

Our Process Safety Story



We take safety seriously

Safety is top of mind in everything we do at Contact Energy and is critical to the ongoing sustainable operation of our business.

Done well, it creates value. It helps us to perform reliably, is a reflection of business quality, makes us a strong employer brand, enables an engaged workforce culture, and has a positive effect on our bottom line.

What process safety means for us

For us, process safety is about 'keeping the hazards inside the equipment' – electricity in the wires, steam or gas in the pipes, and water behind the dam – so we do no harm to our people, plant and the environment. In a nutshell it's about making sure we leave nothing to chance.

But having good measures, systems, procedures and policies in place to help us proactively manage the risks that our major hazards represent is just one side of it. At its heart process safety is about engagement and creating a culture that empowers people to play a meaningful role in identifying potential safety problems and coming up with ways to solve them.

**AT ITS HEART
PROCESS
SAFETY
IS ABOUT
ENGAGEMENT**

Our goal at Contact is to have a generative safety culture, where safety is part of our DNA and where we provide a safe environment for our people to learn.

If something does go wrong, instead of demanding answers to why it went wrong, we ask: Where are our defences weak? What can we learn? How can we improve? And, how can we build the capacity to fail safely?

Where our process safety journey started

Back in 2013, we were concerned about the number of process safety events happening globally.

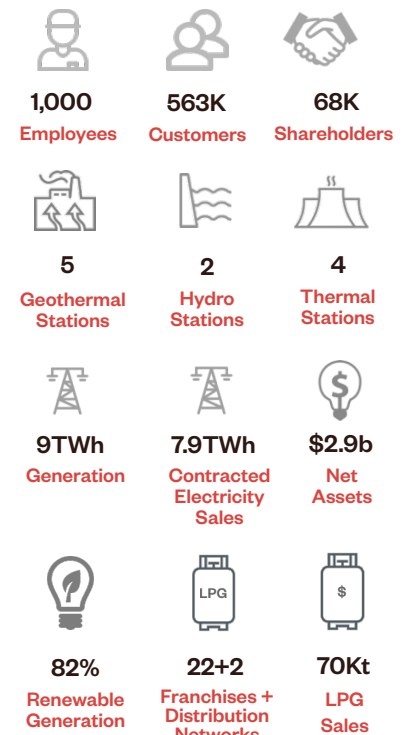
While our industry has an excellent record in occupational safety, the increase in significant asset failures worldwide is a lagging indicator for deteriorating process safety.

There were other drivers as well, including evolving international awareness of, and guidance around process safety, legislative changes and stronger business imperatives.

We looked at what others were doing and gathered insight into innovative approaches to process safety and what global good practice looked like. We also attended international events, reviewed our regulatory/industry guidance, and carried out benchmarking.

Who is Contact Energy?

Contact Energy is one of New Zealand's largest companies. Our generation portfolio includes geothermal, thermal, hydro and gas storage. We supply electricity, natural gas and LPG to customers across New Zealand. We're always looking for ways to improve the service and choices we give our customers, the performance of our assets and the engagement of our people.



All figures as at June 30 2016

How we went about improving process safety

Rather than reinventing the wheel, we took the approach of building on our existing process safety improvement activities and on the learning and knowledge of others.

We took a look in our own backyard and asked ourselves: Are we doing enough? Are we focused on the right things? Do we have the balance right between what we're doing in occupational safety and in process safety? Do we have the right culture? And, how's our process safety incident record?

We also teamed up with global process safety experts, Lockheed Martin and worked with them to assess our process safety systems. Their approach was focused on helping us answer these three important process safety questions:

1. Do we understand what can go wrong?
2. Do we know what our systems are for preventing this?
3. Do we have information to assure us our systems are working effectively?

Creating common understanding

We wanted to develop common understanding, across the organisation, of what was needed to ensure the integrity of our operations.

We used a Process Safety Management Framework, developed by the Energy Institute (EI)¹, as the basis for developing our own framework. We chose the EI framework because it was created in partnership with the industry, captures industry good practice, helps organisations answer the first two process safety questions with confidence and provides a baseline from which to assess how good an organisation's defences are.

