation), commissioning, operations, including *ad hoc* reconstruction of parts of the terminal and new developments, through to eventual decommissioning. The area for review shall be restricted to within the zone for which the SIC is responsible for environmental matters and will include the activities of tankers trading to Sullom Voe, ship-to-ship transfer and West of Shetland activities. Under the European Habitats Directive, SOTEAG shall advise on the environmental implications for terminal operations and new developments for Sullom Voe as a Special Area of Conservation. SOTEAG will also advise on developments by third parties, which might impinge on the environmental status for which SOTEAG has responsibility."

Table 2

THE SOTEAG MONITORING COMMITTEE

The Monitoring Committee is currently drawn from:

> University of Aberdeen (current Chairman)
> University of Aberdeen, Executive Secretary
> Independent Chemist (formerly from the Fisheries Research Services)
> Fisheries Research Services, Aberdeen
> Scottish Association for Marine Science, Dunstaffnage Marine Laboratory
> Independent Seabird Expert (formerly from The Centre for Ecology and Hydrology)
> Shetland Islands Council, Infrastructure Services
> Environmental Technical Authority, Sullom Voe Terminal
> Scottish Natural Heritage
> Scottish Environment Protection Agency, Shetland
> Shell U.K. Ltd

Membership is based on the individual expertise of the members, not on the institution represented. The Chairman is appointed from SOTEAG, and the terminal has ex-officio representation.

Terms of Reference (revised in 2007)

(a) To advise SOTEAG on a scientific monitoring strategy that will allow early detection of environmental change resulting from oil terminal and associated developments during the constructional, operational and decommissioning phases including consideration of effluents and other emissions to the environment.The ongoing adequacy and effectiveness of the monitoring programmes will be a necessary part of these responsibilities.

(b) To define the requirements of monitoring programmes, to consider proposals to meet these requirements, and to make recommendations to SOTEAG on their implementation.

(c) To initiate additional studies in relation to environmental damage and recovery in the event of a major accident.

(d) To provide an independent interpretation and assessment of the results of these programmes and other relevant information and report to SOTEAG.

(e) To be alert to any future oil-related developments in Shetland and provide early advice on appropriate monitoring programmes.

A Firm Foundation – Our History

With the discovery of North Sea oil in 1972, the local authority successfully promoted through Parliament an exceptional Bill which became the Zetland County Council (ZCC) Act 1974, providing the legal framework to control all oil industry developments.

An inspirational proposal from a University of Aberdeen Professor, in association with a close oil industry colleague, was discussed and agreed with the ZCC to bring together around one table a single, environmental advisory group of all those responsible and concerned about major oil finds invading a remote island community dependent upon fishing and crofting. History has shown this unique initiative to be visionary in its scope.

SVEAG provided advice to the Council on all environmental aspects of the new terminal developments. By 1976, prior to any construction, SVEAG published its wide-ranging Environmental Impact Assessment (EIA) that provided a comprehensive description of a variety of habitats, such as rocky shores, soft shores, salt marshes, seabed and coastal waters. Internationally-important seabird populations were also included in the studies. A critical element was an assessment of the location and state of the most vulnerable areas to the proposed developments.

This pioneering EIA provided important baseline data on the near-pristine environment, which formed the bedrock for the internationally-recognised SOTEAG environmental programmes that have since followed.

Environmental Monitoring

Why monitor?

The coasts and seas around Shetland not only support a rich and varied wildlife but are also areas of outstanding natural beauty. In March 2004, Sullom Voe's special geographical features – which remain unspoilt due to 30 years of high-quality marine environmental management – led to its designation by the European Commission as a **Special Area of Conservation** and it now receives legislative protection under the terms of the European Habitats Directive and Regulations.

SOTEAG's environmental monitoring programmes are designed to monitor any environmental effects of terminal operations and continue to provide an ongoing 'health check' at Sullom Voe by: detecting and measuring changes over time; evaluating the amount and significance of change, and advising SVA Ltd whether remedial action is required. Scottish National Heritage (SNH), in association with SOTEAG, periodically carries out additional monitoring in respect of the area's new conservation status.

