

Process Safety
Our Story

Contact®



Contact Energy is one of New Zealand's largest companies. Our generation portfolio includes geothermal, thermal, hydro and gas storage and we supply electricity, natural gas and LPG to customers across New Zealand.



1,000
Employees



553k
Customers



68k
Shareholders



5
Geothermal
Stations



2
Hydro
Stations



4
Thermal
Stations



9TWh
Generation



7.9TWh
Contracted
Electricity Sales



\$2.9b*
Net Assets



82%
Renewable
Generation



22+2
Franchises &
Distribution
Networks

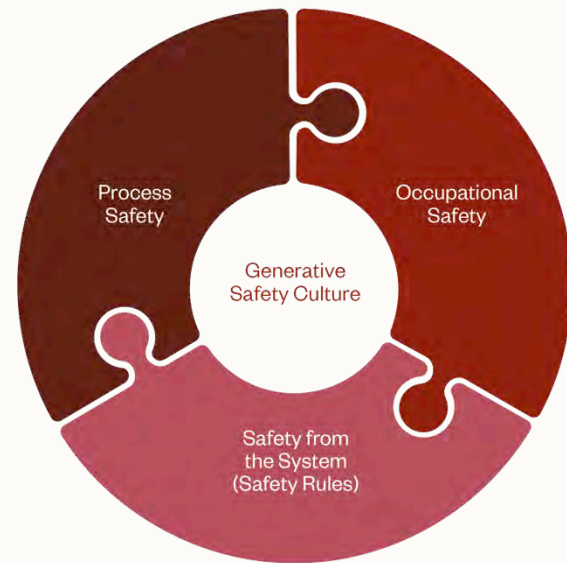


70Kt*
LPG Sales

* As at 30 June 2016

Safety involves 3 key elements

All three need to be in place if we are to fully support our generative safety culture.



An integrated HSE Management system

What we mean by Process Safety



or

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.

Our process safety journey... getting started





We were concerned about the number of Process Safety events happening globally

Our industry now has an excellent record in occupational safety but we are seeing an increase in significant asset failures which is a lagging indicator for deteriorating Process Safety.

Figure 1

Chart showing Contact's improved occupational safety performance with fewer people being hurt. Total Recordable Injury Frequency Rate (TRIFR)

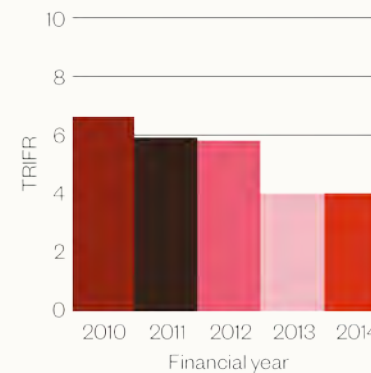
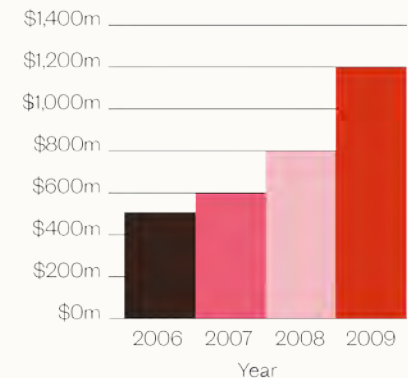


Figure 2

Chart showing increasing worldwide incidence of asset failure related major insurance claims – a lagging indicator for worsening process safety performance





In 2013 we decided to review our own Process Safety practices

Rather than reinventing the wheel, we took the approach of building on the learning and knowledge of others. We also wanted to build on our existing improvement activities which had been set up to address specific issues.



We took a look in our own backyard and asked...

Are we doing
enough?

Are we
focused on the
right things?

Do we have
the right
culture?

Are we too focused on
Occupational Safety at
the expense of
Process Safety?

How's our Process
Safety Incident
record?



Our approach was focused on helping us answer these 3 simple Process Safety questions:

①

Do we understand what can go wrong?

②

Do we know what our systems are to prevent this happening?

③

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



We needed to frame up our approach so we developed our Process Safety Management framework with help from global experts

Contact Process Safety Management Framework

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



By thinking in these terms we made sure we were putting the right mix of barriers in place

Contact Process Safety Management Framework

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

● Focus areas
 ● Risk control areas

Elements

Geared towards helping us answer the first two Process Safety questions:

- Do we understand what can go wrong?
- Do we know what our systems are to prevent this happening?



