

The Esso Gas Plant Explosion:

LESSONS FOR FORMS MANAGEMENT

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(This paper is based on a lecture given at the Annual Symposium of the Business Forms Management Association in Phoenix Arizona in May 2006)

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On September 25, 1998, an explosion at the Esso Natural Gas Plant at Longford in South Eastern Australia killed two men, injured eight others and cut gas supplies to the city of Melbourne for two weeks. Damages claims exceeded 1 billion dollars. Although the direct causes of the explosion were operational and engineering issues, a subsequent government Royal Commission blamed Esso and its management. The issues uncovered provide serious lessons for all aspects of management and especially for the management of business forms.

Why this paper was written

In early 2005 I read *Lessons from Longford: The Esso Gas Plant Explosion*¹, by Andrew Hopkins, Associate Professor of Sociology at the Australian National University. In it he details what went wrong at Longford and the lessons all companies need to learn from it. It's a superb book, and as I read through it, I was struck by the parallels with the problems that organisations face when they fail to manage their basic office routines, and especially the failure to manage their business forms. As I read the stories of what had gone wrong at Longford many examples from my 40 years working with forms came flooding into my mind and I realised that it would provide useful material for the BFMA Symposium. My hope is that those who read this paper will also learn lessons from Longford that might alleviate potential catastrophic business failure.

Now if you think I'm exaggerating with words like 'catastrophic', just consider these statistics³:

- Each year 550,000 people filled out a government application form for financial assistance. Close to 100% of application forms had one or more data errors resulting in most of them being sent back to applicants for more information. Some were sent back to users up to 4 times for more information. The basic salary cost alone exceeded \$2 million, just to correct the errors on a single form. The total cost was estimated to be closer to \$10 million.
- A state government utility surveyed 2,000 completed forms, half of which were internal, and they found 80% to have one or more data errors.
- Studies of three leading insurance companies providing life insurance and similar products showed that close to 100% of applications for life insurance had data errors. Interestingly, after useability testing and a more modern approach to design, the error rates were dramatically reduced, in once case to 15% with one or more errors and in another to as low as 5%.
- A high profile government grant application, many filled out by specialist consultants, had 97% with one or more errors.

- A government application form for business incorporation resulted in letters to 90% of applicants asking for more information.

These are just a few of the examples from my own experience, but they highlight the type of problem I'm talking about.

What is the cost burden to an insurance company when close to 100% of applications for life insurance have data errors. Even worse, what happens when many of these errors are undetected and the company is forced to pay out far more in insurance claims than it needs to. On the other hand, what is the burden (both cost and psychological) on its customers when they fail to receive an appropriate benefit because they made a mistake filling out a form. Even further, what is the burden to the company of lost business when the customer decides to renew with a different company because of their bad experience. There may even be potential customers who go elsewhere because they find the form too burdensome to fill out.

We can ask similar questions with regard to taxation return forms. How many people fail to pay the correct tax because forms are poorly designed? What is the cost to organisations such as the IRS, Australian Taxation Office and similar organisations in other countries when attempting to locate and correct such errors?

Many people would not consider these issues to be catastrophic, but if it costs up to \$10 million just to correct errors on a single form in a small population country such as Australia, what is the global impact of error-prone forms. And in case you're thinking that these are just isolated incidents, my experience with public-use forms has been that without proper testing and appropriate consideration of all the human issues, the majority have error rates of between 80% and 100% with one or more errors in the data collected.

Forms problems may not be as critical as a nuclear or gas explosion, but we need to think about paper-based organisations where operations are based on data collected. Even manufacturing plants often depend on accurate data collection. I've seen situations in the printing industry where forms have been incorrectly printed because of bad data on specification forms and have had to be reprinted. The most serious issue is that management generally doesn't even know the errors are occurring. They aren't mindful of the problems or the solutions—one of the major problems of the Longford explosion.

Now back to Longford

Much of the background information in this paper comes from the two books^{1,2} by Andrew Hopkins that deal with the disaster and from the findings of the Royal Commission. All I want to give here is a very brief outline of the series of events. Readers who are interested in a more detailed explanation should read the above publications.

