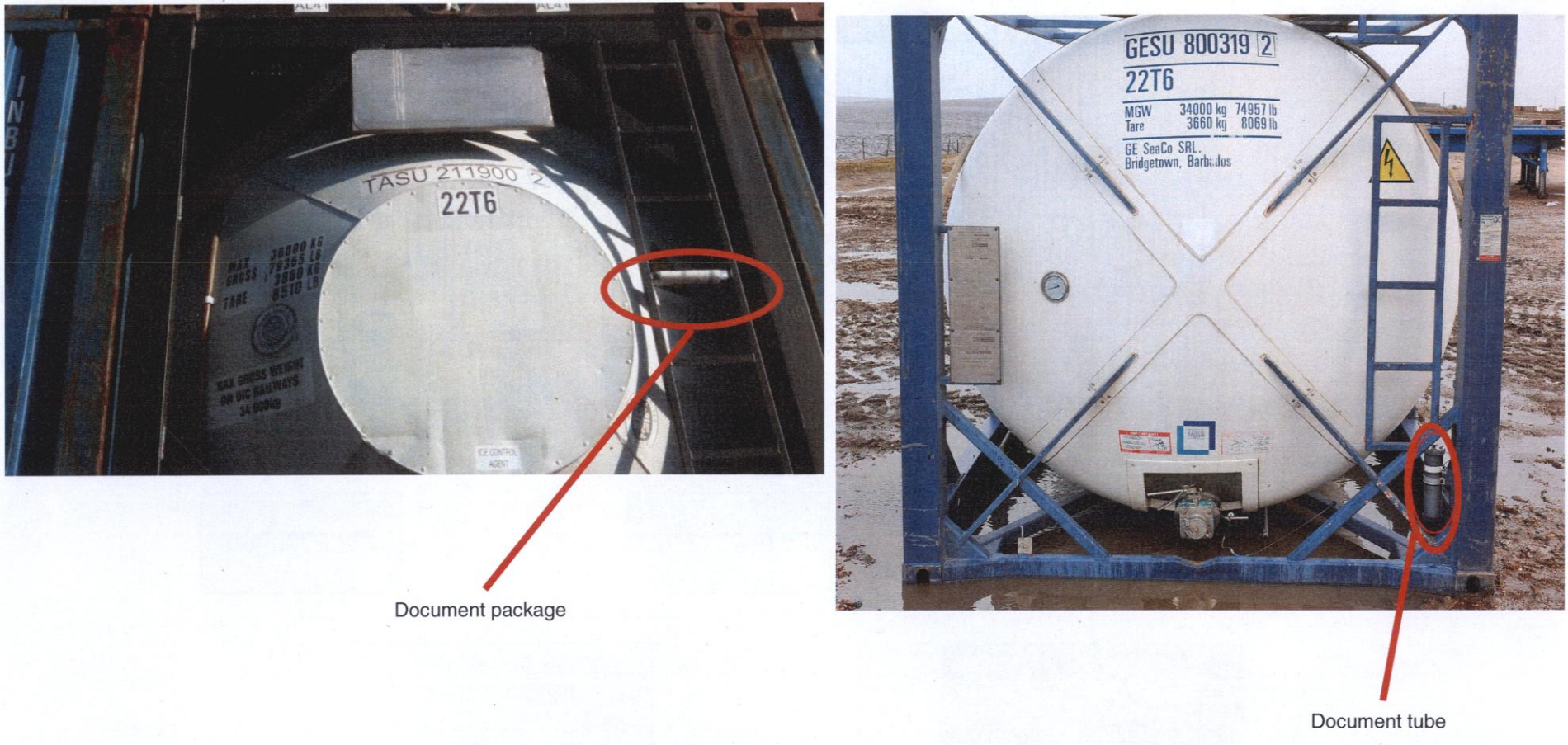
Figure 4 – Document placement



31. As heralded in the NAO's report on information management[10], the complexity of the supply chain and the lack of a joined-up information management system pose a **latent weakness** in the supply chain brought about by resource constraints. This presents 2 difficulties. Firstly, it would be difficult for the MOD to demonstrate a good level of stewardship and care of a product through this convoluted process, which in effect would negate any reliance placed on the supplier to assure the quality of a product. As procurement policy is reliant on the manufacturer's guarantee of quality, this effectively undermines the department's ability to pursue a claim against any manufacturer when quality becomes an issue. Whilst it had no bearing on the outcome in this case, the Inquiry **observed** it could do in future.

