

## That Fateful Day

The story is based on the findings of the public inquiry into the deaths on Brent Bravo on 11<sup>th</sup> Sept. 2003. The witness statements and the comments and conclusions of Sheriff Colin Harris are covered in this paper and should be compared with the Audit findings from 1999. These Audit findings were not communicated to the HSE at the time but that is what the Shell internal Auditors recommended. The findings were provided to the HSE by the Author on 22<sup>nd</sup> May 2005 to be led as evidence at the subsequent inquiry, but this was not done. This will be covered in further submissions to the Trade Unions and the Justice Committee which will follow this paper. I wished at the public inquiry to testify against Shell but this was not allowed.

The reader can follow **the trail** from October 22<sup>nd</sup> 1999 to 16.00 hours on the 11<sup>th</sup> September 2003. The most important aspects of this submission are that it gives an outsider a view into the brutal regime existing in 1999 under which the offshore employees worked where harassment and bullying was rife.

The Operators to protect themselves from the slings and arrows showering on their heads coped by violating their own procedures, for example chronic violation of the permit to work system using the operations **umbrella** to protect them from what would fall on their heads if in carrying out safety critical activities the installation was accidentally shut down.

In 1999, Managers and Directors needed to act, and act decisively. The mentally unbalanced Asset Manager needed to be removed, this didn't happen, this being their biggest sin.

Failing to act on the warnings of their own Auditors, and the pleas of their Chief Internal Auditor they demonstrated apathy, indifference, and criminal negligence that the reader no doubt will find hard to fathom. The Explanatory Notes attached at the end of this paper helps the reader at least to obtain **some understanding of the human factors involved.**

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**This paper is a formal submission to the Holyrood Justice Committee on behalf of the family of Keith Moncrieff, who was unlawfully killed on Brent Bravo on 11<sup>th</sup> September 2003, along with his workmate Sean McCue.**

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## **Introduction**

The evidence of what happened on that fateful day the 11<sup>th</sup> Sept 2003 is taken from the FAI witness statements in the 38 days of Inquiry ending on 25<sup>th</sup> January 2006. It shows how the failure of Directors caused the deaths and how their failures made responding to the emergency more difficult than it should have been.

The evidence demonstrates beyond reasonable doubt that wilful negligence by Directors contributed to the deaths. Attached with this submission is the Audit Notes, with attached technical explanation, starting on 3<sup>rd</sup> Sept to 22 October, 1999, with the subsequent Management Presentation held on 22 October.

**Management Presentation on 22 October 1999 Tullos Conference Room Phase 3: held approximately 4 years prior to the fatalities.**

A management presentation was given to the complete Shell Exploration and Production (hereafter referred to as Shell) management team including Directors, to the effect that Brent Bravo should cease operations. **The full management presentation slides are shown on an attachment to support this submission.**

They were informed by the author, that the risks on Brent Bravo specifically were **estimated to be in the intolerable range** between 1000 to 10,000 times greater than the value in the Safety Case, that is between 0.5 and 5 fatalities per annum. The actual figure, after the double fatality was 0.5, so we have an installation with 156 persons on board 24 hours a day, 365 days per year, operating for a prolonged period with **individual risk levels 1000 times higher** than they should have been, and with their employees on the platform blissfully unaware of the risk they were taking just being there.

## **On 22 October 1999 – What did the Auditors recommend**

Directors were recommended to act, the Managers responsible for the Brent field operations on a day to day basis, should be suspended from their duties, pending an inquiry into their criminal misconduct by knowingly operating this installation whilst it was in a dangerous condition. The Production Director specifically was informed, along

with the Brent General Manager, that the Brent Asset Manager was running what was **described as a brutal regime** from his offices at Seaford House. The Auditors considered from the way he was running the operation, the evidence of mistreatment of staff and of his total disregard for essential controls that he was putting the lives of offshore workers at constant risk, and **that he was mentally unbalanced**. The Production Director knew about these concerns, he was given by the author a profile of the Asset Managers suspected sociopathic behaviour, **refer to Explanation Note A**, but he would not remove the Manager. His MD wouldn't let him.

### **The Audit Procedures used to develop the findings followed Shell International guidelines**

The Audit Notes with Technical Notes were developed after inspection of Brent Bravo in early September 1999 and following interviews with the Auditees. In this **formal process** Auditees have the right to deny, or change findings to their satisfaction and in agreement with Lead Auditor, or simply accept the findings. The findings were totally accepted by the Auditees prior to the Management Presentation. Under the then Shell International Exploration and Production (SIEP) rules, findings accepted by an Auditee became substantiated fact, not allegations. The action to reduce risk by following through on the findings is the responsibility of the Auditee who under SIEP rules will be held **personally accountable** for failure to reduce risk i.e. failure to implement measure to counteract in a timely manner his findings. **To prove guilt beyond reasonable doubt there is demonstrated within this submission the verified fact that the defects present in 1999 were still present on 11<sup>th</sup> September 2003, the fateful day, these defects according to the Sheriff contributed to the deaths.** Namely

- (1) Knowingly operating plant and equipment whilst it was in a dangerous condition
- (2) Unlawfully fitting temporary repairs on pipes carrying hydrocarbons
- (3) Operating with 15 secondary Emergency Shutdown Valves (ESDV) including the valve involved in the fatalities when they were knowingly in a failed condition
- (4) Failure to comply with the Permit to Work system (PTW)

**(1) to (4) can be cross referenced throughout this submission, from 1999 to the fateful day indicated by an Audit Trail highlighted in yellow just follow the trail.**

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## That Fateful Day - 60 minutes between 15.00 & 16.00 hours

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The chronology of events on the 11<sup>th</sup> September is provided to illustrate how the fatalities occurred, the violations of standards and procedures that contributed to the deaths, and the failure of the offshore staff to respond adequately to the developing incident hindered by failures in essential equipment all contributing to the deaths. The installation has started up after a routine 10-day shutdown on 22<sup>nd</sup> August. At the time of the incident, it was in full production. It was just another day, there were 156 persons on board.