Andrew Hopkins described what happened:

The input to the Longford gas plant is a mixture of gas, light hydrocarbon liquids and water which is piped ashore from Bass Strait [the stretch of water between the Australian mainland and the island state of Tasmania]. The components of the mixture are separated in a complex process of heating, cooling and pressure changes. From time to time variations in the mixture coming ashore can cause what are called "process upsets", that is disturbances in normal operating conditions. The morning of the accident, a severe process upset caused an automatic shutdown of the circulation of "lean" oil which warmed the plant. Operators did not manage to restart the circulation for some hours. This caused a 14-tonne metal heat exchanger to become extremely cold – about 50 degrees [Celsius] below zero.

The operators and their supervisors then made a critical error – they decided to reintroduce the warm oil into the heat exchanger after it had become super cold. A cold glass is likely to shatter if boiling water is poured into it; metal which has been chilled to a low enough temperature becomes brittle and can be expected to fracture in much the same way, if suddenly warmed. This is exactly what happened on the day of the accident – the cold, brittle metal fractured in a catastrophic way, allowing vast quantities of gas and volatile liquid to escape, find an ignition point and catch fire. The company claimed that operators had been trained about the dangers of cold temperature embrittlement and should have known better. They should have allowed the heat exchanger to thaw out before they began to re-establish the warm liquid flow.

As a result of the explosion, two men were killed, eight others were injured seriously enough to be hospitalised and gas supplies to the city of Melbourne were cut for two weeks. The fireballs from a number of explosions could be seen 60 kilometres (37 miles) away and it took more than 2 days for the fires to be fully extinguished. Most of Melbourne's 3.2 million residents were affected in some way with many thousands of people laid off because their employers relied on gas. As an example, a Toyota manufacturing plant was shut down with 2,600 workers sent home. There were also many side effects. The following is from a report by Neil Bibby, president of the National Fire Protection Association⁴.

“Although necessary, the speed of the shutdown created major headaches for process industries that depend on gas. For example, a major glass producer's furnaces were closed down, leaving the glass to solidify inside them. Bakeries were forced to shut off their ovens in the middle of baking, and dairies came to a halt while milk was being processed.

The shutdown created a major logistical problem, as well. Maintenance contractors and about 4,000 volunteers from the Country Fire Authority and the State Emergency Service put in long hours visiting every home and business in Victoria to turn off gas meters. In some cases, old valves jammed or leaked, angering some residents, who were slapped with a \$500 fine if they refused to turn off their gas. Approximately 26 languages are spoken in Victoria, making it difficult for volunteers to explain to some people why they had to turn off their only means of cooking and heating.

Major industries were also affected, including Amcor, Australia's sole supplier of white paper; car manufacturers such as Ford and Toyota; bakeries; glassmakers and brewers; bottlers; brickmakers; and thousands of restaurants. Hospitals restricted surgery to emergency procedures, and hotels and restaurants, which had been gearing up for the Australian Football League's Grand Final match, one of the busiest weekends of the year, had to restrict hot water, air conditioning, and their menus. By the end of the shutdown, 100,000 or more people suffered from unpaid layoffs or forced leaves.

In addition to millions of dollars in losses to industry, the disaster has shaken the people of Victoria's confidence in the state's ability to provide a secure infrastructure that ensures employment and basic comforts, such as heat and hot water.”

A government Royal Commission blamed Esso (a subsidiary of Exxon), not the individual operators, and claimed that the accident could have been prevented. While there were many lessons to be learned for industrial safety, the most serious lessons were for management.

In the remainder of this paper I want to look at the lessons that Dr Hopkins discusses and consider their implications for office management in general and for forms management in particular.

Operator failure and faulty training

Operators at Longford did make mistakes, but was this their fault? The Commission said no. Esso claimed that the operators had been trained. This is true, so why didn't they know what to do? There were a number of root causes of the training failure.

