

---

**How Shell supported by UKOA accepted that reducing loss of containment of hydrocarbons was their highest priority but had at the same time a standard supporting the application of temporary repairs on paper thin pipework. An expedient and low cost keep production going at all costs policy, This policy directly contradicts their stated commitment to reduce leaks because it does not tackle the key concern that completing a temporary repair on an already degraded pipe does not reduce risk and the likelihood of repeated loss of containment persists**

---

This is submission to Trade Unions on behalf of the Moncrieff family. This submission is also copied to the Chair of the Holyrood Justice Committee for information and to supplement the evidence already passed to the Committee.

---

In this document is evidence from November 2003, two months after the fatalities on Brent Bravo. This evidence was passed in November 2003 to the Offshore Safety Division (OSD). The evidence is the wholly owned property of Shell Exploration and Production (Shell Expro) and was given to me, in my role as a Shell International EP (SIEP) Auditor as part of an internal investigation in 2005 into the misconduct of Malcolm Brinded who was in 1999 the MD of Shell Expro. The information re Temporary Repairs is courtesy of a Technical Review carried out immediately after the fatalities the Head of Engineering for Brent Gordon Muir. He gets a mention in the paper That Fateful Day.

Although the situation in 1999 was bad, very bad, by 2003 the situation had deteriorated further.

Before I turn to temporary repairs per se I would like to dwell on some background to all this

### **Loss of Containment**

In perhaps the most comprehensive study carried out into the causes of loss of containment McGillivray and Hare, HSE Laboratory Buxton examined causes of containment leaks from circa 2001 to 2008. As could be expected loss of containment, gas and oil leaks increased as the installation aged. Over 15 years in operation a marked increase in leaks was observed. Piping is the most common equipment type that experiences releases, predominately through thinning of the pipe wall, with a small contribution as leaks from flanges or small-bore instrument connections. The Brent installations in 2003 had been in operation for some 45 years.

It is not surprising therefore that the most common failure mode recognised by Shell Maintenance Engineers is age related failure. For pipework the failure mechanism is internal and external corrosion and is compounded in the Brent Field by internal sand erosion becoming an increasing factor after the start of the low-pressure option where gas was the main product, refer to the Appendix in The Case against Malcolm Brinded.

**In the North Sea loss of containment is a disease that the operators appear unable to cure.** In the study for example and considering the 8-year period 1992 till the beginning of 2000 there were circa 1800 minor, significant and major hydrocarbon releases in the UK sector of the North Sea. A

hydrocarbon release is classified by the HSE as a dangerous occurrence because of the potential consequences.

The mean time between dangerous occurrences was for the combined North Sea installations, all operating by that time in compliance with their post Cullen Safety Case, was at that time 38 hours.

### What was Shell Expro contribution

Consider the data from Shell, between 1999 and 2003, over a four-year period it suffered loss of containment 205 times with leaks from hydrocarbon pipework, so the mean time between dangerous occurrences in the Northern, Brent and Central oilfields was 7 days. In 1999 there was no evidence that hydrocarbon leaks were being reported to OSD.

### The industry commitment to reduce loss of containment

Shell and other Operators are committed, supported by the UK Operations Association, to reduce loss of containment to zero. They accept it should not happen.

You simply cannot demonstrate that the Industry post Cullen is doing everything as far as reasonably practicable to reduce risks, that is the product of the probability of a dangerous occurrence and the potential consequences ensuing, if you keep having a dangerous occurrence every week. In the Shell case, over 90% of its leaks were from carbon steel pipes, where through corrosion or erosion, resulted in the wall of the pipes thinning.