32. Secondly, the lack of a single source of information clearly created difficulties in tracking and establishing the identity of the glycols once they had arrived. This **latent weakness** based on **fallible decisions contributed** to the misidentification of the glycols. However, the system, such as it is, is not designed to provide proof of identity. Fundamentally, it should not have been used as such.

RECOMMENDATIONS

- 1.5.1
- 1.5.2

[10] Ibid.

The Purple Gate, Bicester

INTRODUCTION

33. Initial investigations in the Inquiry highlighted incorrect information on VITAL as a potential cause of the contamination. This information was input at the Purple Gate at Bicester. The Purple Gate is designed to be the front door to the military logistics system for all contractorised logistic support, encompassing a huge variety of commercially available items that all come with their own issues; such as irregular packaging, labelling, or documentation that is not compatible with MOD systems. As a result, the Purple Gate relies on the manual input of information in to VITAL, prior to onward movement to the demanding organisation.

FINDINGS

34. In the case of containerised items including glycols, there are 2 personnel responsible for capturing the information and accepting deliveries to the BIST. On any given day, this may entail between 12-15 containers and each might contain as many as 1,000 items. In entering the information for each shipment on to VITAL, the operator is responsible for deciding the fidelity of information each time. For an operational theatre and to ensure accurate tracking, 15 separate pieces of information have to be entered in the system at the maintain issue data entry point. Alternatively, the use of a deployment package requires just 4 items to be entered: including the destination; the product description; the related MOD Form 640 number; and the Consignor. An automatically generated VITAL serial number known as AFA is also added. The former process takes in excess of 6 minutes, the latter may be completed in approximately 35 seconds by an experienced operator.

35. This procedure is outlined in a work-based instruction (at **Annex II**). In the case of the glycols, the deployment package option was used but shortcuts were made, resulting in just an AFA number, the product description and the destination. **Exhibit 21** shows the information entered for glycol GESU 8003187. The MOD Form 640 number and consignor were missing and the product was incorrectly entered as FSII, when in fact the glycol contained ICA. An error was also made with glycol GESU 8003192, where the contents were recorded as AL34 instead of ICA, shown in **Exhibit 22**. Although not required by the work instruction, it is a matter of routine to copy the paperwork and archive it in case of future queries. Regrettably, the copies could not be found for the shipment of the 5 glycols. This was not considered significant by the Inquiry, although the information is used to track missing consignments by Bicester's helpdesk on occasion.

36. The Inquiry found that the process outlined in the work instruction was not always being followed. Details were insufficiently recorded on all 5 of the glycols. A later consignment of ICA for the Falklands was examined during the Inquiry's visit on 27 Sep 11 and similarly, didn't have consignor and reference details completed (**Exhibit 23** – bottom left box) and the product description was anti-freeze. Owing to staff illness it was also discovered that a temporary and informal job swap had occurred at the time of the glycols movement through Bicester.

37. One persistent rumour that the glycols never have paperwork with them is based on a number of personnel who have checked document tubes on the glycols (see **figure 4**). The standard practice at the Purple Gate is to affix the envelope containing the paperwork to the rungs of the ladder and not use the document tubes as the position of the tube can vary considerably and they are not always accessible when the glycols are stacked together.

38. The Onward Transmission office also made transposition errors whilst creating the shipping notes for the 5 glycols. The shipping note also required the destination, a unique identifier number for the T998H, the product and the container number. The contents of 2 of the glycols were

incorrectly recorded with the same product that VITAL had wrong but a third, correctly noted on VITAL as AL34 was recorded as containing FSII on the shipping note. The Inquiry noted that the similarity of wording in errors suggested that information was being 'cut and pasted' to reduce data entry time.

39. The Inquiry also noted a number of significant management challenges at the Purple Gate. Following interviews with a number of personnel, the Panel formed the opinion that successive changes in the organisation and constant reductions in staffing levels had resulted in low morale amongst staff, who felt overworked and undervalued. The sheer volume and repetitive nature of manual data entry onto an old and slow IT system was a source of frustration and created low arousal. Staffing shortages were sometimes ameliorated with agency staff but the impermanence of their employment exacerbated issues by simply creating a training burden for hard-pressed staff. Some capability to trouble shoot and provide top cover was provided by a small military staff but these resources were due to be civilianised.