SOTEAG's work provides ongoing, independent assurance to the people of Shetland that the environmental impact of the terminal's operation is negligible. It also provides an unambiguous, independent check in a wide geographical environment and endorses specific statutory monitoring programmes on the control and treatment of effluents and wastes that have evolved over three decades.

What do we monitor?

SOTEAG's monitoring programmes are designed to detect and measure both chronic and acute changes to the marine and coastal environment, and along the tanker approach routes to the terminal and port. These include:

- low-level cumulative effects on the environment of routine operations
- localised contamination due to any small accidental pollution incidents which may have short-term, low-level effects.

Special programmes can be designed and activated to assess environmental damage and recovery over time in the event of any major pollution incident.

When contaminants are at very low concentrations, any biological, physical or chemical effects are likely to be subtle, accumulate slowly over a long time and not be easily detectable, unless they stand out against the pattern of natural changes. To measure the level of chemical contaminants and how they may have changed over time, the scientists examine samples of sediment, plants and animals living on the rocky shores and seabed. Biological monitoring selects target organisms and communities to see if the numbers and distribution have changed and how healthy the individual animals and plants are.

Because of natural changes and fluctuations, the value of SOTEAG's monitoring work increases with each year that passes. Only data over a long period of time can separate possible terminal-related impacts from these natural fluctuations.

Based on results and experience, and in response to changing statutory regulations, today's monitoring activities focus on the elements that provide the most useful scientific information. They are part of SOTEAG's Core Monitoring Programme, adopted in 1989.

For information on our Monitoring Strategy and a detailed history of SOTEAG's monitoring activities, please visit:

www.soteag.com

Statutory Monitoring

Challenges for the terminal operator in the new millennium include major changes in the ongoing regulatory regime dealing with emissions. Since the terminal first became operational in 1978, ballast water discharge from tankers at the jetties, and gaseous emissions from the power station and flares, have been measured in order to comply with the appropriate legislative requirements.

In 1999, the Control of Major Accident Hazards (COMAH) regulations were enacted. This required the terminal operator to submit a safety report to the Competent Authority (jointly Health & Safety Executive (HSE) and SEPA) stating in detail when and where major accidents which could affect the environment or people could occur, how these are prevented, mitigated against and the response and recovery processes in place should they occur. The Sullom Voe Safety Report is reviewed regularly and rewritten as necessary every five years.

Since 1978, monitoring of the seabed (physical, chemical and biological) has also been undertaken at the effluent outfall diffuser in Yell Sound. With effluent discharges over the last decade significantly reducing along with North Sea oil throughput, all these chemical monitoring results show that hydrocarbon levels in the seabed sediments are now below pre-operational levels.

Throughout SOTEAG's monitoring history, all statutory monitoring results have been compared and correlated with those of the SOTEAG Monitoring Committee in the wider geographical area, for mutually reinforcing assurances. This exchange of information is regarded as extremely valuable by the terminal operator, SEPA, the statutory monitoring contractor and SOTEAG.

Case Study

Since 1991, the special biennial surveys and analyses of dogwhelks have demonstrated the only major impact of tanker operations at the terminal to be significant, long-term impacts from tributyltin (TBT) contamination.

The recorded history of the decline in populations began in 1987, when 95% of the female population in the immediate vicinity of the terminal were unable to reproduce. With increasing distance from the jetties, the effects were less severe and populations were more healthy and reproductive. SOTEAG's dogwhelk monitoring revealed severe and extensive damage that could be attributed unequivocally to exposure to TBT, a chemical biocide used in paints on the hulls of the world's ships and oil tanker fleet as an anti-foulant.

By January 1, 2003, the International Maritime Organisation banned global application of organotin compounds, and ordered a complete prohibition of the compounds on ships on September 17, 2008. Monitoring showed that by 2004, dogwhelks were still completely absent in the immediate jetty area, but that there was a gradual increase in populations around Sullom Voe, demonstrating a slow recovery process.