### Refer to That Fateful Day

As alluded to in the document that Fateful Day as the OIM says they were carrying out the programme on the platform for inspections of pipework. At the sampling points they were recording that the pipes were well below their Minimum Allowable Wall Thickness (MAWT) and were thus aware that these pipes, as designed and installed, were potential leak sources because they could not withstand the pipe class specified Maximum Allowable Working Pressure (MAWP). As the OIM states if they had acted on this information, after all it does seem a bit pointless to record this safety critical data and ignore what it tells you, there would not have been the need for patch 86, and Moncrieff and McCue would still be alive if some heed had been taken of the inspection data. And when it was apparent as in the case of patch 86 that a replacement pipe spool was needed, his Asset Manager would not spend the money to do so.

But the Shell response to the 205 temporary repairs, you can observe the data in the attachments, was not to shut down, to isolate and make safe the 205 pipes that had already leaked by replacing the thin walled spool by a replacement pipe spool, NO, that would have interrupted production so let's just stop the leak, fit a bandage (patch) or clamp over the festering wound and carry on big numbers and straight lines. They and UKOA accept that this approach meets the industry standard.

### What did Shell and UKOA say publicly about temporary patches

On 19<sup>th</sup> September 2003 just 8 days after the fatalities that had been caused by a leak from patch 86, the condition of which was in the Sheriff's words materially defective, Greg Hill, the Shell Production Director, tells the BBC that patches are an industry standard way of repairing pipework, we monitor all our patches through a patch register and none of our patches are safety critical, if they were safety critical they would have been dealt with. UKOA jump in also and tell the BBC that patches were used as standard across the industry.

Could this be the same Industry that is publicly committed to reducing losses of containment and with an Industry whose Safety Regulator has this performance indicator as its number one technical integrity indicator?

Consider the Production Directors statement to the BBC and compare it with the facts from the FAI report. The leak from the downpipe in the Utility Shaft, in itself by government definition, a **dangerous occurrence, was first detected on 14<sup>th</sup> November this was 9 months and 28 days before the fatalities.** According to the installations design philosophy, this was a dangerous area, were a loss of containment would cause, or at least would have the potential of contributing to a major accident event, so Hill says in these circumstances it would be **dealt with, and 3 days later patch 86 was applied.**

He tells the BBC that Shell have standards around how much these patches can leak **and none of these patches are at risk!** He said there was in these circumstances a patch register, but there wasn't in 1999 and witnesses at the FAI said that on the beach they had no knowledge that this patch had been fitted. But all the unregistered temporary repair did was stop the current leak it did nothing to restore the integrity of the pipe to the as build as designed status **and a further loss of containment could be expected, it was inevitable.**

**As evidence to this on the 17<sup>th</sup> August the patch leaked again badly causing gas alarms to activate, and was repaired again, and on 21<sup>st</sup> August one day before the platform started up it leaked again and finally on That Fateful Day it leaked so badly when Moncrieff was attempting to repair it again resulting in his death, and the death of Sean McCue with a vapour cloud estimated to be in excess of 6000 cm entering the enclosed space where they were working.**

It took till 4<sup>th</sup> Sept. 2003, 7 days before the fatalities for patch 86 to be properly dealt with, **at least the planning for it to be replaced was set in motion for a new flange to flange pipe spool to be fitted, 9 months and 25 days after it was first fitted and given the highest risk ranking** and it should be urgently replaced. So much for the statement to the BBC that if the patch was critical it would be dealt with. The term **authorised** as used to justify such repairs is misleading, all the authorising covers is the type of repair used, is it likely to stop the pipe leaking again at that specific point, it does not imply that the integrity of the pipe per se is assured, far from it. In That Fateful Day you will read how non-compliance was being covered up by authorised deviations from safety critical maintenance. **The same pressure would have been exerted on the mechanical engineer "authorising" these repairs.**

#### **Why is it unlawful to apply temporary repairs to hydrocarbon pipework?**

In the case of the Brent oil field certainly pipes were failing from age related failure, many have been in situ carrying hydrocarbons for 40 years. After the fatalities Shell publicly admitted it has cost some £800m to recover pipework to the as designed and as installed status. This is what they should have been doing all along with extended summer shutdowns replacing sections of pipework on a risk priority basis.