And, set out our objectives

Plant	<ul style="list-style-type: none"> Enhanced plant reliability. Safe operations. Well maintained risks.
Process	<ul style="list-style-type: none"> Improved transparency of key processes. Common process safety processes and practices. Sustainable, easy to find and easy to use processes and systems
People	<ul style="list-style-type: none"> Senior management has visibility of core operational processes. Increased confidence and assurance from Board to plant level. Staff and contractors have the knowledge, skills and competence to operate and maintain the plant effectively and safely. Process safety culture is embedded into the organisation from senior managers right through to the sharp end.

The Gap Analysis highlighted areas we needed to focus on

We found that while there was a positive culture, and a lot of work underway, there was still more we could be doing to strengthen Process Safety.



The Hazard Risk Analysis identified over 200 Major Accident Hazard scenarios



200+ MAHs identified
through site workshops

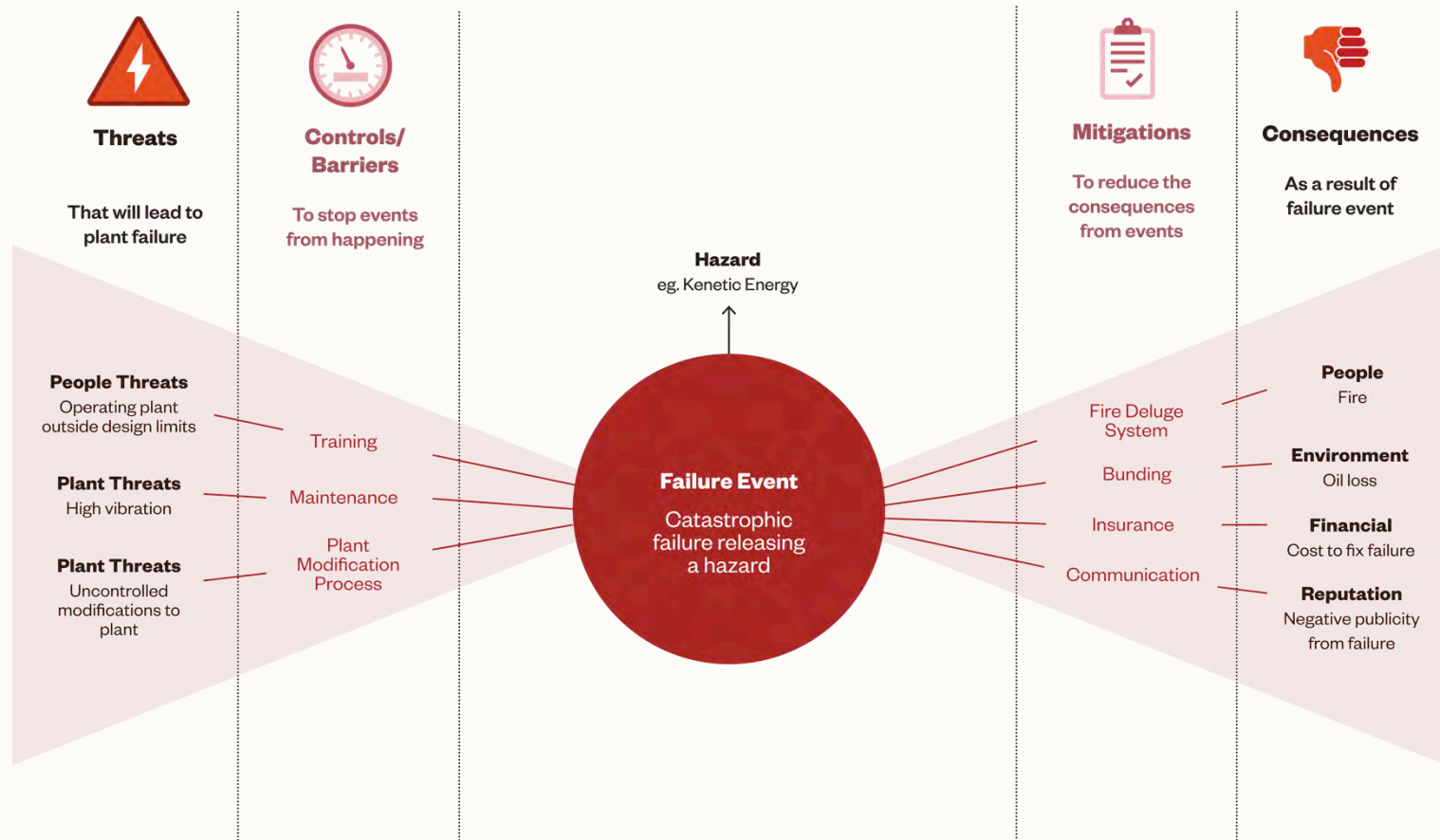


MAHs consolidated to 87
for detailed assessment

Do we understand
what can go
wrong?