### At approximately 15.00 hours:

Prior to entry into the Utility Shaft, a tool box talk meeting was held. Keith Moncrieff and the trainee Operations Technician (OT) Sean McCue were present along with another young trainee OT who was coordinating the planned launching of a pig (a device the geometry of which fits inside the bore of the pipe with the purpose of cleaning out the inside of the pipe). Present at the meeting was the **acting** Operations Supervisor (OS), his job normally a system supervisor (SS), the first level of supervision above his technicians. The instructions clearly given to Moncrieff, as covered in the FAI report, **was to repair the leak from patch 86**. For that purpose, he had obtained materials and a screwdriver, **no permit was raised**. The decision not to raise a permit was not Moncrieff's, **he was acting to instructions**, the acting OS as the most senior person there obviously considered a permit was not required.

The concern raised at the meeting was the risks of patch 86 leaking during the planned pigging operation. They knew that gas had leaked from the patch before on several occasions, and if it happened again causing the gas sensors at the 81m level to activate on detection at high level this would result in an automatic shutdown of the Surface Process (SPS). The general platform alarm (GPA) would go off throughout the installation, and the platform status lights would change from normal green to red. On red alert, the crew would proceed to their muster stations within the temporary refuge. With an SPS, the produced gas in the main Separators is automatically diverted to the flare as a safety measure to reduce the fuel inventory should fire be present. With the hydrocarbon process down there would be insufficient pressure to keep the pig moving, it could get stuck. Keith Moncrieff was to work on the patch so that it would not leak during the pigging operations planned to commence later that day.

At approximately **15.30 Hours**

Moncrieff and McCue entered the shaft. In the Sheriff's words they were entering a restricted area, into a confined space, the pipe to be repaired was designated as safety critical as it could contain hydrocarbons, and a failure of the line could cause, or contribute to a Major Accident Event. Patch 86 was at the 81 m level, circa 260 feet down, it is assumed the lift was used to descend as they were at the 81 m level in a couple of minutes. There was no leg entry sentry, it was normal for OTs regularly carrying out their watchkeeping duties that the shaft entry control was from the central control room (CCR). To aid the control room operator (CRO) two cameras were located at the 81 m level allowing him to observe from his control room what was going on if something went amiss.

**15.38 + 8 minutes after shaft entry**

Fire and Gas alarms sound in the CCR, the CRO monitoring the alarm panel observes a gas sensor at the 81m level registering low level gas, and one registering high-level gas. This is the area that Moncrieff and McCue were repairing patch 86.

The CRO radios McCue advising him of gas alarms, McCue reports back by radio that oily water is **leaking badly** from Patch 86 with the water spraying onto the inside of the shaft walls. Although Sean McCue was a young trainee, he seems to have been fully aware of the situation that he and Moncrieff were in. He asks the CRO what was the liquid level in the de-gasifier vessel as monitored in the CCR, he was told it was indicating zero liquid level.

The CRO and McCue both knew that the oily water was volatile vaporising in the atmosphere into a gas cloud causing the alarms, they knew that it was probable that more volatile liquids would come, the Level Control Valve (LCV) on the de-gasifier vessel was not functioning. Following the spilling liquids was the potential for gas to flow. With the liquid level at zero in the de-gasifier, these volatile liquids would continue to flow through the vessel, through the hole in the pipe and into the shaft. The liquid was vaporising into gas (mainly methane with proportions of ethane, butane and propane) at atmospheric pressure. The patch had leaked badly before causing gas alarms to activate, the operators were thus aware that the de-gasifier separator vessel LCV was ineffective and McCue at this moment was witnessing the results of that. The only way to stem the flow was to close the local isolation valve just upstream of patch 86, close it quickly, if this couldn't be done then make their escape from the shaft.

This was 8 plus minutes after shaft entry, to avoid an escalating hydrocarbon event, the CRO being aware of this asks Mc Cue by radio if it was possible to locally isolate at the

hand valve upstream of the leak. McCue reports he has already tried; the valve is locked open and mechanically preventing him from closing the valve by a key operated interlock on the valve because there was no key present its presence not considered or discussed at the pre-entry tool box talk. The CRO, a fully competent OT to be able to act as CRO, should have instructed McCue and Moncrieff to don their personal self-rescue sets, these by chemical reaction convert the breathed air to oxygen, leave the scene immediately. Further the CRO should have initiated a surface process shutdown from the CCR so that this would reduce or stop gas entering the shaft, it may not have done, but the SPS would have changed the status of platform with the GPA sounding. Mustering would commence, both the acting OS and the Offshore Installation Manager (OIM) would be aware that something was going seriously wrong. The CRO was alone in the control room, the situation had potential for escalation, he needed help. At that time the CRO should have taken charge, McCue was a trainee OT, an apprentice learning his trade.

**15.44 + 14 minutes after shaft entry and 6 minutes after they should have been instructed to escape**

For 6 minutes, a delay resulted that was to have fatal consequences, the CRO tried to locate key in the CCR safe, it was a crucially important key, and by this time with assistance the CRO was still searching through drawings to find unique key number. It was futile, the loss of containment was ongoing. Even if they had found the key it would have taken about 20 minutes or so to get it to the 81m level and would have involved a third party being exposed to risk. The general platform alarm sounded, gas sensors indicating low level gas present at the 76m level some 50 feet above where the men were located. Methane is lighter than air, and the vapour cloud was clearly rising up the shaft, moments later two gas detectors at the 76 m level confirmed low level gas. Both men had not donned their self-rescue sets. It was only at this time that the CRO, by the public address system, requested the acting OS to attend the CCR. **His first call for help.**

**15.46 + 16 minutes after shaft entry and some 8 minutes after they should have been instructed to escape**

Two fire and gas alarms raised on the CCR panel indicated high level gas at 76m level. The vapour cloud was expanding. This initiated an automatic surface process shutdown. This tripped the main power generators as designed so to do, and the shaft intake and extract ventilation fans and associated louvres closed also as designed to do. There was also now no supply to the lift.