Contact Process Safety Management Framework

PLANT	PROCESS			PEOPLE	RECOVERY	
Technical Risk Management Management of Change Plant Status Review / Technical Risk Register Strategic Spares Engineering Standards Technical Knowledge Management Design Review Asset Investment Civil Asset Inspections Pressure System Safety	Safety Critical Systems Critical Systems Emergency Supplies Fire Systems HV Electrical Systems Main Protection Systems Environmental Systems	Alarm & Instrument Management Process Control Critical Instrumentation Protective Systems / Devices Alarm Systems Operational Technology Security	Maintenance Management Work Prioritisation / Planning / Scheduling Work Identification / Routine Plant Inspections Work Execution Personal Risk Assessment	Operations Management Start Up / Shut Down Procedures Routine Plant Checks Routine Testing Shift Log / Handover Safety Rules & Personal Risk Assessment Operating Limits / Envelopes Operational Risk Assessment Third Party Activities	Staff Competence Competency Assurance Leadership Training Needs Analysis Communications Staff Knowledge Management Contractor Competency	Emergency Preparedness Emergency Planning, Arrangements, & Equipment Crisis Management Environmental Protection Systems
Operations & Compliance Audit	External Audit	Integrated Internal Audit	Incident Reporting, Investigation & Action Tracking	Controlled Documents (Policies, Procedures, Standards)		

Assessing our defences

With our Process Safety Management Framework in place we knew where our defences needed to be strongest. So, we kicked off a process safety 'health check' to measure how well we were doing with process safety.

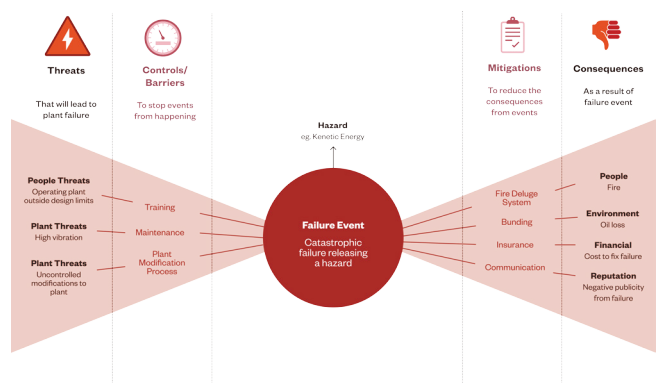
¹ Energy Institute, High Level Framework for Process Safety Management (PSM)

This included:

- * **a gap analysis** to assess our process safety management culture, leadership and processes against industry good practice and guidelines, and to identify our process safety gaps. This involved an assessment, OECD and staff process safety culture surveys, and an operational integrity analysis. From there we were able to work through the business benefits associated with different options that would close our process safety gaps along with associated timescales and resource demands.
- * **a hazard risk analysis** to formally identify our Major Accident Hazards (MAHs), the control and mitigation barriers we use to manage them, and to establish whether our MAHs were adequately controlled. This involved the identification of MAHs, threats, barriers and barrier performance indicators (PSPIs). Through site workshops, the hazard analysis identified over 200 MAHs, which were consolidated to 87 for detailed assessment.

Visualising our Major Accident Hazards

We used Bowtie diagrams to visualise and assess our MAHs. We use them because they're a simple and graphical way to show the links between the potential causes/threats, preventative and mitigated controls/barriers and consequences of a major accident. They help us demonstrate how our major risks are controlled.



Prioritising what needed to be done

We prioritised what needed to be done using weighted criteria which included priority/benefit, workforce challenges, change impact, flow-on work, resource needed and cost.

Presenting the case for change

In 2014, we developed the business case, which brought together a number of parallel activities including the simplification of our HSE Management System, process safety improvements and asset integrity work. It also included the prioritised recommendations from the gap analysis.