SOTEAG'S Core Monitoring Programme

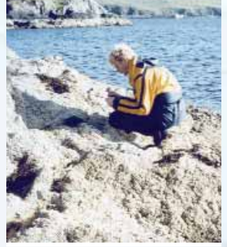
Chemical and macrobenthic monitoring

These earlier programmes were combined under a single contractor and have been carried out biennially since 1990, using the same monitoring stations in Sullom Voe, Garths Voe, Calback Ness and Yell Sound. The programme covers sediment grain size, organic matter content, sediment hydrocarbons - focusing on concentrations with complex analyses to try to identify whether it is derived from natural biological sources, such as peat, other oil-related sources such as combustion, or from spilt fuel or crude oil, and its origins. All these results are correlated with any effects on the types of species and population numbers of plants and animals found living on the seabed. Every six years, heavy metal concentrations are analysed to ensure no major fluctuations have occurred.

The programme also incorporates two of the original soft shore sites in Sullom Voe, which continue to be monitored for hydrocarbons, grain size and organic matter.

Rocky shore and dogwhelk monitoring

Rocky shore monitoring has continued annually since the 1970s and is probably the longest and most valuable dataset in the UK. For example, in 2001, SOTEAG allowed access to this data set by the MarClim Project, a UK and Ireland initiative designed to assess and predict the influence of climatic change using intertidal rocky shore animals.








Ornithological monitoring

A full-time programme of monitoring seabird populations has continued throughout Shetland since 1978. This long-term programme is important because birds are mobile and know no boundaries; some migrate to Shetland in winter, and many are vulnerable to floating oil slicks, or illegal discharges from passing tankers not entering Sullom Voe. The programme has concentrated on selected cliff-nesting species and inshore waterfowl, and sample study sites have been selected throughout Shetland. The programme complements similar work undertaken during the seabird breeding season by SNH and RSPB on their nature reserves, and by Fair Isle Bird Observatory Trust (FIBOT).

The same independent, full-time resident ornithologist has carried out this monitoring programme since 1978, and a part-time assistant is employed temporarily at peak monitoring periods.

The main elements of the programme include:

Monitoring of cliff-breeding populations:

Population counts of Northern Fulmar, Common Guillemot and Razorbill at study plots at Sumburgh Head, Troswickness, Eshaness and Burravoe during June. Northern Fulmar breeding success is monitored at all four colonies; that of Common Guillemot at Sumburgh Head only.

Populations of Atlantic Shag are monitored throughout Shetland by counts of nests along defined stretches of coast bordered by a lack of cliff habitat. Breeding success is monitored in study plots at Sumburgh Head.

Population counts of Black-legged Kittiwake are conducted at all colonies in Shetland, at intervals of no more than every 3-5 years. Breeding success is currently monitored at Sumburgh Head, No Ness, West Burra, and Burravoe, Yell. On Foula, this work is carried out by the Foula Ranger Service.

Pre-breeding counts of Black Guillemots (Tysties) are made during April, when the birds are flightless during moult, at 12 sites around Shetland, and at four other sites monitored by the Foula Ranger Service, RSPB, SNH and FIBOT.

Winter Counts of Diving Seabirds and Seaduck: Standardised surveys are made of Sullom Voe and Yell Sound, and other inshore coastal areas throughout Shetland, as permitted by weather conditions.

Beached Bird Surveys: Monthly beached bird surveys have run continuously since March 1979, with volunteer assistance, to find dead seabirds on selected beaches around Shetland. Selected samples of oiled feathers from any oiled birds found are sent for analyses, with strict quality controls, to ensure the origin and possible source of pollution.

Seabird Ringing Scheme: Since 1978, SOTEAG has sponsored ringing of selected seabird species in Shetland by three remaining ringing groups: the Fair Isle Bird Observatory; the Shetland Ringing Group; for many years, by Glasgow University on Foula, and now by the Foula Ranger Service.