With no mechanical ventilation, any purging of the gas vapour (estimated to have risen from evidence given to the Sheriff **to a volume of 6238 cubic metres**) by the intake and

extraction of air within the enclosed space ceased. Oxygen levels would have been falling as the atmosphere was increasingly dominated by rich hydrocarbons. Power to the normal lighting in the shaft ceased as the batteries in the individual fluorescent light fittings automatically switch from two tubes to a single tube. This reduction of energy consumption by the light fitting lengthens the life of the batteries, **but illumination levels are halved, this illumination is provided for a longer period usually in excess of 1 hour, but reduced to a level just sufficient to make an escape.**

The **emergency generator did not start automatically as it should have.** See Explanation Notes at end of this chronology.

Throughout the incident, the telephone and the one-way Public-Address system operated by the CRO from the CCR, continued to operate.

**At 15.50 + 20 minutes after shaft entry and 12 minutes after McCue should have been instructed to escape**

The FAI heard medical evidence that by this time both men could have **been mentally impaired by breathing a hydrocarbon rich atmosphere.** The CRO called McCue over the Public Address system and McCue contacted the CCR by phone. **The CRO told McCue they both should leave the shaft, make their escape.**

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The Sheriff did not ask the CRO as a witness at the FAI as to how he found McCue, was he stressed? Was he still at the 81m level, had they made any attempt to escape from the shaft? Did he indicate by voice or otherwise his physical or mental condition, was he rational? This is important because this was the last contact made with Moncrieff and McCue by the CRO. Both men had not donned their self-rescue sets, **narcosis** would have been established, lack of oxygen would have made it nigh impossible to climb the stairs. **Hope of rescue was gone.**

The Sheriff wrote that between **15.45 and 16.00, the inhalation of hydrocarbons would have caused narcosis making the men unable to think for themselves** or to use any judgement to protect themselves.

**16.05 + 35 minutes after shaft entry, 27 minutes after they should have been instructed to escape, could have been using their individual self-rescue sets, and after the SPS should have been activated from the Control Room**

Emergency Generator started manually after 15 minutes of delay. **It should have started automatically when main power was tripped.** Lighting levels restored as was radio communication. At this point the CCTV cameras, were used to search the utility shaft for the two men and located a person was lying face down at the 81m level. **The**

**cameras in the shaft were known to be degraded, this was the same as four years earlier when they were known to provide poor picture quality.** Refer to the FAI report.

### **End of Fateful Day**

**PS:**

**The Sheriff reported that the cameras were replaced after the fatalities.** The cameras should have been replaced earlier, way back in 1999 during the Audit.

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### **Comments on failure of critical equipment and the consequences of this failure**

#### **The failure when immediately needed of the Emergency Generator**

On the 22 October four years earlier Directors, and the assembled leadership team in Aberdeen were made aware that this critical piece of equipment was unreliable and may not be available in an emergency. Another critical piece of equipment, the UPS which was not being maintained and tested in line with maintenance schedules in 1999, also failed. This equipment was included in the 82% of Safety Critical Equipment whose records were being falsified. Directors were made aware of this non-compliance four years earlier but they took no corrective action.

#### **What is the UPS, and why is it vitally important in an emergency?**

UPS stands for Uninterruptable Power Supply unit. This complex device inverts the DC output of its battery pack, into an AC output. This device has a singular purpose which made it absolutely essential in an emergency, to supply equipment needed to maintain in use the OTs hand held radios. Radios gave constant communication when needed between the CCR and any <sup>ONE</sup> at work in the shaft. You simply cannot manage an escalating emergency if your vital communication links are impaired. You can use the telephone at the 81m or the 76m level as McCue did, but that takes time and effort ascending or descending up or down stairs and vertical ladders. If the OT cannot communicate to the CRO, then he cannot communicate what is happening instantaneously to the CRO, so that the CRO has the necessary information needed by the OIM and the OS assisting him in the Emergency Control Room. Without feedback, a short-term emergency situation can rapidly escalate until you have a crisis on your hands.

#### **Cameras, yet another failure**

Some background, in 1999 the CRO was found to be manually operating the Test Separator, a vessel that should only be used for testing the output of a single well, the information useful to the reservoir Petroleum Engineer for obvious reasons. This

Separator was being used to augment production which of itself was unusual but not unlawful. However, the level control functions on the Separator are designed to automatically control variations of liquids in the vessel. So why I asked the CRO are you manually controlling the Separator liquid level?

He replied that the LCV and downstream ESDV were unserviceable due to their internals being ground down by reservoir sand erosion, the Test Separator operation in 1999 was similar in many ways to the operation of the de-gasifier vessel at the time of the incident.

He then went on to explain that he had a dual role constantly monitoring the process control panel, but also, keeping a watchful eye on the Utility Shaft as the leg entry sentry. I asked him to pan the cameras at 81m level. They were in exactly the same condition as described by Sheriff at FAI, nothing it seems changes, for the better at least.

In 1999 I was given assurances by the OS who had attended the CCR at my request, that he would have the cameras replaced asap. He had sent a material requisition into the beach but as far as he was aware no replacements as yet had been ordered.

**Prelude to the deaths, how this situation on the fateful day had developed over a period of 10 months, with many opportunities missed that would prove fatal**

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**14 November 2002: The beginning of a series of events, interruption of any one of these links in the chain, may have prevented the deaths on 11 Sept, 2003**

OTs discover leak in the closed drains de-gasser rundown line which runs from the process drains degasser vessel down to a 24-inch manifold in the utility shaft. Hole is leaking oily water. An absorbent cloth was placed below the drip, the leak did not cause the gas detection system to alarm. There is no mention in the FAI report as to whether the OTs tested for gas using a hand-held meter. As the line involved carries hydrocarbons and passes through the confined space of the shaft it is designated as safety critical as a failure of the line could cause or contribute to a major accident. The leak was **evidence of wall thinning due to internal erosion or corrosion. It is not contentious**, that action should have been taken at the time to take this line out of service, then carry out a pipework survey, fabricate and fit a new flange to flange pipe spool piece, integrity test, put back into service.

**17 November 2002: + 3 days after leak first observed**

OIM visits site with Wood Group Maintenance Team leader and platform Inspector. Jointly agree to fit "temporary" patch, allocate as patch 86. Repair not carried out under Permit to Work as it should have been.