**Simply put, the repair only stopped the pipe leaking at the location it was leaking.** Whereas a replacement spool of the correct pipe class when fitted could be hydrotested against a blind flange to ascertain the integrity of the spool in that it could hold the MAWP that could be achieved in that section of the production process. **Patch 86 could not and it is unlikely that the complete piping circuit could not either because it was in the same condition as the section where patch 86 was fitted. A pipe in its simplest definition is a containment vessel, hydrocarbon piping which cannot withstand the design limits of the process in which it is installed raises the risks of loss of**

containment exponentially to unacceptable levels. The probability of the pipe failing is set at 1 or unity, because these pipes were failing somewhere in the oilfield every 7 days.

The risk that applies is directly related to the potential consequence of the leak because leaks are inevitable. The consequences are defined by the HSE in terms of volume of loss, that is minor, significant or major. Significant and major releases increase societal risks, that is risks to the total population of the platform including risks of impairment of the Temporary Refuge.

But this platform like all others had a Safety Case. This a legal document where the operator states what his commitments are and how he will faithfully operate his installations with the risk levels as stated in his Safety Cases. It is a contract with Society generally that the Operator makes in writing since the whole point of the post Cullen era was for Operators recognise their own residual risks, who better, and explain in the Case the measures they have enacted to reduce these risks. In this way justify the continued operation of that specific installation.

I can assure the reader that in no chapter, in any of the many Safety Cases for the Shell oilfield, does it mention that if a hydrocarbon pipe leaks due to age related failure it will simply bandage the leak up, and carry on producing.

The whole point of this approach to Safety, was supposed to ensure that the public would never ever again watch those horrible pictures in their living rooms of 167 men dying as their large installation was destroyed. Otherwise, the Safety Case is a worthless document, a waste of the paper it is written on. And for Brent Bravo the TV pictures screens on the evening of the 11<sup>th</sup> Sept 2003 could have been of the stumps of the concrete support columns, the 24,000 tonnes topside having fallen into the sea. (1)

---

#### Summary of attached documents in order of appearance

- (1) Letter from internal Chief internal auditor to Directors dated 20/10/99 raising concerns about risks due to temporary repairs
- (2) The efforts to establish just how many temporary repairs, despite the Greg Hill statement to the BBC that there was a register, and the location of every patch was known. After their initial efforts they discovered more unknown about repairs and the operators were instructed to walk all the lines because the more they searched the more they found. There is a histogram indicating the level of repairs carried out on 17 offshore installations. All this after the 22<sup>nd</sup> October 1999 Management Presentation where Directors were informed that the auditees accepted that the practice of carrying out such repairs would cease, but instead an epidemic of repairs is evident over the prolonged period from 1999 till the fatalities.
- (3) The 19<sup>th</sup> September 2003 reply to the BBC from Greg Hill supported by UKOA
- (4) A copy of the Hydrocarbon Release Overview from the HSE Buxton researchers

Bill Campbell

8<sup>th</sup> December 2018

limit. In one specific case involving operation of an oil separator, the violation was known about and accepted up to the level of a Senior Manager.

There was evidence of false and misleading information in maintenance records for safety critical equipment, for example the Brent Bravo ESDV which failed its leak-off test in April 1998 was recorded as 'NO FAULT FOUND'.

ESDV

### Implementation and Performance Monitoring of Safety Critical Equipment

#### Prevention of Fire, Explosion & Emergency Response Regulations (PFEER) Examination and Verification Schemes, refer to Audit Notes interview of Bureau Veritas

The general level of understanding of these schemes throughout the organisation is poor and even encompasses the limited knowledge of some people who work the process on a day to day basis. A significant concern is the effectiveness of the PFEER process. This is a statutory scheme ensuring that PFEER safety critical elements on an offshore installation are examined and tested in accordance with the Duty Holders' published performance standards. A number of offshore systems can not currently meet their published performance standards. These standards in turn are being relaxed with no demonstration of a robust assessment of the risks involved. There is also divergence in standards being applied pan Expro e.g. leak-off testing for riser ESDV's. Where cited in the Duty Holder's written scheme, the 2<sup>nd</sup> Party Verifier (UESE/6) should validate and approve any changes to these performance standards but this does not always happen. Concerns expressed to the review team by an independent PFEER examiner included pressure being exerted to sign off non-compliance's. Evidence was obtained of a report being signed off prior to remedial actions being undertaken.