We used Bowtie Diagrams to visualise each of the Major Accident Hazards





With the framework and objectives in place, we kicked off a Process Safety Health Check

What?	Why?	
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.	<div>Do we know what our systems are to prevent this happening?</div> <ul style="list-style-type: none"> - Development of options, timescales, resource demands, costs and business benefits for gap closure.
Hazard Risk Analysis	To formally identify our Major Accident Hazards (MAHs) and the control and mitigation barriers we use to manage them. And, to establish whether our MAHs are adequately controlled.	<ul style="list-style-type: none"> - Identification of MAHs - Threats - Barriers - Barrier performance indicators (PSPIs)

Our process safety journey... getting going





It was time to bring it all together

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





We looked to some fundamental principles of change

1. Change has to be supported

2. Change should happen within people, not to people

3. Change needs to be integrated into everyday business

4. Change needs effective communication

5. Change must have full Executive & Management commitment

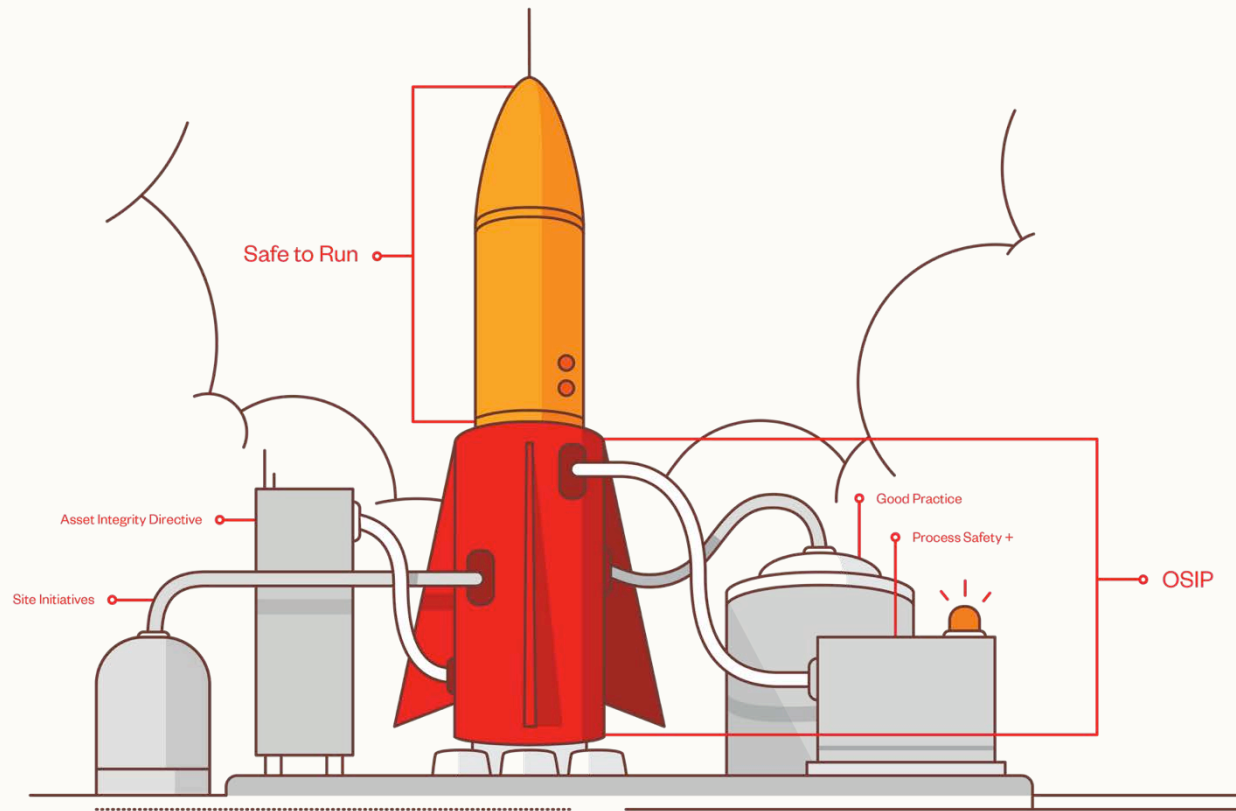
6. Change needs the right focus and culture

7. Change has to be supported by good measurement



1. Change has to be supported

We integrated our process safety initiatives into a single programme.