**17 August 2003: + almost a year since "temporary" patch 86 was installed, no survey had yet been completed so that a replacement spool piece could be replaced**

Another leak, OTs report that they found gas sensor splashed with oily water dropping from above, they report that **patch 86 was badly leaking, single gas head went into low level alarm**, but portable sensors detected no gas at the vicinity when they arrived. Patch retightened, new jubilee clips. Left with no signs of leakage. **No permit raised.** No thought it appears as to why volatile liquids were leaking from the pipe. For this to happen something is not quite right! This vessel was only used intermittently. It takes liquid from closed drains, so where is the gas coming from? A thorough investigation at this point may have prevented the deaths.

**21 August 2003: + 3 days since last leak from patch 86, and 1 day before start-up of production after routine summer shutdown. Platform crew change ongoing, the crew**

**that had experienced the problems highlighted during the shutdown were going home, all their knowledge of the last 10 days flying away with them**

OTs doing watchkeeping inspections find patch 86 downstream of the de-gasifier vessel had failed again, oily water again splashing striking the shaft wall. They investigate in communication with the CRO and conclude that the de-gasifier Separator LCV 6600, could not maintain liquid level in vessel. Patch 86 repaired yet again. **No Permit raised.**

The OS handover notes **quote** temporary repair on degasser line, the LCV failed and pipe is leaking badly, trying to track down details for replacement spool **unquote**

During the 10-day routine maintenance shutdown and prior to start up it was known that 15 ESD valves including the ESD valve EZV44715 had failed their performance tests but this did not change the decision to start up. In addition to the failed ESDVs the level control valve (LCV) on the de-gasifier vessel as discussed, was known to be inoperable.

It's not contentious that under Royal Dutch Shell rules operations should not have commenced as there were foreseeable risks to the health and safety of those involved.

#### **22 August 2003 + 1 day since last leak from patch 86**

According to the Sheriff, when the decision was made to commence production the oncoming OIM was not aware that patch 86 had leaked badly only 5 days previously. The last information he had was obtained from the platform inspectors report for August, this he read clarified that patch 86, together with a number of other temporary repairs, were **quote in good condition with no sign of leakage or loss of integrity unquote**. **This was a failure of communication, inexplicable to the author, that would prove fatal on 11<sup>th</sup> September.**

The OIM was aware however that **ESDV EZV44715 was in a failed condition** that information was in his handover notes. Using data that he did have, he carried out a subjective risk assessment and read classification of risk from failed ESDVs throughout the hydrocarbon process. He reads that EZV44715 had a risk level attributed to it such that if this ESDV was known to be malfunctioning when in use required the process to be isolated and the ESDV repaired as soon as reasonably practicable. There is no mention in his assessment of the other critical failure, the de-gasifier vessel LCV, whose failure contributed to the heavy flow of volatile liquids into the shaft.

As soon as practicable should have been before the platform started up according to RDS policy which at its highest-level stresses compliance with the law, that it was unlawful to commence operations is not contentious.

**4 September 2003:** 7 days before the incident, 9 months and 25 days after patch 86 was fitted, when 3 days earlier on 14 November 2002 that year the leak was first observed. **A work request raised at Seaford House putting plans in place to have pipework around patch 86 surveyed and replacement flange to flange pipe spool fabricated. The need to get this done was given the highest risk ranking, spool should be replaced urgently, within one month.** If the spool piece had been fitted within a month of when the hole was first observed, 14 Nov 2002, the deaths could have been avoided.

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**Attached are Explanation Notes providing help and understanding to the reader.**

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If the reader wants to understand what was going on in the prolonged period from the Audit in 1999 to the fateful day these explanations help particularly to an understanding of the human factors, how people behaved as they did:

**A: The unbalanced Asset Manager**

**B: The narcotic effects of inhaling hydrocarbons, and depleted oxygen levels**

**C: Unlawful temporary clamps and patches on pipes containing hydrocarbons**

**D: The misuse offshore of subjective risk assessments**

**E: The undesirable consequences of vertical relieving and lack of planning**

**F: Chronic violation of the Permit to Work procedures**

**G: Operating with Emergency Shutdown Valves known to be in a failed state**

**H: The potential consequences to the structure of the Utility Shaft if the gas vapour cloud had ignited**

**I: The non-compliance with the inspection, maintenance and performance testing of safety critical equipment**

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## **Explanation Note A: How the mentally unbalanced Asset Manager had conditioned everyone from OIM to technician to do his bidding, or else!**

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Refer to the futile delay at 15.38, some 8 minutes into the event on 11 September

### **Fear of Retribution**

My contention is that this delay, this vain effort to stem the flow, to find the missing key was through concern, McCue **was as yet was not concerned for his life, or that of Keith Moncrieff**, at this moment in time he was gambling, and the CRO was hoping, being aware of the retribution they would suffer from their mentally unstable Asset Manager. If they could still by some miracle stop the platform from shutting down, because in this surreal and alternative world that he had been brought up in as an apprentice, a brutal regime inflicted on him and his crew from Seafield House, that was what was important, that is what was his driver for staying too long at the scene. So, at this moment the CRO and McCue pursued the key to the isolation valve. With the escalation ongoing, with the time constraints, there was never any hope of closing this valve, but they persisted. The delay at this critical time allowed the inevitable to happen, the vapour cloud that entered the shaft, from 15.38 onwards was **estimated by mass balance to develop into the massive volume of 6280 cubic metres, 6 times the area of the shaft from the 81m level to the shaft entry point**.

On Brent Bravo operating knowingly when the plant was in dangerous condition had become normalised. As witnessed during the audit in 1999, **they had been conditioned** to do this by their Asset Manager, who took his instructions, his testimony under formal interview in 1999, from his boss the MD. Keep production going and keep the revenue flowing into the coffers, that's what was important.