40. It must be recognised that VITAL was never designed to provide proof of contents of any package – it is only a consignment tracking tool. Indeed, data entry for the product description was limited to 30 characters. However, the system might have become a victim of its own success as increasing reliance is placed on the fidelity of the information. The Inquiry found a number of personnel were aware of its potential shortcomings, yet few were sufficiently concerned to distrust it.

41. Again, the Inquiry noted that dangerous or explosive goods were handled in a very different manner, with a greater deal of attention applied and distinct routines to ensure greater safety throughout the Purple Gate.

42. The Inquiry discussed the potential impact of a more joined up logistics IT system. VITAL was able to extract details of a demand during consignment from an MJDI record for MOD supplied materiel, which would have removed the initial identification errors and may have provided sufficient information for the correct identification to be made once the glycols had been found and the VITAL numbers checked. However, the nature of the contractorised logistic support solution in this case meant that there was no automatic connection of information between the demander, the supplier and the consignor. A joined up logistics management information system remains an aspiration and undoubtedly will solve many inconsistencies once achieved. However, in the meantime, it must be appreciated that the legacy systems and boundaries between different systems introduce risks that are not always immediately obvious.

CONCLUSIONS

43. Significant upheaval and staffing issues have led to considerable **latent weaknesses** in the system and created numerous **error provoking conditions** that will be extremely difficult to resolve without major resource uplifts. As a result of these conditions, a number of active errors and procedural failures were made in manually recording information from the glycols on arrival at the Purple Gate. As these active failures were later relied upon to identify the contents of the glycols, albeit erroneously, they must be considered a **contributory factor**. Specifically, the work based procedures were not followed which were **contraventions** as a result of **lapses** in the performance of the tasks. The Inquiry also believes that the errors in transposing information on to VITAL and on to the shipping notes were most likely the result of a 'cut and paste' **slip**.

44. As a single person was responsible for affixing the envelopes to the glycols, and there was no management scrutiny, the Inquiry team **observed** that there is a possibility that the wrong envelope could be affixed to the wrong glycol, representing a **latent weakness**.

45. The Inquiry acknowledges that the resource implications of attempting to guarantee the fidelity of VITAL information are wholly impractical and would result in the system attempting to deliver a level of provenance for materiel that it was never designed to provide. Work is ongoing to provide regular suppliers with greater access to the military logistic system and in some areas, provide access to VITAL at the commercial base, in a system known as electronic business capability. It is anticipated that this will remove 60-70% of the current manual input requirement. However, this is not likely for smaller suppliers for the foreseeable future. Accordingly, it is imperative that users of VITAL understand that it cannot be used to ascertain the contents of any package and original manufacturer's labelling or paperwork must be used instead. As a policy of education and training will lack permanence, and would only reach those who operate and are familiar with the system, the Inquiry considers that an investigation is required to ascertain the feasibility of a permanent 'health' warning being added to product descriptions, labelling and all paperwork produced by VITAL.

RECOMMENDATIONS

- 1.5.3
- 1.5.4

Supply controls in the Falkland Islands

INTRODUCTION

46. Once the glycols had arrived in the Falklands, there was a gap in the supply chain where no positive control was exercised over the materiel. The use of glycols to order product in bulk by-passes normal supply accounting systems that may have helped to indicate an issue with identifying the contents of the glycols.

FINDINGS

47. In normal supply chain operations in the Falklands, the receipting of stores from any delivery source to a unit was controlled by the Receipt and Despatch (R&D) section. Simply put, their function was to receipt materiel as ordered and either warehouse it, or distribute it to the demanding organisation and account for the process. However, owing to the nature of fuels and additives and licensing requirements for receipting areas, R&D did not deal with POL natures – instead this was handled by the Ground Fuels section who operated to achieve the same effect.

48. Back in Jan 11, the initial demand for the FSII from the PSD had been passed to the Ground Fuels section who attempted to place the demand. However, as the demand was novel by volume, it was rejected by MJDI owing to the quantity and cost. Although glycols had been demanded from the Falklands previously, there was no procedure for submitting the demands and the lack of corporate knowledge through the short tour cycle meant there was a delay in processing the demand correctly.