- Number one was the use of a 'competency-based training' methodology. The operators were given written tests for which they were able to memorise answers. The results of these tests were used to determine job classification and pay level. So there was certainly an incentive to answer correctly. But giving a correct written answer is no indication of competency as shown below.
- It was possible for them to answer all the questions correctly but not understand the reason. The training did not test for understanding. So they knew what to do, but in the critical area of metal becoming very brittle at extremely cold temperature, they had no understanding of the danger.
- An operator who was nearly right in the answer was given coaching by the assessor. The person was asked if the answer was understood and if they said 'yes' they were passed. But this did not check whether they *really* understood, only if they *said* they understood. Given the pay increase incentive, this was no guarantee. If they said that they didn't understand there was the implication that the explanation given by the assessor was inadequate.

"According to one of the operators who gave evidence at the enquiry, it took 'gumption' to ask for a re-explanation." – LESSONS FROM LONGFORD, P18.

- One operator admitted that it was the 'normal practice' for operators to give answers that they didn't understand. The view is that it isn't generally required to get 100% of answers correct to pass an exam.

So what is the implication for business forms? Forms have three general types of 'operators'—designers, form fillers and form processors. The main problem lies with the designers who frequently receive inadequate training. They may attend courses or read books, but this is no guarantee that they know the subject matter. They may even pass a written examination but this is no guarantee that they *understand* the subject matter. For example, you could be asked about the importance of testing and give a technically correct answer. But if your answer is based on a belief that testing is about proofreading, fill-out space, or conducting focus groups, then your answer *would* be inappropriate.

As for the form fillers, they rarely receive training before filling out a form. Designers often think the person has been trained because they give them a long list of instructions, but research in this area shows that form fillers generally don't read instructions. Their training is very much 'hands on'. They learn as they go and if the form is poorly designed, this 'learning' is grossly misguided.

"An alternative approach would aim to provide an understanding of the fundamental scientific and engineering principles involved. Such an approach would give operators considerably more knowledge than was required for routine plant operations, but would make them better able to analyse and deal with non-routine occurrences... This alternative might be described as education rather than training." – LESSONS FROM LONGFORD, P19.

A competent forms analyst needs to understand a lot more than just basic technical issues. For example, it's easy to learn about how to select a Pantone color, but a knowledge of the psychological implications of using that color and human vision issues such as Daltonism and the way red light focuses behind the retina may have a significant bearing on useability. '*Understanding*' is an important part of the forms analyst's training.

I find it an appalling state of affairs that even those people trained in graphic design—the ones who often design forms—are rarely given training in human communication. They know all about the so

called ‘rules’ of layout—they know all about ‘grids’, ‘white space’ and a host of other technicalities—but they rarely know anything about how people think or how people approach the form-filling process.

While major newspapers reported that the major cause of the Longford Disaster was inadequate training, Andrew Hopkins raises two important issues that have direct relevance to form design.

“Although the Commission spoke of inadequate information and training as the ‘real causes’ we are entitled to ask: ‘Why was their training so inadequate?’ and ‘Why were the operators and their managers so ignorant of the dangers?’ As soon as we ask these questions, a host of other contributory factors comes into view. These factors are further back along the causal chain and, in this sense, more fundamental.” – LESSONS FROM LONGFORD, p21.

This is something I’ve spoken about many times over the years. Why do organisations pay such scant attention to training of forms analysts? Why does management fail to understand the problem? These questions will be answered in more detail in the following sections.

Failure to identify the hazards

Here is where we come to one of the major causes of poor training. Exxon, in a safety review⁶ stated that:

“To prevent the undesirable consequences of accidents, one must first identify the hazards which can lead to accidents. Once the hazards have been identified, a major stumbling block to loss or accident prevention has been overcome.”

The problem we face with business forms is that management doesn’t recognise that bad forms *are* a hazard. As I’ve said so many times in other places, people consider form design to be nothing but drawing lines and boxes, and adding words. We learn drawing in kindergarten, so form design is ‘kid stuff’. If people can’t fill out forms properly we say they are ‘functionally illiterate’, yet we fail to see that it’s the *designers* who are functionally illiterate since they haven’t learned to design forms to suit the required function.

At the beginning of this paper, I talked about the high error rates of many forms. In almost all organisations that I have worked with, management doesn’t even know about these errors, let alone the severe impact the errors have on their business.