The Sheriff at the FAI tries to get to grips with work being carried out under what was called the Operations Umbrella. No such system of work formally exists both in the Shell codes of practice for operators and maintainers, nor in the Company PTW procedures, the Operations Umbrella was a defensive mechanism, adopted by the crews offshore. They had been for years under instruction from the Asset Manager to Touch F-all. If they went to work on the plant and raised a permit, as they should have done, if they then accidentally tripped the process whilst doing the work, all hell would break out. The Manager in search of the guilty would ask for a copy of the permit document, the signatories to the permit would be caught out, there was nowhere to

hide. Each time they went to work at the 81m level on patch 86, no permit was ever raised, everybody knew why. Moncrieff the maintenance technician accompanied by Sean McCue is an example of working under the Operations Umbrella which had become custom and practice. Umbrella is well used, to protect them from the showers of invectives falling on their heads if your signature was, unfortunately for you, on the permit.

A Technical Integrity Review after the fatalities reported at November 2003, with regard to witnessed behaviours that were observed offshore during this review on Brent Bravo, and also across the oilfield.

They reported back their findings to the then Production Director Greg Hill, the following is an extract:

Gordon Muir, Brent Engineering Manager, leader of the post fatalities review by Shell completed by November 2003

quote **the most common factor between 1999 and now was that violation of the permit to work system was common, and he asks why are our offshore crew and staff afraid to flag problems? Why are they willing to continue to operate with systems in a dangerous condition? And have our Leaders, and our Asset Managers, conditioned them not to challenge?** Unquote

**Explanation Note B: The narcotic effects of methane gas ingestion into the lung which causes mental impairment, and this combined with oxygen deficiency in the breathable atmosphere within the shaft, and how this would have rapidly effected McCye and Moncrieff's decision making, and their physical ability to escape**

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**15.38 + 8 minutes after shaft entry, probable impairment of decision making, no attempt to don personal self-rescue sets, still hoping to find the missing key**

There was **criticism of the deceased** at the time for their failure to don their self-wearing rescue sets at this critical time, but as the FAI reports from expert medical evidence the Sheriff was made aware of the narcotic effects of breathing hydrocarbons directly into the lungs causes narcosis, a medical term for the impairment of the brain functions, humans stop thinking properly, confusion sets in. Narcosis takes effect in humans rapidly, it is not improbable that at this time the deceased were already mentally impaired.

**Lack of Oxygen in the atmosphere as a contributor to physical condition**

Although the Sheriff and his medical advisers considered there was adequate oxygen present at the 81m level, I doubt it. Insufficient oxygen below 19% in air will have had a negative effect on the physical condition of the deceased who may already have been exhausted from even minor exertion. Calculating from the 81m level upwards, the area of the shaft is circa 1500 cubic metres, the vapour cloud was eventually estimated at 6280 cubic metres, this is 6 times the enclosed area. The gas cloud was expanding rapidly, it is not improbable that the oxygen level was below or near to 16% by volume in the air, making physical exertion nigh impossible.

This was compounded by the ventilation ceasing at **15.46** as it is designed to do, when power generation trips the supply and extract ventilation fans stop and the associated inlet and outlet louvres close as designed to do. At this juncture any purging of the gas vapour by the intake and extraction of air within the enclosed space ceased. Oxygen levels must have been falling in an atmosphere dominated by rich hydrocarbons.

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**Explanation Note C: the unlawful fitting of temporary clamps or patched hydrocarbon pipework, Directors were made aware of this on 22 October 1999 but took no action.**

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At Stonehaven Sheriff Court in 2004 Shell pled guilty to repairing pipes used in hydrocarbon service with so called **temporary** patches or clamps. The fact that this repair on patch 86, one of 85 of the patches logged by the platform inspector was materially defective, on its own, is not relevant. Shell high level policy is to ensure compliance with the law. To cease or not commence operations if in so doing, there are foreseeable risks.

The post fatalities review by Shell reported at November 2003 that the number of temporary repairs witnessed on Bravo in 1999 (14) had by November 2003 increased to 33, of which 9 were not approved. The totals on the Brent facilities under the control of the Asset Manager were 111 of which 32 were not approved, all this despite Directors accepting the recommendation to stop the application of such repairs in breach of RDS policy on 22 Oct 1999.

Fitting Temporary Clamps on pipes, the wall thickness of which were at, or below, the minimum acceptable wall thickness of the pipe concerned, as was the case in the majority of the repairs carried out, is simply not allowed. Fitting a temporary repair which was "approved" did not guarantee the integrity of the pipe, unlike a replacement flange to flange pipe spool, the integrity of the repair, a clamp or patch, could not be hydrotested or otherwise, it was just as a short-term low cost expedient measure preventing the pipe from leaking so that production could continue with no interruption, **a band aid approach**, just like sticking Elastoplast on a festering open wound. Despite the rules, the Asset Manager would have his way, **the invention of the temporary repair was his**, when I left Aberdeen late 1996, I am not aware of a temporary patch or clamp ever being fitted on an operational pipeline containing hydrocarbons, it was just verboten. Having clarified all this let's consider what was happening.

**"Temporary"** had no meaning in the Asset Managers alternative world, we all understand its meaning as existing for short duration, and in the dangerous location of the shaft as Sheriff Harris so adequately described, even under the Asset Managers

**thickness checks had been completed, and the warning signs of pending wall thickness heeded** unquote.

**4 September 2003, 7 days before the incident, 9 months and 25 days after patch 86 first leaked** a work request is raised at Seaford House which puts into place actions to have replacement spool fabricated. In terms of Risk, the replacement of patch 86 by a fabricated spool was given the highest ranking, the spool should be replaced urgently quote **within a month** unquote.

Nothing has been done on patch 86 for a year because of the actions of the Asset Manager and now it's too late, much too late,

Due to the behaviour of this mentally unstable man, who constantly repeated that he took his instructions directly from his MD, Keith Moncrieff and Sean McCue will be dead within 7 days.

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**Explanation Note D: Subjective Risk Assessments carried out offshore to justify starting-up. This practice is in breach of Royal Dutch Shell Policy and Guidelines**

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Royal Dutch Shell at corporate level have the principle that operations carried out worldwide **must be compliant with the Laws of the countries they operate** in, quite straightforward, not open to misinterpretation.