Supplementary monitoring

SOTEAG contributes limited funding to the Foula Ranger Service, on the Island of Foula, to undertake certain aspects of monitoring geared to SOTEAG's specific needs. Their own monitoring programme covers the following species: Red-throated Diver, Northern Fulmar, Atlantic Shag, Common Eider, Arctic Skua, Great Skua, Black-legged Kittiwake, Arctic Tern, Razorbill, Black Guillemot and Puffin.

Conclusions

Over the years, SOTEAG has been able to provide scientific evidence that, with the exception of the 1978 *Esso Bernicia* fuel oil spill, neither operations at Sullom Voe Terminal, nor associated tanker traffic, have affected Shetland's seabird populations.

This long-term data set is highly valuable for many reasons, eg it shows that the percentages of oiled birds on Shetland beaches continue to be among the lowest in Europe, and hence that the waters around the Northern Isles are relatively very clean and now provide a benchmark for Europe.

The data on seabird numbers show a continuing decline in many species over the years.

This information makes a major, annual contribution to the Joint Nature Conservation Committee (JNCC) UK Seabird Monitoring Programme, which also demonstrates that these declines are occurring across the UK and Northern Ireland.

www.jncc.gov.uk/Publications

Oil Spill Contingency Planning and Response

Responsibility for advice on oil spill containment and recovery lies with the Sullom Voe Oil Spills Advisory Committee (SVOSAC), with which SOTEAG has close links through common membership and exchange of information.

SOTEAG has also contributed to the Sullom Voe Harbour Oil Spill Plan (SVHOSP) with advice on the clean-up procedures most appropriate to certain areas of Sullom Voe. This is based on SOTEAG's detailed knowledge of both the sensitivity of the shoreline and other environmental features, such as the seasonal presence of vulnerable species of bird or marine mammals likely to be affected.

SOTEAG also takes part in the regular oil spill exercises at the terminal. Following the *Esso Bernicia* incident, SOTEAG and SVOSAC collaborated to design and locate a series of permanent, shore-based spur booms, to protect environmentally sensitive areas within Sullom Voe, or to be collection points for booming any spilt oil for safe removal. At the same time, SOTEAG advised on how to clean contaminated shores and initiated special monitoring projects to study their rehabilitation.

Wildlife Response to Major Oil Spills

In 1988, at SVOSAC's request, SOTEAG advised on an appropriate strategy for dealing with wildlife casualties in the event of a major oil spill in Shetland. The SOTEAG Wildlife Response Co-ordinating Committee (WRCC) was set up, including all organisations in Shetland normally involved in the wildlife aspects of oil spills (see Table 3).

As a result, in 1991, SVA Ltd provided grant aid to the Scottish Society for the Prevention of Cruelty to Animals (SSPCA) to help build a bird cleaning and rehabilitation centre at Gott, in Shetland. The Hillswick Wildlife Sanctuary also developed through grant aid as a charity caring for marine mammals, mainly seal pups and otters. The WRCC oil spill plan is an integral part of the SVHOSP, and the Shetland Islands Council Shetland Contingency Plan, which was activated to cover the *Braer* oil spill.

The WRCC oil spill plans are updated annually and have become a model for European and global wildlife response. SOTEAG was also one of the major contributors to the publication *A Guide to Oiled Wildlife Response Planning*, prepared by the EU Sea Alarm Foundation and published in 2004 by the International Petroleum Industry Environmental Conservation Association (IPIECA Report Series Volume 13) in Balbriggan, Ireland.

www.oiledwildlife.eu

"SOTEAG is a globally-recognised authority on oil spill contingency planning and response as a result of its early experience of the "Esso Bernicia" oil spill in 1978. In 1989, following the serious "Exxon Valdez" oil spill in Prince William Sound, Alaska, advice continued to be sought from many of those involved in Alaska, based on Shetland's good, long-term environmental management record. Two SOTEAG Executives were invited to visit the State Governer, the Alyeska Terminal and others, and thereafter the Prince William Sound Regional Citizens' Advisory Council, based on SOTEAG's independent concept, was established and is still active.