Sadly, even many forms ‘professionals’ don’t want to break out of the bounds of their antiquated traditional approach to form design. They seem to be comfortable with the status quo and they don’t want to leave that comfort zone. On numerous occasions, after giving a lecture to forms people about modern design and testing methods that create successful forms, I’ve had people say to me that although they liked what was said, they’d never be able to use those methods in their organisation: *“because we’ve always done it another way”*.

Another of the hazards evident in the Longford situation was that engineering plants change over time. They grow and evolve. Esso recognised this in a statement to the Commission⁷:

“...changes potentially invalidate prior risk assessments and create new risks if not managed diligently”

This is one of the issues that is recognised by people experienced in forms useability testing. An organisation may conduct useability testing on a form and make the appropriate changes to resolve any issues, but forms also grow and evolve over time. Just because you’ve conducted one series of tests and made relevant changes, it doesn’t follow that the test results remain valid. In fact, those evolutionary changes may totally invalidate the effectiveness of previous changes.

Removal of specialists

One of the significant issues revealed in the Longford experience was the removal of engineering support from the plant and placing it in Head Office. The problems at Longford were too complex for operators and their supervisors to manage and there were no engineering staff on site on the day of the accident. Until 1991, engineers had been employed at Longford, knew the plant well and worked with the operators. The engineers were moved as a cost cutting exercise.

The Commission's report talked about the results of this action⁷:

“The change appears to have had a lasting impact on operational practices at the Longford plant. The physical isolation of engineers from the plant deprived operations personnel of engineering expertise and knowledge which previously they gained through interaction and involvement with engineers on site. Moreover the engineers themselves no longer gained an intimate knowledge of plant activities. The ability to telephone engineers if necessary, or to speak with them during site visits, did not provide the same opportunities for informal exchanges between the two groups, which are often the means of transfer of vital information.”

— REPORT OF THE LONGFORD ROYAL COMMISSION, PARA 13.81

Business forms are no exception to the need to keep specialists on site. Some organisations move all their specialist staff right out of the organisation, choosing instead to outsource the whole forms function to printing and graphic design companies and, in some cases, to specialist forms companies such as ours. It has been an alarming trend over the past decade and even before in some cases, and the results are now becoming evident. I'm finding that it's becoming increasingly difficult to discuss forms issues with clients because they don't have staff that understand them.

Some organisations that outsource their forms function keep a few trained staff on site to deal with the suppliers, but this appears to be rare. Even when they do, the staff on site are often not senior people and lack the knowledge of a trained Senior Forms Analyst. The Forms Analyst/Senior Forms Analyst relationship is akin to the Operator/Engineer relationship at Longford. With outsourcing, even to forms specialists, there can be a reluctance on the part of the supplier to share knowledge with the organisation's internal staff for fear that it will lead to loss of business.

Esso required any change such as this to require a risk assessment and evaluation. The Commission report⁷ stated that:

“such relocation was implemented without any such assessment ever taking place.” — REPORT OF THE LONGFORD ROYAL COMMISSION, PARA 13.82.

Forms management outsourcing should be no exception. If it is to be implemented, then there should be a risk assessment and full evaluation of all the issues, not just short-term financial gains.

Another common and related problem is the decentralising of the forms function with each section designing its own forms—usually with no specialist expertise on site. It's not that decentralising of the design is the problem, but the decentralising of the responsibility. One excellent example of effective decentralisation is Boeing. The company's forms specialists are scattered around the country, but all work under a central control and to the same standards.

Ignoring alarms

Whenever something went wrong in the Longford plant, an alarm would sound. In the case of one incident Esso investigators found that there were an average of 12 alarms every minute during a 12-hour shift. With so many alarms going off, they were ignored.

“[operators] were very conscious of the fact that variations in operating conditions might affect the quality of the gas produced, causing it to go ‘off spec’, that is, to be no longer in accordance with the customer’s specification. In short, they understood that process upsets had potential commercial consequences. But they were not aware that process upsets could affect the safety of the plant. It is important to bear this in mind in the following discussion of alarms.

For various reasons it was difficult for operators to maintain the process within the specified limits and the result was that there were frequent alarms. Ironically, it was easier at times to maintain the quality of the outgoing gas by allowing processing to occur outside the specified limits, that is, with some part of the system in alarm. Operators quickly cancelled the audible alarm but the visual alarm lights were less obtrusive and easier to live with.” – LESSONS FROM LONGFORD, P40.