49. This delay necessitated hastening action by a number of desks before the orders were finally submitted through the Direct Supply Clerk and Sgt PPC in SCAF. Together with the failure in Feb 11 of a cross base blending operation (discussed in the chapter on infrastructure), this highlighted fragility in FSII supplies and focussed management attention on rectifying the potential shortage. SNCO Av Fuels produced a report to OC F&L outlining the issues (**Annex JJ**) and as a consequence, Ground Fuels elected to remove themselves from the process in future. In their view, this simply removed an unnecessary link in the chain of ordering the product. However, it also potentially removed a safety feature in the supply chain – that of supply professionals receipting and then passing on materiel to a user or demander. Although it may have speeded the operation, in effect it meant that no-one in R&D needed to account for the glycols as a receipt and then issue them. It also meant that no-one was concerned to trace delivery paperwork to close the demand loop.

50. The standard procedure in 460 Port Troop was to obtain an electronic copy of the Cargo Load and Stow report from Marchwood and use this to check the containers and items being offloaded. Once the list has been cleared and all loads and offloads were complete the Port was declared open and a message broadcast across Mount Pleasant Complex (MPC) and to Stanley Services. The broadcast prompted the demanding units to collect their materiel. 460 Port Troop had, for some time, been requesting shipping notes to aid their understanding of the contents of containers and assist those struggling to identify their demands and the Inquiry was aware that this was in the process of being rectified. The troop had also been attempting to better control the access to the Port and were endeavouring to control the removal of items by requiring a driver's signature on collection. However, at the time of the incident there were few controls in place.

51. Witness testimony (**Witness Statement 10**) confirmed that paperwork was found attached to the glycols and was removed and passed to R&D. Exhaustive searches failed to locate the paperwork and as R&D had neither need nor use for it, there is no reason why it would have been retained. In fact, the only accounting action was taken by the Direct Supply Clerk on 20 Jun 11

when he confirmed with the ground fuels section that 5 glycols had been received. He was told that they had arrived without paperwork and as a consequence he raised Form 600K – a standard form to account for stores items arriving without paperwork. The forms and the related MJDI entries are at **Annex KK**. The clerk's primary concern in carrying out this action was not to establish that the orders had been correctly fulfilled, he merely needed to clear the outstanding demands on his manual register and on MJDI, without needing to confirm the identity of each glycol. Whilst the arrival of materiel without paperwork is not uncommon throughout the supply chain, the Inquiry was informed that this was the norm for the arrival of glycols in the Falkland Islands. Records in SCAF showed that no glycol paperwork had been received in the department since 2006, which may also have added to the rumour that the glycols never had any paperwork.

52. The Inquiry noted that during the ordering process, opportunities were missed to utilise information that may have assisted with the identification process. Specifically, the invoice form MOD 640 numbers relating to each order were passed to staff in MPC and were recorded in the Direct Supply Register, which is at **Annex LL**. Again, although it would have provided no guarantee of the contents of the glycols, the information would have assisted in maintaining the picture and may have highlighted anomalies with subsequent paperwork.

CONCLUSIONS

53. The routine removal of the shipping notes reduced the information available and therefore represents a **latent weakness**. The lack of control at East Cove Military Port was also a **latent weakness** and although neither had an effect on the contamination event, the Panel **observed** that they could do in future incidents.

54. If a supply organisation like R&D or Ground Fuels had been involved in receipting and accounting for the glycols, a check of the paperwork might have highlighted an issue with mistaken identities. Certainly an organisation that needed to account for the items and their whereabouts may have maintained a paperwork trail that would have assisted in and eased the task of identifying the contents. Accordingly, the Inquiry found the lack of supply control in the ordering and accounting for glycols to be a **latent weakness** in the system and this **passively contributed** to the difficulties experienced in identifying the glycols.

55. Similarly, the loss of the paperwork in R&D negated any opportunity to use the paperwork trail to assist in identifying the contents of the glycol. The Inquiry believes that the paperwork was probably disposed of rather than lost as no-one needed it. This was a **mistake** but did not contribute to the misidentification process and therefore is not considered a contributing factor.

56. The lack of a standard operating procedure for the ordering of glycols delayed the submission of demands and encouraged an ad hoc approach to the procurement. This represented a further **latent weakness** in the system as a **failed defence** and may also be considered a **passive contributing factor** as it necessitated the development of an ad hoc system to identify and subsequently move the glycols, thereby making a misidentification more likely.