The business benefits were compelling. In addition to having a demonstrably safer operation, with a reduction in operation and maintenance costs, we were also expecting improved engagement, portfolio risk, plant availability, business efficiency and insurance cost management.

Bringing it together

Knowing what needed to be done, and with our Process Safety Management Framework in place, it was time to pull everything together and decide how to bring process safety to life for people.

We knew that improving, sustaining and in some cases replacing our safety critical processes and systems for the future meant some big changes, so we looked to some fundamental principles of change to focus our approach:

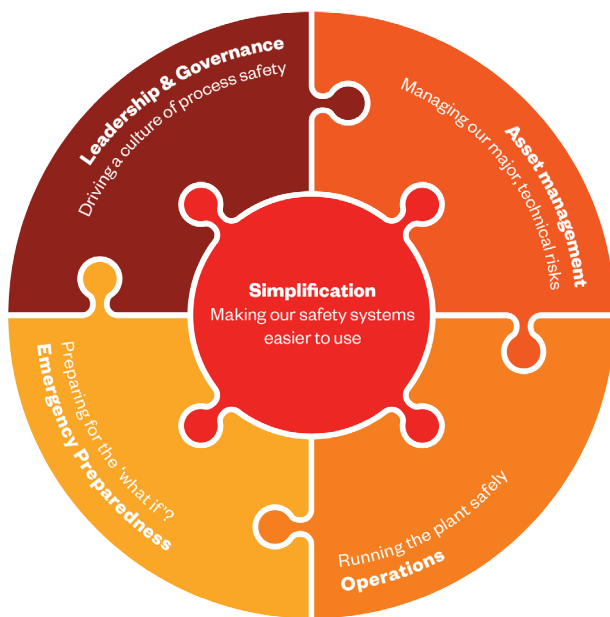
We knew that successful change:

1. has to be supported
2. should happen within people, not to people
3. needs to be integrated into everyday business
4. needs effective communication
5. must have full executive and management commitment
6. needs the right focus and culture
7. has to be supported by good measurement.

1. Change has to be supported

We integrated our process safety, HSE simplification and asset integrity initiatives into a single programme called OSIP (Operational Safety Improvement Programme). The programme was designed to support the business with getting our safety initiatives happening much faster. The programme takes a change management approach to ensure alignment with our aspiration of progressing to a generative safety culture.

The programme consists of 20 projects, managed under four focus areas and nine workstreams based on the high level risk control areas from our Process Safety Management Framework. Its scope involves changes to business processes, the use and integration of new technology and the development of capability, skills and competency.



OSIP's focus areas underpinned by a strong focus on simplification

Making it meaningful

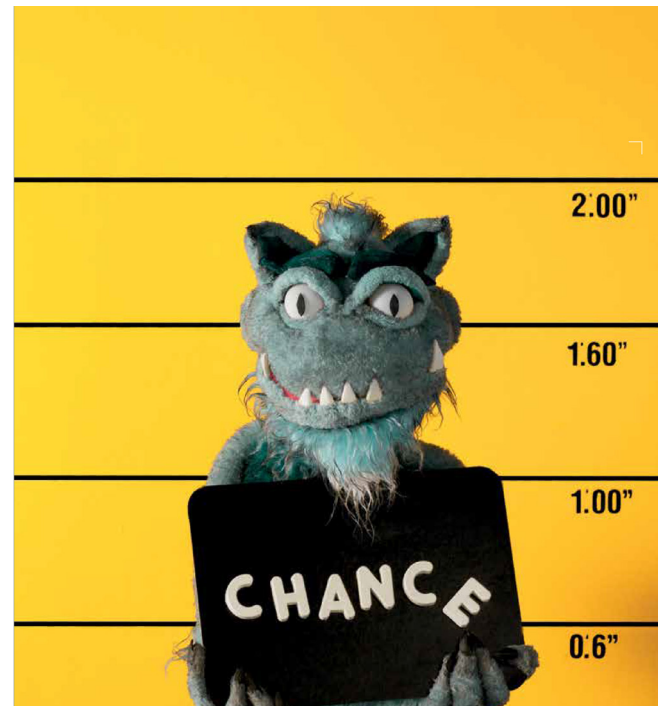
Although the business benefits of process safety were compelling, we needed to make it meaningful for people. It had to be engaging if we wanted it to remain top of mind for people. We did this in three ways:

1. We talked about outcomes, rather than outputs to the extent that we gave the project a name that summed up, for us, what process safety is all about, which is keeping Contact:

'Safe to Run'

Safe to Run represents a fundamental shift in thinking and has helped us position process safety as a way of thinking. We now have people asking if we're safe to run; whereas in the past they'd want to know what was stopping them from restarting the plant.

2. We brought to life the idea of leaving nothing to chance by creating a character of the same name. Chance represents the 'gremlin in the system', the stuff we can't always see, but left unchecked, can cause havoc. We use him to remind people that process safety needs our constant attention. In everything we do, we challenge people to give Chance, no chance.



3. We helped people see where they make a real difference.

We engaged our people on the importance of always having a heightened sense of awareness of safety and of communicating effectively, particularly when involved in hazardous operations. We emphasised the important role they play in developing our process safety culture by ensuring they have the competencies they need to do the job, with a focus on skills which are safety critical. We encouraged our people to understand the processes, procedures and instructions that apply to the activities they carry out and to question anything that didn't seem right or was hard to follow; including reporting any item of equipment that was difficult to operate, maintain, inspect or test. We also communicated that reporting incidents is important because it's one of the ways we learn and improve.

2. Change should happen within people, not to people

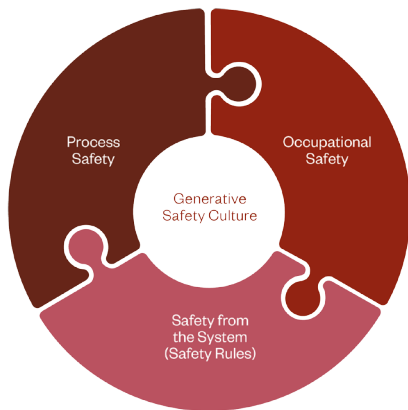
Process safety is more than simply having good measures, systems, procedures and policies in place to manage the risks that our major hazards represent. As we touched on earlier, at its heart is engagement – getting the right people involved at the right time, gaining their buy-in, creating the right culture, and having the people who use the processes involved in designing and implementing the improvements.

So, it was important that we had engaged people from awareness of the need to improve, right through to designing and measuring the improvements. We wanted everyone sharing their knowledge and ideas. We achieved this by:

- * using our collective intelligence and enabling as many people as possible to be part of the improvements
- * identifying 100+ subject matter experts from across the business to lead the workstreams and projects and provide guidance through steering committees
- * trusting our people to come up with solutions.

3. Change needs to be integrated into everyday business

To be successful we knew we needed to take an integrated approach to how we viewed safety across Contact. We did this by positioning safety as ‘how we do business round here’ and applying process safety together with other safety processes as part of overall operational safety, and underpinning this with a generative safety culture.



4. Change needs effective communication

It was important to set the scene for the continuous improvement journey ahead of us. We wanted to be clear about what OSIP and Safe to Run were all about and why we were focusing on process

safety. We supported the launch with a video and a number of key foundational resources:



As the programme progresses we look for simple and creative ways to drive engagement and help our leaders explain the ‘why’, like in this video below where Charley Beagle, one of our Asset Managers from Wairakei, talks about why our new Maintenance Management process is so important.



We talk about ‘smashing complexity’ a lot at Contact, and communicating things simply is central to this. We use simple, visual communications to help people understand what the big picture looks like, before diving into the technical detail; an approach that helps provide context and drives good healthy discussion.

We're making Maintenance Management simpler & safer

Alongside our safe EMAs, we've spent the past year following site processes used to carry out maintenance. We now have a good understanding of what's working and what can be improved. One of the things we found is that processes weren't being applied consistently. This is important to us because consistency improves maintenance effectiveness and helps us prevent major incidents. To help with consistency, and make business practices more efficient, we've simplified the Maintenance Management Process.