I appreciate that form designers don’t work with alarms the way gas producers do, but there are similar underlying principles at stake. The alarms for bad forms occur where the form data is being processed. This is the area in most organisations where the alarms are ignored. Most poorly designed forms send up warning signals, many of which are known to processing staff but often not passed on.

One of the worst examples I came across was an insurance company that **knew** they had problems with data on insurance application forms. They had drawn detailed flowcharts of the whole system which included average times for each step of the process. They even had a 20-minute step built in to return every form to the applicant for more information. Yet in spite of knowing this, there were still many errors. The forms were batched for data entry. If a form in a batch was in error, the whole batch was rejected. Data entry operators didn’t like having to re-key the batch and in time learned what caused the errors and how to alter the data being keyed to get the batches accepted. Up to the point when we talked to the operators, management had never been told of the problem. The alarm was there, but turned off.

In some cases, operators may develop their own forms to bypass problems. The very first job I had in forms analysis was to study the usage of a form filled out in triplicate every time goods were received from overseas. It took a clerk, working at the inwards dock, an average of 4 hours per day to fill out the forms, file the original copies locally and send the duplicates and triplicates to other departments. When finished, **all three** copies were stored in the archives, known locally as ‘the dungeon’. I found over 20 years supply of forms all in lever-arch binders. Yet none of these forms were ever referred to after their initial filling out. After some digging, I found that many years before there had been a problem and someone invented a form to circumvent it—the problem, for some now unknown reason, had long since gone away, but the form remained.

There are three common ways to hear these alarms.

- 1) Have a system in place to get feedback from form processors and help desk staff.
- 2) Before any redesign, and especially major redesign, conduct an error analysis of already completed forms.
- 3) During any design or redesign process, conduct useability testing.

The people who process forms and help users fill out forms are the ideal ones to gather information about problems. This should not be the only source of information, but it is where the major alarms will sound. The latter two items are covered at length in my book *Forms For People: designing forms that people can use*, so I won’t go into the subjects at length here (the book is available from BFMA). It’s sufficient to say that with effective useability testing and error analysis, you should be able to greatly reduce form-filler errors. Research has shown that public-use forms typically have 80% or more forms with one or more errors. We generally find that, with rare exceptions, this can be reduced to 10% or less, often with only trivial errors that don’t affect processing.

Informal work practices

The Longford operators, while ignoring alarms, developed a set of informal work practices. The situation in the Esso plant was no different to what happens in many organisations. Workers modify their procedures to achieve goals that are different to what management intends. I've been working in the systems field for close on forty years and this was one of the things I learned early in my career. I recall one of the first instructions I was given when I started in systems work: *"if you want to know what really happens, talk to the operators, not the supervisors."* This has proved to be true on so many occasions and is one of the first things I teach forms analysts about how to gather information.

While Esso had a manual for the operators;

"It was repetitive, circular, and contained unnecessary cross-referencing. Much of its language was impenetrable. These characteristics made the system difficult to comprehend by management and by operations personnel." – REPORT OF THE LONGFORD ROYAL COMMISSION, PARA 13.39

During the subsequent trial in the Supreme Court, counsel for the prosecution made this statement:²

"What this case highlights is that one cannot discharge one's duty by creating a monumental paper structure and then not implementing it."

Of course, the problem would be overcome to a large extent if organisations had an effective procedures analysis and management system, enabling procedure manuals to be kept up to date and easy to use. My book on procedure writing, *Practical Playscript* (available from BFMA), shows how to write simple procedures that can be easily followed.

Insufficient specialist staff

Andrew Hopkins refers to a number of specialist studies (including the Three Mile Island nuclear accident) which show that at critical times experts are needed on the front line. These people aren't needed all the time so are often seen as redundant. It's when a crisis occurs that they swing into action. As Hopkins says:

"This is one of the features of these organisations which makes them so reliable — and safe." – LESSONS FROM LONGFORD, P49.