In 1993, the WRCC responded to the "Braer" oil spill, a passing tanker not "en route" to Shetland. It went aground on the south coast of Shetland in extreme weather conditions, losing its entire cargo of crude and fuel oil of 87,000 tonnes. The WRCC Contingency Plan, prepared but not published at this stage, was implemented as an integral part of the Shetland Islands' Contingency Plan. The tough lessons learned from that practical experience have continued to update both the Shetland Contingency and Sullom Voe Harbour oil spill plans annually, but have also been used to assist others trying to cope with wildlife response events which have occurred in Europe.

Table 3

WILDLIFE RESPONSE CO-ORDINATING COMMITTEE

Members

- SOTEAG Chairman
- SOTEAG Ornithologist (Vice Chairman), University of Aberdeen
- SOTEAG Executive Secretary, University of Aberdeen
- Environmental Technical Authority, Sullom Voe Terminal
- HSSE Lead, Sullom Voe Terminal
- SEPA, Shetland, representing the Shetland Bird Club
- Scottish Natural Heritage
- SIC Infrastructure Services
- HS & E Strategic Officer, Shetland Islands Council
- SIC Ports and Harbours, Sullom Voe
- SSPCA Shetland
- Hillswick Wildlife Sanctuary
- Royal Society for the Protection of Birds
- Wildlife Liaison Officer, Northern Constabulary
- Westside Veterinary Practice
- Shetland Biological Records Centre

Terms of Reference

Under the auspices and Chairmanship of SOTEAG, the WRCC is responsible for policy and procedures for dealing with oiled wildlife casualties and corpses resulting from a significant oil spill.

Timeline

1972 North Sea oil is discovered.

1974 The Zetland County Council Act becomes law.

1974 Planning and initial construction of Sullom Voe Terminal (SVT) commences.

1974 The Sullom Voe Environmental Advisory Group (SVEAG) is initiated by three individuals from academia and oil industry, with sub-groups on oil spill control and monitoring.

1974 Baseline ecological monitoring commenced over wide geographic area:
- > Fauna and flora on rocky shores (continues today)
- > Subtidal biology (continues today)
- > Fauna on sandy shores (terminated in 1984)
- > Salt marshes (terminated in 1987; updated 1989/1990)
- > Lichens used for atmospheric monitoring of sulphur dioxide (terminated 1982)
- > Range of seabird studies (terminated 1976)

1975 Sullom Voe Association (SVA) - a non-profit making, limited liability, joint-venture company is established by oil industry and SIC partners.

1976 Baseline monitoring results and oil spill strategy published by SVEAG as an early EIA. Group's membership and function then reviewed by SIC.

1977 The Shetland Oil Terminal Environmental Advisory Group (SOTEAG) is reconstituted, with independent Chairman, Secretary, new TOR, and wider representation.

1977 Sullom Voe Harbour and Industry Oil Spill Advisory Committees (SVOSAC/INOSAC) also reconstituted from SVEAG sub-committees.

1978 The SOTEAG Monitoring sub-Committee is established.
- > SVEAG's annual biological monitoring programmes continue.
- > Priority is given to establishing a comprehensive, pre-operational, chemical monitoring programme of water column, hydrocarbons and heavy metals in sediment and marine biota.
- > A Shetland-wide, full-time seabird monitoring programme begins (continues today).

1978 Other programmes carried out by Government agencies and scientific institutions:
- > Hydrography; fisheries effects; ballast water discharge; hydrocarbons
- > Monitoring of Shetland seal stocks. All now terminated.

1978 First oil flows through pipelines. Statutory monitoring under HMIPI (1974-96) Regulations of aqueous effluent discharges and gaseous emissions from flares are the responsibility of SVT.