ESDV

#### Maintenance Non-compliance

Sampling revealed many examples of non-compliance with safety critical and other routine maintenance. Much of this non-compliance appears driven by the requirement to prevent production deferment. As an example, the process for authorising deferments in NBU had significant weaknesses (now being revised). Changes in reporting parameters resulting from the introduction of SAP-PM have served to highlight the non-compliance issue (in the sense that 'true compliance' is now monitored and reported). However, the general prevalence of non-compliance is not directly attributable to SAP.

#### Technical Integrity Reporting and Overview

Based on fieldwork in the Northern Business Unit, Technical Integrity information given to Managers is fundamentally flawed. There is no data validation at source by the people compiling the NBU report. Key performance indicators lack clear definition (e.g. gas releases) and acceptable control limits have not been established (e.g. number of overrides on a specific installation). No person at any level in the organisation appears to have a concise overview of the technical integrity status of a specific offshore installation, (e.g. collective picture of loss of containment risks due to unauthorised clamps on hydrocarbon carrying pipework, thin wall pipework due to corrosion or erosion, etc at any moment in time.)

TEMP REPAIRS

#### Line of sight gas detectors

All the hydrocarbon module line of sight gas detectors had their executive actions inhibited. There was no valid justification for this. These detectors from time to time operate spuriously for a variety of reasons and they were therefore only isolated to prevent a process shutdown – a part of TFA policy. The inhibition of these systems was logged in the CCR. No QRA or other qualitative analysis had been completed to justify the inhibition of this crucial equipment, and no authorisation via change control process had been raised with a technical authority