Forms management is no different in this regard. There may be times when an organisation has more systems specialists than it really needs to get the day to day work done, but when a systems crisis occurs, these people can then step in to solve it. Downsizing has been a modern management fad that has resulted in much inefficiency with very little to show for it. Ironically, while management downsizes forms units to reduce costs, they invariably increase costs elsewhere due to the excessive processing of forms with errors and the input of bad data.

An extension of the problem is the common process of outsourcing, a practice that I have rarely seen working effectively when it comes to forms. This invariably results in a lack of expertise to handle the problems as they arise.

Communication failure

Communication in Esso's Longford plant was typical of the problems found in many organisations. Problems were not passed up to the right person and critical information was unrecognised, ignored or buried until something occurred to resurrect it. In the case of the gas explosion, process upsets were dealt with if they were likely to affect profit, but the more serious issues were ignored.

This happens with forms in many organisations. When there's a problem, it is rarely given to someone with the authority to deal with the root cause. I was asked on one occasion to advise one of our state transport departments on form design. I was shown a copy of the form used for registering vehicles. It was an incredibly complex form with a check box for every possible type of vehicle, trailer or other motorised conveyance. It had almost a whole page of little check boxes, many of which had confusing captions. When I went to the main processing office, the staff told me that the form was excellent and they didn't know why anyone needed to look at it. When I asked if anyone ever made a mistake they told me that *every* form was wrongly filled out, "*but that's OK, we know how to correct the errors*". In another state, the application for a driver's licence was so bad that it was virtually impossible for anyone to fill it out correctly. So instead of getting people to fill out their application and bring it to the counter, forms were removed from the public area and everyone had to go to the counter and have one of the staff fill it out for them. I stood behind the counter for some time watching this process and was amazed at what I saw. People still didn't understand the questions, even when the counter staff explained them, and staff frequently wrote down wrong information.

Even when a problem is passed up the line, it's frequently ignored or treated as unimportant. Some years ago, I was consulting to a forms printing company that was having great trouble getting the order forms from Sales to include accurate information. It was obvious from the outset that the major problem was the form itself. It was extremely difficult to follow with the result that most sales people made mistakes. When I explained the problem to the CEO his response was that if his sales staff couldn't fill out the form correctly, then he'd replace the staff. So much for forms improvement—and in this case, at one of Australia's leading forms printers.

Not so long ago, I was advising an organisation about its form design needs and was told by one of their staff that their forms were in good shape and they were happy with them. They'd conducted a study of some of their major forms and tabulated the errors per question in a spreadsheet. Their own analysis showed that some forms had a 100% error rate—a far from satisfactory figure. I pointed out that I wouldn't have accepted even a 10% error rate as satisfactory.

Organisations need to have procedures in place to detect the warning signs of forms trouble, followed by ways to deal with them. Management needs to specify the type of information that needs to be communicated and then make sure that there are people on staff who know how to deal with it. When I worked for Ampol Petroleum in its Systems Development Department we received regular reports from around the country about forms problems. In fact, we encouraged people to let us know about problems. Invariably, these turned out to be systems and communication issues that we were able to analyse. In this case, many system problems were showing up as forms processing issues.

If a forms management unit is functioning effectively, people will report problems and you'll be able to deal with them. You need to realise that some people are afraid to report problems for fear of reprisals, so there needs to be a way to encourage them. Once you get a report of a problem (or even a perceived problem), make sure you report back to the person, even if the answer is that you aren't able to do anything at this stage (with the reason why). Let people know that you take their reports seriously.

Corporate culture

Another major problem at Longford was Esso's corporate culture.

"The Royal Commission effectively found that management at Esso had not demonstrated an uncompromising commitment to identify and control every hazard at Longford. In short, if culture is the key to safety, then the root cause of the Longford accident was a deficiency in the safety culture of management." — LESSONS FROM LONGFORD, P76.

What is your corporate culture when it comes to forms? If you're to have lasting success, your forms program need the active support of their chief executive. Management needs to make a commitment to getting forms right. The following are two extracts from a *Statement of Expectations* in October 2005 from the Australian Government's Minister for Human Services, Mr Joe Hockey, to the CEO of Centrelink, one of the Department's major agencies.