RECOMMENDATIONS

- 1.5.5
- 1.5.6
- 1.5.7

The misidentification of the glycols

INTRODUCTION

57. The principle catalyst for the introduction of the ICA instead of FSII in to F-35 and the use of FSII on the runway was the misidentification of the glycols whilst they were at East Cove Military Port. The subject of considerable speculation throughout the Inquiry, it remained unclear precisely how the mistake was made, and by whom.

FINDINGS

58. Once the FIRS had docked and was being unloaded, FS F&L and SNCO Av Fuels elected to go to East Cove Military Port to attempt to identify the glycols. They were well aware of the priority on the FSII supplies and as the SNCO PSD was presently still in the UK, it was important that the supplies were moved on to their final destinations. The glycols were soon found on the hard standing but both recall some difficulty in identifying the contents. They sought assistance from 460 Port Troop but the Cargo List used by the Port Troop only detailed the containers as general stores so they returned to the container park. Both also recall some envelopes with VITAL paperwork attached to the glycols, which SNCO Av Fuels removed and handed on to R&D as discussed in the previous section. The VITAL numbers were taken and they returned to MPC.

59. At this point, testimony diverges. In an email on 10 Aug 11, SNCO Av Fuels recalls the FS F&L having a list of the expected containers and their contents prior to going to the port **(Exhibit 24)**. However, according to FS F&L's testimony (**Witness Statement 11**), he went to SCAF after the visit to the port and asked the Direct Supply Clerk to identify the contents and was subsequently given a list of contents corresponding to the VITAL numbers and the container numbers. However, the Direct Supply Clerk (**Witness Statement 8**) refutes this and maintains that he had no way of establishing the contents. He agrees that prior to the arrival of the glycols, he had confirmed that 5 were en route and there is some email traffic to evidence this tracking action through Bicester and with Univar. He agrees that he did have a list of the serial numbers at that point. Had he been approached to identify the contents once they had arrived in the Falkland Islands, it would be reasonable to assume he would have done the same again and approached Bicester or the manufacturer. However, Univar have no record of any request for information over the dates when the glycols arrived, and there is no evidence in the Bicester help desk database, which records all queries that cannot be satisfied immediately.

60. It is possible that Bicester were able to respond immediately, which would have negated the need for an Inquiry to be recorded on the database. In doing so, it is most likely that the help desk would have accessed the VITAL records. Had they done so, this would have resulted in 2 errors on the list of containers to contents. The helpdesk is unlikely to have used the shipping notes as this would have required a manual search and would be unlikely to be achieved immediately. But had they done so, the shipping notes would have produced a list with 3 errors. The helpdesk cannot have used the MOD Form 640s; again, this would require a manual search and even if the forms had been copied in to the archive (they could no longer be found), the glycol serial numbers were not recorded on them which would have required the VITAL record to be accessed anyway, again resulting in a list with 2 errors.

61. The Inquiry considered whether the Direct Supply Clerk might have used his own records and in particular the direct supply register. SCAF had received an email on 18 Mar 11 stating the MOD Form 640 number for the FSII and its despatch details. Similarly, the MOD Form 640 numbers for the ICA glycols are also correctly recorded on the register. However, as mentioned above, there is no record on the MOD Form 640 of the glycol serial number. Accordingly, a list developed from MOD Form 640s would bear no correlation to the list of container serial numbers.

Although the work instruction at Bicester requires the MOD Form 640 number and consignor to be captured on the VITAL record and copied in to the archives, this had not been done, so there was nothing to link the VITAL record to the MOD Form 640 serial numbers, either. Consequently, it was not possible to identify which container was associated with which MOD Form 640 without the associated paperwork from the glycols. Finally, as the MOD Form 640s all recorded the correct contents, the subsequent list should have been correct. It therefore seems unlikely that the Direct Supply Clerk could have provided a list of containers with their respective contents.

62. By 3 Jun 11, SNCO Av Fuels had produced work orders to move all 5 of the glycols to their respective destinations. The work order was based on a list of serial numbers and contents given to him by FS F&L. The list was hand written in a notebook belonging to FS F&L but now cannot be found. The work orders for the glycols are at **Exhibits 1 and 2**. However, this list now contained 4 errors and cannot be reconciled with any known source of information, as shown in Table 1.