1. Change has to be supported

The OSIP programme was designed to help get process safety initiatives happening much faster.



- launch programme with a finite term
- 9 workstreams
- 21 projects
- detailed plans
- resources & costs agreed
- all recommendations from Health Check incorporated into projects
- clear governance
- includes people from all over Contact



**1. Change has
to be
supported**

Although Process Safety is compelling at a business level, we needed to make it meaningful for people across the business.

We reframed what Process Safety was about by giving it a name that summed up ‘what’ we were aiming for, which is to keep Contact...

‘Safe to Run’



1. Change has
to be
supported

Rather than engage people in OSIP, the programme, Safe to Run helped us position Process Safety as a way of thinking.

‘Safe to Run’ represents a fundamental shift in thinking

From...

Why can't we
restart the
plant?

To...

Are we
safe to
run?



**1. Change has
to be
supported**

Although keeping Contact Safe to Run was what we were aiming for, we still needed an easy way to engage people in Process Safety.

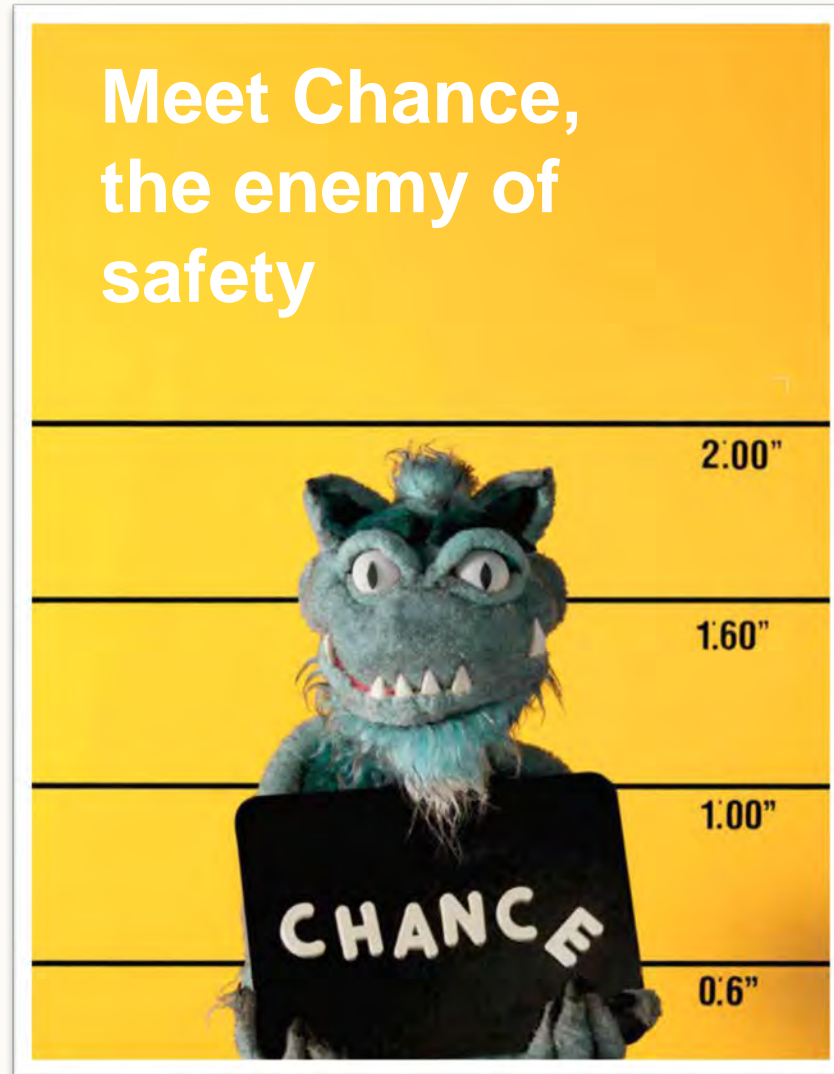
Process Safety is about leaving nothing to chance.

We wanted people to recognise that, by leaving nothing to chance, we keep Contact Safe to Run. But how do you do that when, in reality chance is invisible?