Work Clearance

Work Clearance and Planning for permits helps us identify how we keep people safe when they're carrying out their work on the site. Operations, Maintenance and Engineering will work together to make it happen.

Work Identification → **Work Planning** → **Work Scheduling** → **Work Execution** → **Work Closeout**

- Work Identification:** Take the time every time we identify defects, repair, maintenance and work requests.
 - WH01 Anyone who comes into contact with work needs to be aware.
- Work Planning:** Once the work has been identified we work through the scope of work, make sure it's safe and work on it.
 - WH02 Maintenance Planning and Engineering, Operations collaborate.
- Work Scheduling:** We then schedule all work ensuring that the correct resources and tools are available so that the work can be carried out in a safe and timely manner.
 - WH03 Work is scheduled once it's been identified by the Asset and Operations Managers and Engineering.
- Work Execution:** Once resources and with appropriate permits we carry out the work in a safe and timely manner.
 - WH04 The Maintenance Team or Contractors perform the work.
- Work Closeout:** Before the work can be signed off, we ensure it's accurate that the people doing it record what was done, what was done, and ensure the site after the work was completed.
 - WH05 The Maintenance Engineering or Operations Team close out the work.

What this means for you...

From 15 June the Maintenance Management Process will be different. To help you get to grips with what's changing your Managers and MMUG representatives will take you through the changes in Team Briefs. In the meantime, take a look at the new process and have a chat to your site MMUG member if you've got any questions. These changes are another important step in helping keep Contact Safe to Run and that's our overriding priority.

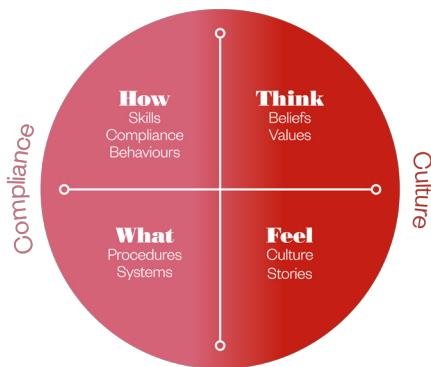
5. Change must have full executive and management commitment

We engaged our leadership team early through a series of briefings and presentations. We also brought our operations leaders together to talk about how, as a team, we'd generate success. Our CE, Dennis Barnes appears in communications to reinforce the importance of the work we're doing, and we've established a leader development programme¹ to support leaders in empowering their teams to drive the change.



6. Change needs the right culture and focus

When we set up OSIP, Contact was already well underway with developing an underlying safety culture that supported people to try new things and to build the capacity to fail safely. It was important to build on this to create a strong culture around process safety.



Balancing compliance with culture

We did this in the programme by agreeing some principles to guide the work we were doing:

- * **We aim for perfection – but are practical about it.** This is about the importance of making small, incremental steps where we can and not waiting until we have everything absolutely perfect.
- * **We balance compliance with culture.** This is based on the Integral Model² (above) which emphasises the importance of considering cultural aspects, such as how people 'think' and 'feel' rather than just the 'how' and 'what' of compliance.

¹ Leader development programme, Acumen Global Partners – helping organisations implement strategy through building leadership capability

² Diagram adapted from Ken Wilber, Bob Anderson, Eric Klein and Jim Stuart

7. Change has to be supported by good measurement

Although we were confident that the programme would help us answer the first two process safety questions...

1. Do we understand what can go wrong?
2. Do we know what our systems are for preventing this?

...we weren't able to answer the third question with any confidence:

3. Do we have information to assure us our systems are working effectively?

This was because we didn't have a clear view of how all of our assets were performing. So, in parallel with our other process safety initiatives, we developed a process safety dashboard which gives us visibility of the health and strength of the barriers/controls we have in place to keep us safe from major hazards.

It's made up of a comprehensive set of leading and lagging process safety performance indicators, each linked to a risk control area.