At lower level this translates that for functional assets operations should cease, or in the case under consideration that operations should not commence until there are no foreseeable risks to the persons employed.

The OIM was aware however that the **ESDV EZV44715 was in a failed condition** that information was in his handover notes. Using data that he did have for the classification of risk to individual ESDVs on the process, he reads that EZV44715 which has to prevent back flow from the HP flare KO drum and should close on a surface process shutdown or in an emergency, had a **risk level attributed to it such that if this ESDV was known to be malfunctioning when in use that it required the process to be isolated and the ESDV repaired as soon as reasonably practicable**. As soon as reasonably practicable should have been before the platform started up, the platform was already shutdown the process dead, what better time?

**What the OIM did not appear to consider was that the de-gasifier level control valve (LCV) was also not functioning and we know from the radio call from the OT to the CRO at 15.46 that the level of this vessel was indicated as zero liquids, if on the fateful day volatile liquids flowed past the ineffective ESDV 44715 then it had an open route to patch 86 via the failed LCV of the de-gasifier vessel. A non-return valve (NRV) that should also have interrupted backflow was found on examination by the HSE at their laboratory after the deaths to be in a failed state. In any case, the FAI determined, that the deaths may have been avoided if the ESDV had been functioning properly.**

**The risk assessment completed by the OIM was flawed**

Royal Dutch Shell **simply does not recognise the use of qualitative risk assessment** in these circumstances as a tool to be used on complex facilities, it is simply not allowed, Shell International standard EP95 -0352 refers.

But the OIM should not have been involved in a risk assessment, no one offshore should, according to the Royal Dutch Shell Guidance EP 95-0352 on qualitative risk assessment such an assessment **should not be used on Brent Bravo or elsewhere, they are only to be used on very simple facilities or operations. where the risk exposure to the workforce is low.** But in any case, should be carried out by competent persons who to avoid conflict of interest, production vs safety, should be persons independent from the line management of the facility.

The invention of localised, let's get the show on the road risk assessments, was another package to add to the Asset Managers tool pack, tools to justify keeping plant going. Such workplace risk assessments offshore have been criticised by the HSE Executive, whose research indicates misuse of this tool is common. When wrongly applied they can have catastrophic results, refer to explosion at the BP Texas City Refinery.

Look no further than the risk assessment that contributed to the deaths on Brent Bravo, **the risks of shutting down** the platform if the patch gave way during pigging, was the only consideration. Production needs dominated. **The risk assessment was not about risk to the 156 people on the installation** on the 11<sup>th</sup> Sept as it should have been, **but the risk of stopping revenue flowing into the coffers.** McCue and Moncrieff died because production dominated the thinking of the operators, **safety was not on their radar screen.**

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**Explanation Note E: Vertical Relieving and Manning: Directors were warned on 22 October 1999 that the Asset Manager was misusing rules on vertical relieving and failing to accept or plan for the consequences**

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Emergency Response has to be taken into account when considering the levels of competency of persons on the installation who may be called upon to act to save lives. To react to an emergency properly there needs to be a sufficiency of competent well-trained crew to handle it.

**15.38 + 8 minutes into the event**

Under Shell Emergency Response procedures held offshore, it is not contentious that the deceased should have been instructed to escape from the shaft wearing the self-rescue sets provided and that the CRO should have activated a surface process shutdown. **The number one priority in an emergency is preservation of life.** On Scene commanders, OIMs etc are taught to get on the front foot in an incident, look ahead at the developing consequences and act decisively and quickly.

On 11 Sept If the gas vapour had ignited, the Shaft may have collapsed or partially collapsed, only a shift on the cellar deck support structure of a few degrees could have torn apart oil and gas lines and a major conflagration would have ensued if spilling hydrocarbons were ignited. The topside weight of Brent Bravo, liquid filled vessels etc, is around 24,000 tonnes. **If the CRO had activated a Surface Process Shutdown at 15.38, the huge inventory of gas in the process separator vessels would have been flared reducing the amount of fuel available to feed a fire.** The principal ESD valves should have closed.

The workforce would have assembled at their muster stations, the coxswains would have been preparing the lifeboats for sea, the Fire Teams would have mustered at their emergency stations ready to don breathing apparatus if required. The OIM would have gone to the emergency control room. He would have, or should have, contacted the Emergency Coordinator (EC) in Aberdeen, the ECs support team there would have been called to attend in his support. Coastguard would have been informed, helicopters made ready and available, the list goes on.

**There is no evidence of any of this happening when it should have at 15.38.** And less than 20 minutes later the men may have been already dead or dying. This preparation would not have saved Sean and Keith, but if the vapour had ignited there may have

been a potential Piper Alpha, the emergency response on the installation would have at least been on the front foot.

### **Role of the OIM: historic learning from passed emergencies**

Following the learnings from Piper Alpha, the Shell rules were that at least 2 persons should be present on the installation at any one time both assessed as competent to Manage Major Emergencies. This competency gained from training and under realistic simulated conditions assessed against the standard developed by my Department as the then Head of Operations and Maintenance strategy in the early to mid-90s. It is highly unlikely that the acting OS met the required standard. If his OIM had been at the 81m level with McCue and Moncrieff he might have been a casualty also and if the vapour cloud had ignited and if the platform was still standing then a second competent on scene commander would have been essential. There was a relief Operations Supervisor on board from 20<sup>th</sup> August and another person who was acting System Supervisor. Not aware if relief OS had been assessed as competent to manage major emergencies, if not, these rules, along with a plethora of others were being breached. The author is competent to assess the response to the evolving incident in the shaft, he himself was assessed as **being able to manage major emergencies** by Royal Navy Commanders **and it's with this experience that the internal standard was written**. Involved with the development of operations staff the author assessed as competent 21 OIMs under realistic simulated conditions and against the standard. Also acted as an Emergency Coordinator for Shell and on transfer to The Hague in late 1996 assisted there in exercises, so that staff there could have a more effective response at Corporate Headquarters to major accident events.