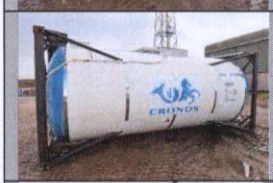
Container	Container Number	Actual Contents	Univar/ Kilfrost records	MOD Form 640	VITAL	Shipping Note	SNCO' AV Fuel's work order
	GESU 8003187	ICA	ICA	ICA	FSII	FSII	FSII
	GESU 8003314	FSII	FSII	FSII	FSII	FSII	ICA
	GESU 8003192	ICA	ICA	ICA	AL-34	AL-34	ICA
	CRXU 8511900	AL-34	AL-34	AL-34	AL-34	FSII	AL-342
	CRXU 8510328	AL-342	AL-342	AL-342	AL-342	AL-342	AL-34

Table 1 - Glycol contents by source

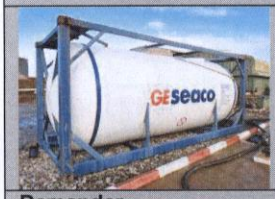
63. It is possible that the difference had come from a transposition error made by SNCO Av Fuels from the list FS F&L gave him, although SNCO Av Fuels is certain that the details were entered correctly. However, an email from the FS after the event indicates that the original issue paperwork on one of the containers was used to identify the contents as FSII (**Exhibit 25**). This is also supported by SNCO Av Fuels email on 10 Aug 11 at **Exhibit 24** who stated that the only paperwork they could find was that on glycol GESU 8003187 that listed its contents as FSII. Witness testimony (from **Statement 10**) was clear that all the containers had the VITAL paperwork attached in clear plastic envelopes. Although the standard procedure at Bicester was to attach all

the delivered documentation, the Panel acknowledges that this might not have been done, as suggested by the other errors made at Bicester at the time following the informal job swap. This would have made identification a challenge, and would have allowed a greater reliance to be placed on the VITAL label as there was nothing to contradict it.

64. If FS F&L had only checked the VITAL paperwork in the envelope on GESU 8003187, he would have satisfied himself that it was indeed the FSII he was looking for. The FS agreed that this was the only container he was particularly concerned about, owing to low running supplies. Earlier efforts to confirm that the 5 glycols were en route meant that he knew that of the other 4 glycols, 2 would be ICA and the other 2 would be the aircraft de-icer, all bound for the ICA compound. The latter 2 may have proved easier to identify as aircraft de-icers as they are supplied by Kilfrost who routinely seal the valves with a company tag and had done so in this case. Furthermore, the 2 glycols were supplied by the company Cronos; the other 3 belonging to GESEACO, so their appearance was markedly different as can be seen in the table above. Therefore, by a process of elimination, the FS could have assumed that the remaining 2 glycols must have been ICA. Had he checked these 2 containers' paperwork at this stage, it would have revealed that the presumed ICA was recorded on VITAL as FSII and AL-34, necessitating some other method to identify the contents.

65. The Inquiry must acknowledge that this theory is simply an extrapolation based on a comment in an email. However, the Inquiry surmised that it is *probable* that FS F&L identified one container using the attached VITAL record and made an assumption about the remaining 4. This is not unreasonable; FS F&L had no reason to suppose that his assumption would not be checked by a responsible end user prior to use. The Panel also assesses that it is *possible* that the Direct Supply Clerk made an educated guess as to the nature of the contents before passing the list of both contents and serial numbers to FS F&L but can find no motive to support why he might have done so, or why the subsequent work orders do not tally to any source that might have been available to him.

66. The information sources available in the logistics chain are the result of a system that is still slowly moving towards a more integrated IT solution. As highlighted earlier, each area within the chain still uses its own form. Unfortunately, those forms do not share a complete picture and the proliferation of forms and numbers renders the information opaque, as illustrated in the table below.

3187	Container Number	Contents	T998 No	FMN	Order number	Reference Number	640 Number	Packing ID
	GESU 8003187	ICA						
Demander					3062	510451	134085	
Company records	8003187				863734			
MOD Form 640		ICA			863734	510451	134085	
Freight Request		ICA					134085	
Shipping Note	GESU 8003187	FSII	BIC/FAL /2173					
VITAL Freight Move Note		FSII		AFA 20306451				AFA 20306436
SNCO Av Fuel Work Order	8003187	FSII						
3314	**Container Number**	**Contents**	**T998**	**FMN**	**Order number**	**Reference Number**	**640 Number**	**Packing ID**
	GESU 8003314	FSII						
Demander					MAN/7140		134082	
Company records	GESU 8003314	FSII			862674	Graham Armstrong		
MOD Form 640		FSII			862674	Graham Armstrong	134082	
Shipping Note	GESU 8003314	FSII	BIC/FAL /2172					
Bio Security	GESU 8003314			AFA 20306414				
VITAL Post Despatch Record	GESU 8003314		BIC/FAL /2172	AFA 20306414				
VITAL Packing List		FSII		AFA 20306230				AFA 20306392
VITAL Freight Move Note		FSII		AFA 20306414				AFA 20306392
SNCO Av Fuel Work Order	GESU 8003314	ICA						