Leading indicators measure the effectiveness of the barriers we've got in place to prevent incidents (eg maintenance plans). Each leading indicator has a defined target, a tolerance band, and information on good practice.

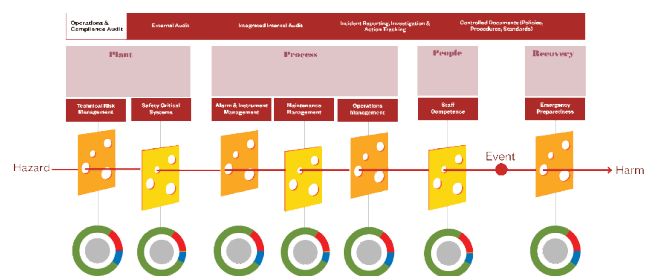
Lagging indicators measure actual process safety incidents and are categorised by severity of safety incident.



We use the Swiss Cheese model³ as a way to illustrate what can happen when failures or deficiencies in the risk controls coincide (as shown by the line in the diagram below from hazard to harm).



By placing the model between our Process Safety Management Framework and the dashboard we can see the importance of having the right information (dashboard) to ensure our risk controls (Process Safety Management Framework) are well managed.



³ Swiss Cheese Model, James Reason, 1990

What we've learned so far

We've learned lots on our journey towards improving our process safety. Most importantly that it isn't just about having processes and procedures in place. Here are some of the key themes that emerged for us:

It starts from the top

Process safety needs to be of corporate importance. Executive and management buy-in and involvement is key.

It's about people

While processes and procedures are important, it's people that make the real difference. It was important to us that our people were part of the improvement and that we supported leaders in empowering our people to drive the change.

At its heart is engagement

From getting buy-in, to getting design input, implementing change relies on good engagement. That's why we made sure people knew where we were headed and why, and where they made the real difference. Through the programme we've created a culture that encourages engagement and where people feel valued.

It has to be integrated

Process safety can't be a bolt-on. It has to be integrated with other safety disciplines. In our case the programme aligned with our aspiration of progressing to a generative safety culture.

Make it simple

Processes and procedures need to be simple to use and easy to find. We've found that simple language and catchy metaphors go a long way towards helping people understand why they do what they do every day. Simplifying entire processes down to a single page has helped lift people above the technical detail, and provided an opportunity for good healthy discussion, and decluttering has helped support our people better manage risk.

"CONTINUOUS
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Visualise it for people

Bowtie diagrams have been a great way to help explain our risks because they visualise them in a single, easy to understand picture.

Shaped like a bow tie, the diagram shows a clear differentiation between proactive and reactive risk management. The power of the Bowtie method is that it provides an overview of multiple plausible scenarios. In short, it provides a simple, visual explanation of a risk that would be much more difficult to explain otherwise.

Don't wait 'til it's perfect

As Mark Twain once said 'continuous improvement is better than delayed perfection', and it's a principle that's been core to the success of our programme, where we aim for perfection, but are practical about it. We've found the approach of our people designing, developing and testing new processes, and then refining them, is better than waiting until we've got everything 100% right.

You need the right information

Having the right information is vital. We started with a 'health check' so we could review the effectiveness of our process safety approach in demonstrating our MAH management performance. And, we implemented a process safety dashboard as a priority knowing that you 'can't fix what you can't see'. Without the right information we wouldn't have been able to prioritise our initiatives or know how well our systems were working.

Where to next for us

Process safety has been a catalyst for broader improvements across a number of areas including culture, leadership, breaking down silos, realising process efficiencies, developing new ways of working and transitioning into a culture of 'continuous improvement'.

Looking for help to accelerate your process safety journey?

Contact[®]

If you're looking to accelerate your process safety journey, we're here to help. Through our experience we can help you lead process safety transformation efficiently, provide expertise and guidance, provide transferrable processes and models, help you identify your approach to engagement and advise on technology to support sustainability.

Drop us an email, we'd love to hear from you: andy.sibley@contactenergy.co.nz