### **Lack of Planning and the consequences**

The 10-day shutdown was carried out by A shift, they had the knowledge and experience of what had gone on including the knowledge that patch 86 had leaked again. They were ideally placed to start-up and were accountable for sorting out any faults of their own making. But just before start-up, they handed over to B shift. Here we have crew A interchanging with crew B and to get to grip with what was ongoing B shift mainly relied on written handover notes.

The outgoing OS handover notes **quote temporary repair on degasser line, replacement spool, LCV failed and patch 86 is leaking badly**, trying to track down **details for replacement spool** unquote. The oncoming OS knew about this but the OIM's written justification as part of his risk assessment didn't, it would appear, have this information specifically that the LCV on the de-gasifier vessel was in a failed state.

**Such confusion should be avoided and it would have been if A shift had started up the platform prior to B shifts arrival, or better still, Brent Bravo had not been started up at all.**

There is precedence for this is in the oil industry history book, this time it was lack of information between the day and nightshift that led to the gas compressor on Piper A being started up by the nightshift with a flange on the compressor lying loose.

Let no one say that planning and inadequate handover information between shifts and crews cannot have dire consequences.

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**Explanation Note F: on 22 October 1999 Directors heard that violation of the Permit to Work (PTW) procedures was common practice**

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After Piper Alpha, the Shell PTW guidance was edited and reissued. In the early 90s I was Head of Operations and Maintenance Strategy and was responsible for inclusion in the scheme (the custodian of which was the Head of Safety) what work could be undertaken by operations and maintenance staff offshore. In short, the operations staff, those working under the supervision of the OS, were allowed only to do watchkeeping duties e.g. monitoring on a 24-hour basis the process, visual inspection, taking oil and gas samples, produced and potable water samples, checking that chemicals were being injected into the oil stream, corrosion inhibitor etc. They would carry tools, adjustable spanner, to help in taking samples, clearing out liquid level glasses on Separators. For 25 years everybody knew their role.

Maintenance staff, under the supervision of the contractors Maintenance Team Leader, were to carry out routine preventative, corrective and breakdown maintenance. The term first line maintenance as covered in the FAI report is not defined in the maintenance dictionary. To do maintenance as described above was also a role that everybody was aware of. Maintenance work required a Permit raised initially by the maintainer with his precautions listed, then approved, by the OS, before final approval by the OIM.

The PTW system has existed since the 70s when the installations were installed and had served Shell well. It was in fact copied by other Oil Companies, which Shell did not object to for the greater benefit of all.

The maintenance policy, codes, standards and procedures for which the author was the custodian makes no mention of front-line maintenance, or operating or carrying out maintenance under the **Operations Umbrella**. This was explained in Explanation A, in that working under the Operations Umbrella was a defensive mechanism to avoid retribution should the platform be accidentally tripped during the maintenance activity being carried out.

To finalise all this, in the context of the deaths and in relation to the fitting and repair of **patch 86 on 17<sup>th</sup> November 2002, and further on 17 August 2003, and on 21 August 2003, and on 11<sup>th</sup> September 2003**, to comply with the Shell PTW procedure,

compliance with which is mandatory, **it is not contentious that a permit should have been raised but you are now aware why this was not done.**

#### **The FAI report: The Sheriffs opinion re the PTW**

The Sheriff rather **optimistically** determined that the **deaths could have been avoided if a permit had been raised on 11<sup>th</sup> September.**

Prior to entry into the Utility Shaft, a tool box meeting was held. Keith Moncrieff and the trainee Operations Technician (OT) Sean McCue were present along with another young trainee OT who was coordinating the planned launching of a pig (a device the geometry of which fits inside the bore of the pipe with the purpose of cleaning out the inside of the pipe). Present at the meeting was the acting Operations Supervisor (OS), his job normally was a system supervisor (SS), the first level of supervision above his technicians. The instructions clearly given to Moncrieff, as covered in the FAI report, was to repair the leak, for that purpose he had obtained materials and a screwdriver, no permit was raised. That decision re the permit was not Moncrieff's, the acting OS as the most senior person there obviously considered a permit was not required. We know why, **nobody raised permits if it could be at all avoided.** The thought process of the risk assessment was focussed on the consequences of what they were planning in relation to the pigging operation. No one present at the pre-entry Tool Box Talk considered the valve that could be closed if things went pear shaped, **no one apparently knows the valve is locked and, in any case, where is the key? We may need it! My opinion is even had a permit been raised, no one would have considered the isolation valve, the operators thought it was not locked, why should it be, it played a crucial role.**

Locking an isolation valve that in itself could have been quickly closed would have prevented the deaths on that fateful day. Why it was locked is beyond my comprehension.

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## **Explanation Note G: Potential collapse of the structure if the vapour cloud had ignited**

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On 22 October 2003 Directors were told that the explosion venting, as by design is located on the roof of the cellar deck above the Utility Shaft, was on 6 Sept 1999 prevented from operating in an explosion by two double stacked marine containers some 20 tonnes. This was not acceptable and I discussed immediately with the Shell tool pusher. It was custom and practice to do this due to the heavy workload, operating, wire line logging and drilling activities and it was a fault of all installation designs that insufficient space for storage of heavy equipment was provided. Particularly the need for simultaneous operations was not considered in the 70s by the Design Consultants. When the experts at the FAI did their probability of structural failure analysis, I assume they would have considered the venting arrangement was as per design. I have no knowledge at the time of the fatalities if the vents were blocked as in 1999, but nothing much else had changed, had it?

Being unaware of the above, the experts had given the results of their studies to the Sheriff to read their conclusions. Of what they said I have no knowledge, suffice to say the Sheriff was concerned enough as explained below. The Sheriff was made aware of this evidence but it was **not led at the Inquiry**; it was beyond the scope the Sheriff said of the 1976 FAI Scotland Act. **He said however that consideration should be given to an Inquiry of a more general nature where these matters could be reviewed, such an inquiry was never held, although the Author pressed the Lord Advocate and the Scottish Government for an answer, and also requested a question be raised at parliament by my MSP Christine May, along with the then leaders of the various parties, Annabelle Goldie and Nicola Sturgeon, and the then Justice Minister Cathy Jamieson, May was asked to raise this matter at Holyrood this was never done, no explanation.**

### **Refer to the FAI report expert witnesses:**

- (1) Karthgeyan, Forbes and White on **the potential consequences** to the concrete structure should the vapour cloud have ignited - representing the HSE executive
- (2) Professor Chamberlain of Shell Global Solutions expert on the dispersion of the estimated 6280 cubic metres by volume of the vapour cloud in the atmosphere with his analysis of the instantaneous overpressure that would have been inflicted on the structure had the cloud ignited.