# Temporary Repairs Registers Asset Inventory Interim Summary

BB FOLLOW-UP 05 NOV 03



## Temporary Repairs Coarse Data (at end September) (2003)

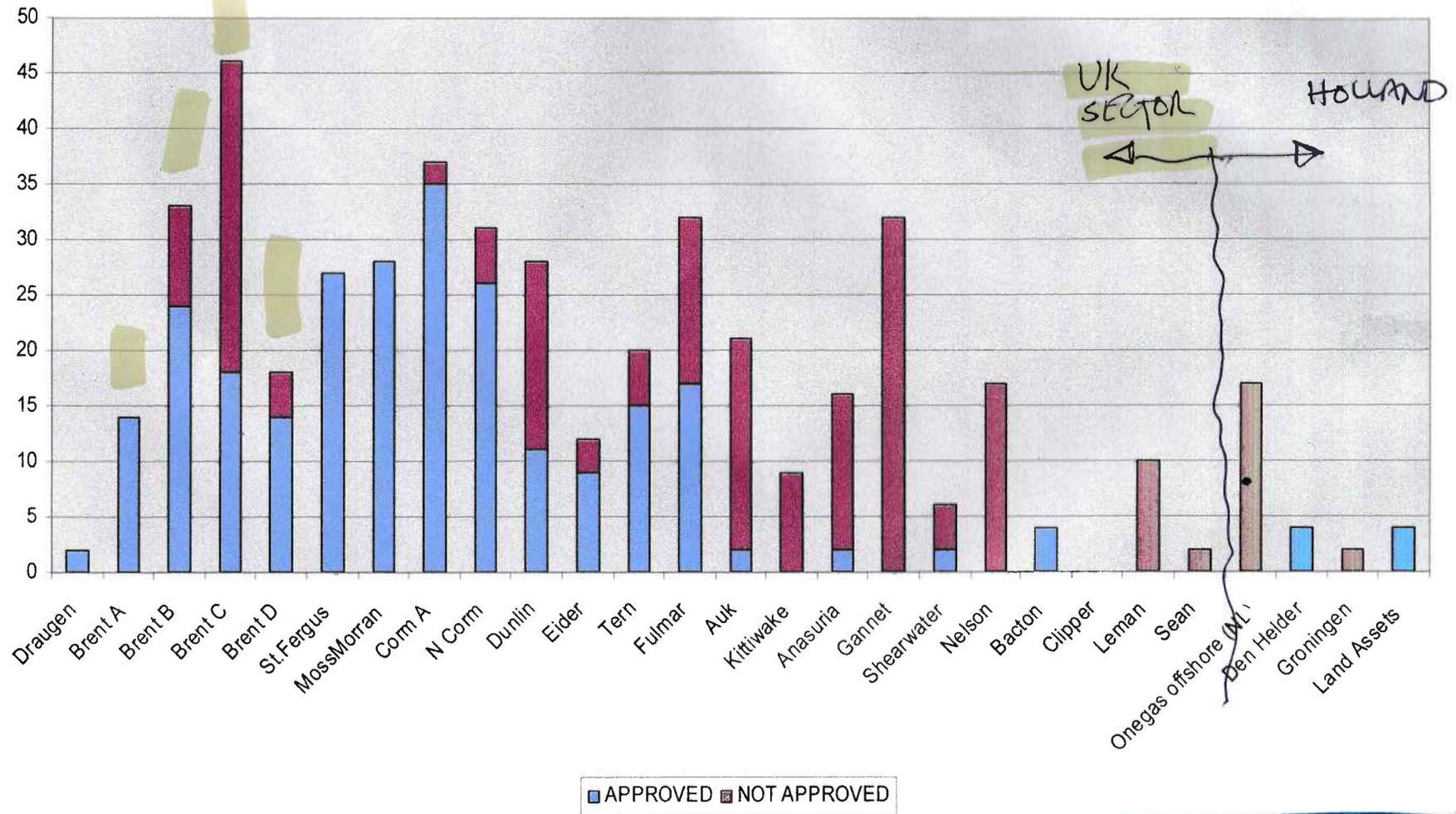
The initial exercise identified a total of 472 temporary repairs of which

- 205 were HC service
- 258 were 'approved'
- 214 were 'not approved' (73 HC service)



NON APPROVED TEMP REPAIRS COVERING  
17 OFFSHORE INSTALLATIONS

OVERVIEW OF TEMPORARY REPAIRS (SEPT 2003)



## Production Director Note of 18/9 (extract).....

### Quote from Greg Hill's e-mail.....

- `...In light of these findings, I am requesting you to complete the following actions. It is my expectation that these have been done in the ordinary course of business. However we need to ensure that all procedures have been properly carried out, and hence this request:
  - Re-check all temporary pipe-work repairs. This means that you must satisfy yourself that all "lines have been walked" to identify all temporary repairs on pipe-work. For each of those repairs I expect you to record the location, type of service, and the integrity of the patch;
  - For each repair, also indicate approval status by the appropriate internal authority, the expiry date of the approval, compliance with the inspection program, and your plans to effect a permanent repair;



MORE FOUND, THE HARDER THEY LOOKED  
THE MORE THEY FOUND

## Deviation Requests Coarse Data (at end September) (2003)

The exercise triggered a bow wave of deviation requests in the former Expro Assets to secure T/A approval

205 such requests processed from 12-30 Sept of which

- 162 were 'new' approved
- 35 were extensions to existing approvals where expiry was imminent
- 8 were rejected by the T/A as not acceptable



## Production Director Note of 18/9 (extract).....

### What has happened since the email was issued ?

- Assets have completed on-site validation exercises and returned updated registers to the follow-up team – covering temporary repairs, passing valves, leaks, weeps and seeps
- As a result significant number of 'new' entries and additional deviation requests have appeared in the system (not previously identified or authorised)
- Initial F2F clarification sessions have been held with onshore asset teams ( for the former Expro offshore assets only)