3192	Container Number	Contents	T998	FMN	Order number	Reference Number	640 Number	Packing ID
	GESU 8003192	ICA						
Demander		ICA			3061	510450	134086	
Company records	GESU 8003192	ICA			863732	510450		
MOD Form 640		ICA			863732	510450	134086	
Freight Request								
Certificate of Conformity								
Shipping Note	GESU 8003192	AL-34	BIC/FAL /2199					
Bio Security	GESU 8003192			AFA 20342582				
VITAL Post Despatch Record	GESU 8003192		BIC/FAL /2199	AFA 20342582				
VITAL Packing List		AL-34		AFA 20342582				AFA 20342545
VITAL Freight Move Note		AL-34		AFA 20342582				
SNCO Av Fuel Work Order	GESU 8003192	ICA						
1900	**Container Number**	**Contents**	**T998**	**FMN**	**Order number**	**Reference Number**	**640 Number**	**Packing ID**
	CRXU 8511900	AL-34						
Demander					MPA/MAN/DMND/10-11/7141			
Company record only from email					*MPA/MAN/DMND/10-11/7141*			
MOD Form 640								
Freight Request								
Certificate of Conformity								
Shipping Note	CRXU 8511900		BIC/FAL /2198					
Bio Security	CRXU 8511900			AFA 20342534				
VITAL Post Despatch Record	CRXU 8511900		BIC/FAL /2198	AFA 20342534				
VITAL Packing List		AL-34		AFA 2034264				AFA 20342486
VITAL Freight Move Note		AL-34		AFA 20342534				AFA 20342486
Sgt Smith's Work Order	CRXU 07649900	AL-342						

0328	Container Number	Contents	T998	FMN	Order number	Reference Number	640 Number	Packing ID
	CRXU 8510328	AL-342						
Demander					MPA/DS/10-11/052		143869	
Company record only from email					MPA/DS/10-11/052			
MOD Form 640								
Freight Request								
Certificate of Conformity	CRXU 8510328	AL-342			MPA/DS/10-11/052			
Shipping Note	CRXU 8510328	AL-342	BIC/FAL /2245					
Bio Security								
VITAL Post Despatch Record	CRXU 8510328		BIC/FAL /2245	AFA 20417832				
VITAL Packing List		AL-342		AFA 20417832				AFA 20417773
VITAL Freight Move Note		AL-342		AFA 20417832				AFA 20417773
Sgt Smith's Work Order	CRXU 8510328	AL-34						

Table 2 - Paperwork trail

CONCLUSION

67. Undoubtedly it was a challenge to identify the glycols. The lack of a label on the container was a **contributory factor** in this. Earlier errors recorded on paperwork affixed in an envelope also **contributed** to the difficulties experienced. The lack of a clear, continuous record throughout the logistics chain information management system also **contributed** to the inability to identify the contents.

68. Regardless of the difficulty of identifying precisely how it was made, at some point, an **active failure** occurred when an erroneous assumption was made about the contents of the 5 glycols. In the absence of clear rules to apply, the person making the decision was faced with novel circumstances and would have attempted to rationalise their assumptions based on the knowledge available. Accordingly, the Inquiry assessed this as a **knowledge-based mistake**. As they were most likely to have based their decision on assumptions rather than evidence, the Panel did consider whether this was a reasonable action. However, the outcome was never intended and certainly not foreseen, and it was equally reasonable to assume that further actions would be taken by the end-user, prior to use. Inevitably, the mistaken assumption led directly to the connection of the wrong glycol at the PSD and the decanting of the wrong glycol at the ICA compound, which resulted in both contamination events and therefore is a **causal error** in both events.

69. Acknowledging the real world resource issues faced by LOG NEC, the Panel fully supports the ongoing efforts to increase and improve logistics IS interconnectivity.

RECOMMENDATIONS

- 1.5.8