Improving forms and letters

Centrelink should strengthen its focus on improving communication with customers. We need to increase confidence in Centrelink by ensuring that we send out consistent and clear messages to customers. I will continue to take a high level of interest in improvements you make to letters and forms to make them easier to understand and use for customers. Substantial progress is required in this area and I expect you to give it high priority and be able to report regularly on progress achieved.

In 2004-05, the percentage of customers rating the ease of completing Centrelink's forms as 'good' or 'very good' was 58%. I expect you to significantly increase customers' ease of providing necessary information to Centrelink."

...

Culture

Centrelink has a duty of care to its customers and its staff. It requires robust systems to ensure the integrity of application of policy. Centrelink's culture must be responsive to the needs of citizens and stakeholders, not a culture that is unduly defensive and process orientated. The organisation should be willing to question itself and its performance on an ongoing basis. As part of this you should fully explore whether any criticisms and customer concerns are valid and, if so, take appropriate corrective action.

I expect to see high level internal reviews to make sure that Centrelink is achieving the outcomes expected of it by government, visibly followed up to provide confidence to the public and the Government that policy is being properly and fairly administered. Staff need to be willing to identify and accept management of issues beyond their immediate responsibilities so that matters are resolved quickly and customers get seamless service.

The challenge for executive management is to recognise potential weaknesses and ensure that arrangements for monitoring, assessment, reporting and review are sensitive to the actual operating environment. In particular, the arrangements should provide for adequate and early feedback to enable corrective action by management, and there should be clear triggers for oversight and involvement at executive level. This requires the identification of problems and acknowledgement of those problems by senior management.

This is the type of commitment needed by all organisations from their CEO.

Ineffective auditing

Auditing at Longford had failed to uncover any significant problems and only provided good news. As the auditing of plants such as Longford is a complex issue and details can be found in the report of the Commission and other publications. However, it does raise issues of concern for business forms.

One of the common 'audit' processes for Government forms in Australia is to conduct market research surveys, generally using focus groups. This approach is grossly misleading. It can be seen as politically unsound to find negative results, so these reports typically only find forms to be well accepted. One particular example was a very high volume public-use form that was attacked by users around the country for its complexity and poor design. People just didn't know what to do with it and often had to ask for professional accountant advice to complete it. Some of the Department's counter staff told me

how the form was so bad that they often had to help users fill it out. Whenever I had a public audience I'd ask how people found the form to fill out and the answers were all negative. Now I realise that researchers generally won't accept such anecdotal comments as evidence, but I never received even *one* positive comment. In talking to the Department's people responsible for the form, I was told that it had undergone 'market testing' and was found to have a high degree of acceptance. This statement didn't reflect consistent public comment. This is only one example, but it can be repeated many times over.

Forms auditing has to be done with an open mind and a willingness to accept criticism. The earlier statement by Mr Joe Hockey is a good example of the willingness to accept the truth.

Conclusion—the need for mindfulness

In summarising the impact of the disaster on major hazard facilities, James Nicol⁵ had this to say:

“The Longford disaster highlighted how a combination of ineffective management procedures, staffing oversights, communication problems, inadequate hazard management and training shortfalls combined to result in a major plant upset with consequential tragic loss of life.

These elements are not unique to the oil and gas industry...

If we look for a common generic answer for the concerns identified by this investigation, it would be collective mindfulness, the idea that no system can guarantee safety once and for all.

Industry and its engineering and safety professionals could have learnt a great deal more from the Longford tragedy.

Unless we learn these lessons and apply them professionally and with sensitivity, the possibility of a second Longford will always be with us.”

We could make similar comments about the state of business forms in most organisations. In my public lectures and publications, I've been saying for nearly thirty years that the biggest problem we have with forms is a lack of awareness of the real issues on the part of management. But the Longford experience shows us that it goes even further. There is a need for *collective mindfulness* on the part of people at all levels when it comes to the issues concerning human communication and business forms in particular.

Organisations need to be aware of the need for adequate staff, effective reporting, identification of data errors and processing problems, and the extreme dangers of handing responsibility to people who are untrained and unskilled in such a specialised area. There has to be a willingness to learn from the mistakes of others and to apply sound forms management principles. Without these changes, we will continue to process bad data and incur a monstrous cost burden for the organisation and its users.

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