### In addition

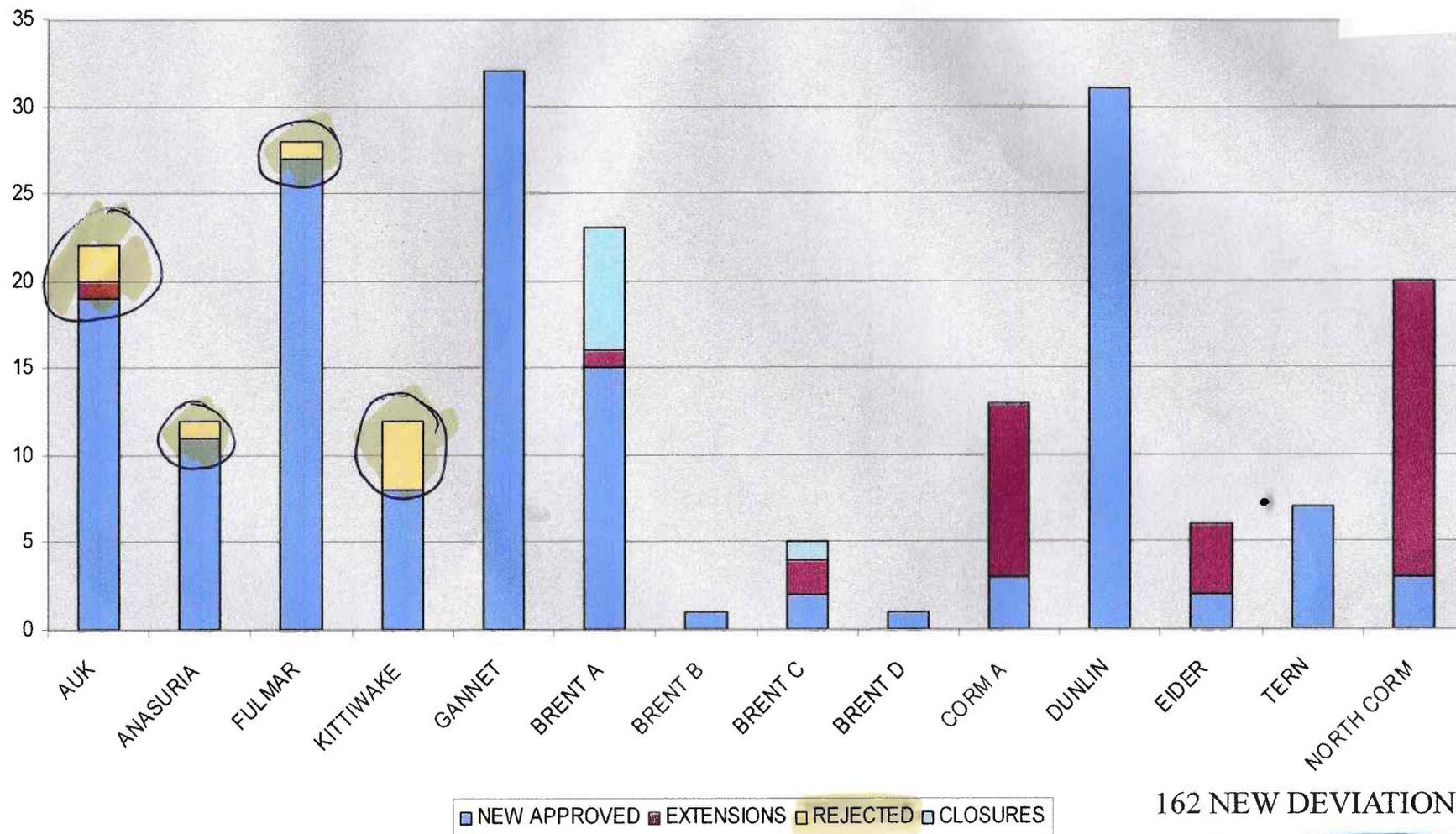
- The guideline document (EM087) has been re-issued to all (former Expro) locations, supplemented by an improved flowchart depicting the 'workflow' for management, approval and control of temporary repairs.