1978 Major oil spill berthing accident. The tanker, *Esso Bernicia,* spilled 1,174 tonnes of fuel oil at jetties (December 30)

1979 Special 3-year research surveys designed to enable ongoing monitoring:
- > Otters died from oiling (research terminated 1983)
- > Breeding performance of sheep, which grazed on oiled seaweed; then terminated.
- > Black Guillemots
- > Red-throated Divers

(Data from both seabird studies integrated into ongoing seabird monitoring - still running)

1980 SOTEAG and SVOSAC design spur boom scheme to contain any spilled oil

1981 Royal Society of Edinburgh (RSE). Biological Sciences (Vol 80) ISSN 0308-2133. Publishes Proceedings of all baseline monitoring data, and pollution/prevention control strategy

1982-1989 Sub-lethal biological effects of common mussels are monitored to determine their "scope for growth"(Plymouth Marine Laboratory)

1982-1983 Independent, external reviews of monitoring strategy by Prof. RB Clark and seabird monitoring strategy by JP Croxall

1987-1988 Internal review of monitoring strategy - Delphi 2000

1990 The Core Monitoring Strategy is defined for future and focuses on key elements:
- > Biennial chemical & macrobenthic monitoring - ongoing
- > Annual Rocky shore monitoring - ongoing
- > Full-time, Shetland-wide seabird monitoring - ongoing

1990 Government legislation introduces Integrated Pollution Control (IPC)

1991 Biennial dogwhelk monitoring begins as part of rocky shore monitoring

1993 The *Braer* tanker goes aground in south Shetland

1995 RSE publishes 1993 symposium Proceedings: Vol. 103. ISSSN 0308-2113 *Monitoring at an oil terminal: The Shetland Experience.*

1996 Scottish Environment Protection Agency (SEPA) is formed.

1998 First West of Shetland Schiehallion Oil arrives at Sullom Voe by tanker.

1999 Pollution, Prevent and Control Act (PPC) is passed.

2001 Control of Major Accident Hazards (COMAH) regulations enacted.

2001 Seven billionth barrel of oil passes through SVT.

2002 Magnus Enhanced Oil Recovery Project. New technology brings gas pipelines from west of Shetland to SVT, and out to Magnus Field in North Sea to prolong life of field.

2004 Sullom Voe becomes an EC Designated Special Area of Conservation (SAC).

2004 First ship-to-ship transfer at SVT jetties.

2004-2005 New technology enables development of Clair oil field (1977) west of Shetland.

2004 Independent, external review of SOTEAG's monitoring strategy by Professor Graham Shimmied, (formerly) Director of SAMS.

2005 November 28: 1 billion metric tones of crude & LPG shipped from SVT.

2006 Thirty-two years of SVEAG/SOTEAG data, records and photographs are digitised.

2007 October: PPC permits issued to Terminal Operator and Power Station

2007 SOTEAG reviews and updates its 1977 Constitution, Terms of Reference and membership on behalf of SVA Ltd.

2008 SOTEAG brochure (last revised in 1997) and website updated.

A challenging future

Since 1974, Sullom Voe Oil Terminal has been the focus of what is believed to be the most intensive monitoring programme of any industrial installation in the UK, Europe or elsewhere. For more than three decades, SOTEAG's work has demonstrated that early fears expressed about the environmental effects of the terminal have not materialised.

To this day, Sullom Voe remains a clean environment and continues to support thriving marine and coastal wildlife.

There is no room for complacency, however. With enhancement of existing North Sea fields – and further opportunities for new developments West of Shetland – the terminal is looking forward to a challenging operational future. The nature of operations may still change, and accidents can occur, therefore it is essential that SOTEAG continues its environmental functions through to eventual decommissioning.

Its knowledge and experience have been sought globally as a model for other industrial developments and SOTEAG has now reached a much wider community beyond the local interests which had the foresight to establish it in the mid-1970s.

SOTEAG's independence and scientific integrity have stood the test of time and in the future, in facing new challenges, will continue to ensure the preservation of the very special place that is Shetland.

www.soteag.com

Photography provided courtesy of: BP Exploration Operating Co Ltd, J. Conroy, D. Hall, H. Harrop, M. Heubeck, C. Moore, Oil Pollution Research Unit, M. Pennington, W. Ritchie, Scottish Natural Heritage, G. Storey