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## **Explanation Note H: The Emergency Shutdown Valve EZV 44715**

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In 1999 Emergency Shutdown Valves (ESDV) were regularly accepted as not performing to mandatory criteria but were entered into maintenance records **as No Fault Found.**

Operating with defective ESDV in 1999 was accepted by Directors but was still witnessed in 2003, and this contributing to the deaths

**EZV 44715** is what is defined in the design philosophy as a secondary ESDV, i.e. designed when all other protection fails, to shut to a fully closed position to protect a section of the hydrocarbon process. That it's a serious criminal offence to knowingly operate with the ESDV in a failed condition is not contentious, Shell pled guilty to so doing at Stonehaven Sheriff Court, a year before the FAI determined this valve contributed significantly to the deaths by allowing backflow of volatile liquids, followed by gas into the enclosed space of the Utility Shaft.

**The Asset Manager had no regard for the Law.**

If you check back to the Audit Notes and the Management Presentation you will see that the principal Brent Bravo pipeline ESDV failed its leak off test in 1999 but was entered in the records as **no fault found.** Some four years after Directors had accepted that this unlawful and dangerous practice needed to stop. **It was an action the Auditees agreed to take immediately and the complete Management Team including Directors were made aware of this but nothing was done.**

**In November 2003 following the Shell internal post fatalities review, this ESDV was recorded as being in the very same condition as it had been four years earlier.**

What they found:

quote principle pipeline **ESD valve has failed its leak off test, Work Order (WO) signed off as OK, and follow up WOs for corrective action cancelled with the faults still present** unquote.

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## **Explanation Note I: Non-Compliance with Safety Critical Equipment (SCE) its inspection, performance testing and routine maintenance**

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**Directors were informed at 22<sup>nd</sup> October 1999 that SCE was not being maintained in line with mandatory maintenance and inspection schedules but took no action. As a direct result of their inaction we have on the 11<sup>th</sup> September the Emergency Generator failing to start automatically, the UPS supply to radios failing also, and the cameras at the 81m level being defective.**

The 22 October Management Presentation highlighted this non-compliance not only in the Brent field but generally across the oilfield. The data from the SAP maintenance computer system indicated that for July, August and September that year compliance was given for Brent Bravo as **96%**, where, on trawling through the records at Seafield House it was actually **14%**. We found that the **missing 82%** consisted of what was called **authorised deviation requests**.

Since these requests as well as looking at single pieces of equipment such as the ESDV, the Fire Pumps, the Emergency Generator, the UPS also covered complete systems e.g. fire and gas detection systems by area protected there was much less paperwork than you would imagine.

In some cases, of course when the equipment failed its performance test, say seawater deluge, when tested if the system did not react according to the accepted criteria the performance thresholds were just altered to meet the new performance criteria. If the performance standard said the deluge should operate in 20 seconds, for example, the accepted parameters were extended, it was what we called at the time **a goal widening strategy, another of the Asset Managers inventions**. In one specific case the deluge did not operate till a delay of 100 seconds had passed.

**This deluge system was then recorded in SAP (the maintenance computer system) as no fault found. The same thing with the principal ESDV which failed its leak-off test and that criteria were raised 20 times above the limit given in the Safety Case.**

### **How could this happen?**

When the Asset Manager issued his infamous instruction called Touch F-all, he sat the technical custodians down individually in his office and informed them he was under pressure from the MD. We must keep the four big beasts going, the MD was on his

side, he took his instruction directly from him. He then asked them to cooperate, none of this compliance bullshit, he wanted them to sign up to his latest invention, **the deviation request form.**

They didn't need to cooperate but staff appraisal reports would reflect that the individual involved **was not on message**, did not **have the right stuff**, they had reached their level in the organisation and any hope of further progression or good performance bonus etc was limited unless of course they requested a transfer to another business unit which he would welcome.

If this happened the Manager could then transfer in someone who was more pliable, more compliant with his wishes.

But if the SCE was not being tested and maintained, how did it not break down?

He would instruct the platform that on these systems whose operation could cause either a surface process shutdown or a total platform shutdown, the latter closing the Sub Surface Safety Valves on the wells coming from the reservoir, they should be inhibited from operation. To the outsider looking in, the Manager was doing a great job with his 96% compliance being doubly rewarded for his efforts by almost constant process plant availability.

The contractor Wood Group **was quite happy**, why complain? They had provided a plant with no or low downtime because they had completed the 96% and were then rewarded for the availability of the plant. Money for old rope! Unfortunately, in the surreal world of Seaford house, someone had to pay, unfortunately it was Keith Moncrieff and Sean McCue, still relatively young men with a long life ahead, whose only crime was to be in the wrong place at 15.38 on the 11<sup>th</sup> September, 2018.

**As an example of all this in action on Brent D in September 1999, there were 96 inhibits and overrides on its Fire and Gas System and 29 on Brent Bravo.**

On a separate file attached in the submission to the Justice Committee is the evidence from September 1999 through to the determinations by the Sheriff into the cause of the deaths in 2006. The separate file contains 3 sections, namely

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**Appendix A: Audit Notes from Sept to October 1999 to be compared with the Sheriffs determinations on the cause of the deaths. Included are technical notes in a separate file. These were used in 1999 to convey the gravity of the findings to Directors**

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**Appendix B: Presentation given to Managers and Directors on 22 October 1999 to a packed conference room in Phase Three Building, Tullos, Aberdeen**

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**Appendix C: The Case against Malcolm Brinded. CBE**

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Here we reach the end of a long series of events, the **end of the AUDIT TRAIL**