8

MATERIALLY DEFECTIVE REPAIRS SIMILAR TO REPAIR ON BRENT B THAT CONTRIBUTED TO DEATHS

### DEVIATION TRAFFIC 12- 30 SEPT (Expro offshore assets)





Last Updated: Friday, 19 September, 2003, 05:58 GMT 06:58 UK

E-mail this to a friend

Printable version

3

- News Front Page
- World
- UK
- England
- Northern Ireland
- Scotland
- Scotland politics
- Wales
- Business
- Politics
- Health
- Education
- Science & Environment
- Technology
- Entertainment

Also in the news

Video and Audio

Have Your Say

Magazine

In Pictures

Country Profiles

Special Reports

RELATED BBC SITES

SPORT

WEATHER

CBBC NEWSROUND

ON THIS DAY

EDITORS' BLOG

## Union raises platform leak worries

**An offshore union claims oil company Shell Expro has found more than 20 leaking pipework patches on a single North Sea platform.**



All pipework repairs are being checked

It comes after the firm ordered urgent checks on all its North Sea platforms following the deaths of two workers.

The OILC union said the Brent Charlie platform has been patched in 47 places, 21 of which were leaking, with seven leaking hydrocarbons.

Last week Sean McCue, 22, of Kennoway in Fife, and Keith Moncrieff, 45, of Invergowrie, Tayside, were overcome by gas while working on patched pipework in a leg of the Brent Bravo platform.

The company said a number of factors led to the tragedy, which were unlikely to combine again.

But all platform managers have now been ordered to re-check the integrity of pipework repairs and certain valves.



**We have standards around how much these patches can leak and none of these patches are at risk**

Greg Hill  
Shell Expro

Greg Hill, production director of Shell EP Europe, told BBC Radio Scotland that the platform was safe.

He said: "Patches are an industry standard way of repairing pipework, we monitor all of our patches through a patch register and none of the patches on Charlie are safety critical - if they were critical they would be dealt with."

"We have standards around how much these patches can leak and none of these patches are at risk."

The offshore union OILC said it had been raising concerns about patched pipework on Shell platforms for more than three years and had been given countless reassurances about their safety.

General secretary Jake Molloy said it was clear assurances were unfounded.

Mr Molloy is still calling on the Health and Safety Executive (HSE) to be "far more proactive" in ensuring industry maintenance procedures are followed.

WATCH AND LISTEN

**BBC Scotland's Colin Wight**

"Patches are temporary repairs on a variety of pipes"

VIDEO

SEE ALSO:

- Relatives' plea over oil platform deaths  
12 Sep 03 | Scotland
- Oil platform deaths inquiry begins  
12 Sep 03 | Scotland

RELATED INTERNET LINKS:

- Shell
- Health and Safety Executive
- OILC
- UK Offshore Operators Association

The BBC is not responsible for the content of external internet sites

TOP SCOTLAND STORIES

- Scots unemployment rate increases
- Police name three road crash dead
- Man tried to kill disabled wife

News feeds

## Danger concerns

The HSE confirmed it had served a prohibition order on Shell Expro's Brent Bravo installation.

The company said it had also brought forward a planned maintenance shutdown on the Brent Charlie platform to carry out checks and repairs, but Mr Molloy said his members still had concerns.

"Shell's announcement only reinforces the views of workers, which has been their for three years, that these are inherent risks and dangers which they have major concerns about," he said.

The UK Offshore Operators Association said patches were used as standard across the industry.

 E-mail this to a friend

 Printable version

### PRODUCTS AND SERVICES

[E-mail news](#) | [Mobiles](#) | [Alerts](#) | [News feeds](#) | [Interactive TV](#) | [Podcasts](#)

[News Front Page](#) | [World](#) | [UK](#) | [England](#) | [Northern Ireland](#) | [Scotland](#) | [Wales](#) | [Politics](#)

[Business](#) | [Entertainment](#) | [Science/Nature](#) | [Technology](#) | [Health](#) | [Education](#)

[Have Your Say](#) | [Magazine](#) | [In Pictures](#) | [Week at a Glance](#) | [Country Profiles](#) | [In Depth](#) | [Programmes](#)

 MMIX

[Back to top ^^](#)

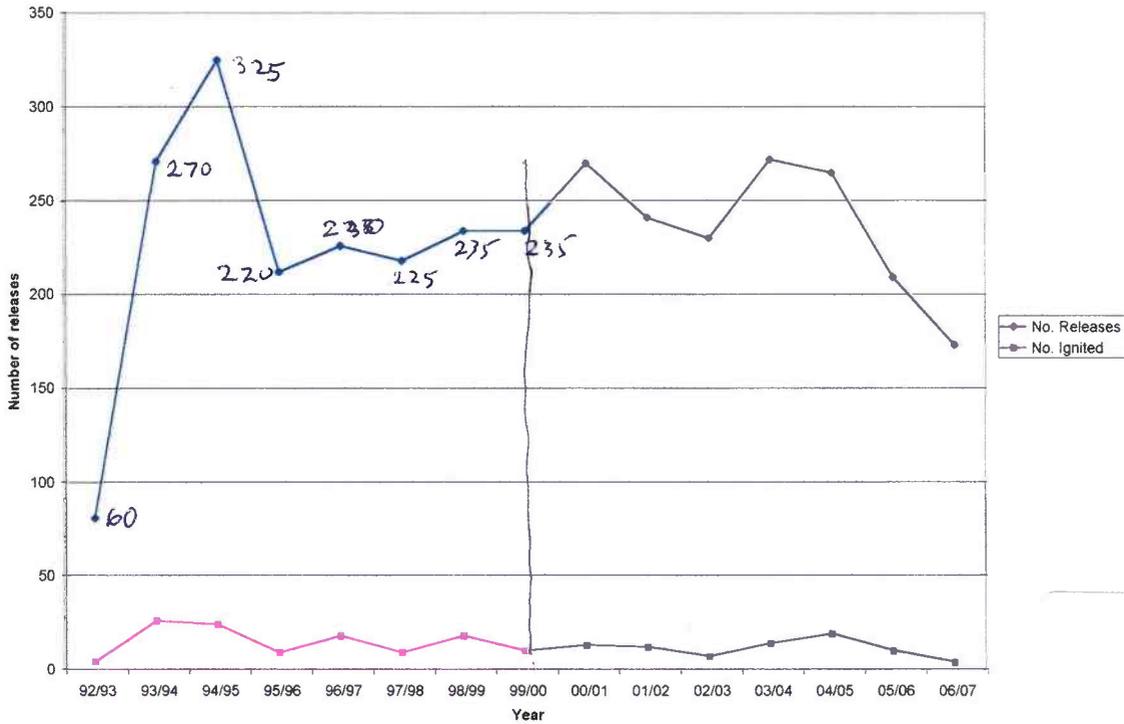
[Help](#) | [Privacy and cookies policy](#) | [News sources](#) | [About the BBC](#) | [Contact us](#)

2,018  
1,973  
-----  
45

### 3 HYDROCARBON RELEASES OVERVIEW

#### 3.1 YEARLY AND MONTHLY RELEASE TRENDS

Before any analysis can be performed on recent data, it is useful to briefly examine release trends prior to the date range of interest (2001 to 2007). Figure 1 below illustrates the total number of minor, significant and major releases that have occurred each year between 1992/1993 and 2006/2007; it also indicates how many releases suffered ignition.



**Figure 1** Total number of minor, significant and major releases between 1992/1993 and 2006/2007