**1. Change has
to be
supported**

So, we
'personified'
change and
challenged
people to give
Chance no
chance.





2. Change should happen within people, not to people

At its heart, OSIP is about engagement – from buy-in to design input. It's about everyone sharing their knowledge and ideas.

Safe to Run uses our collective intelligence

We enable as many people as possible to be part of the improvement

Over 100 subject matter experts from across the business

Our SMEs lead the workstreams and projects and are part of steering committees



You know best!

We trust our people to come up with solutions



Maintenance
"I carry out all routine maintenance as planned"

We showed people where they make a real difference

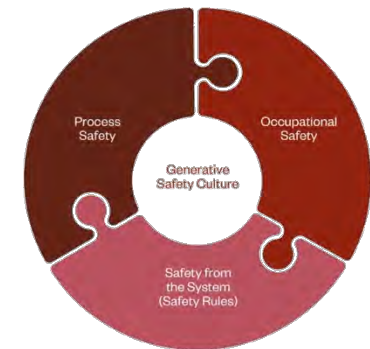


**3. Change
needs to be
integrated into
everyday
business**

To be
successful we
knew we
needed to take
an integrated
approach to
process safety

**Safety is how
we do business
round here**

Process safety forms a core
part of our generative safety
culture



Process safety is applied
together with other safety
processes as part of overall
operational safety



4. Change needs effective communication

It was important to set the scene for what we wanted to achieve.





4. Change needs effective communication

We wanted to be clear about what OSIP and Safe to Run were designed to achieve.

**It's time
to get rid
of Chance**





4. Change needs effective communication

We set out our approach to Process Safety and what the OSIP programme, and Safe to Run, were all about.



Launch collateral



5. Change must have full Executive & Management commitment

We engaged our leadership early and continue to support senior management to be part of the improvements.



Our CE appears in communications to reinforce the importance of what we're

Helping our Leaders Programme

We've empowered our senior leaders to support, rather than direct, the change

Operations Gathering



Generating success

We brought our leaders together ahead of the Health Check to talk about how, as a team, we'd generate success



6. Change needs the right focus and culture

The programme benefits from an underlying culture that supports people to try new things and fail safely

We aim for perfection – but are practical about it

We make small incremental steps where we can and don't wait until we have everything absolutely perfect

We balance compliance with culture

Rather than focusing purely on the 'how' and 'what' we consider how people 'think' and 'feel'

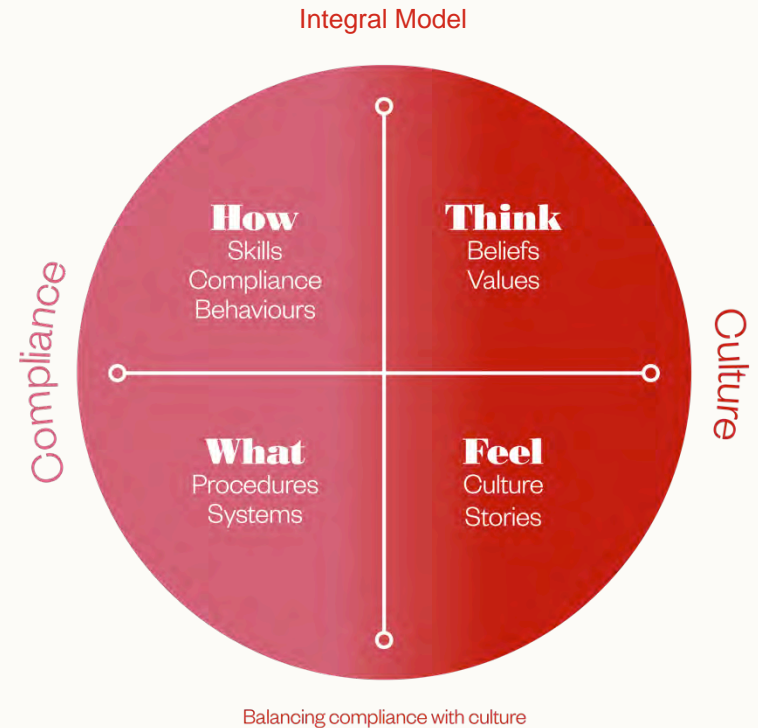


Diagram adapted from Ken Wilber, Bob Anderson, Eric Klein, Jim Stuart



7. Change has to be supported by good measurement

Although we were confident the programme would enable us to answer the first two process safety questions, we didn't have a clear view of performance for all our assets.

③

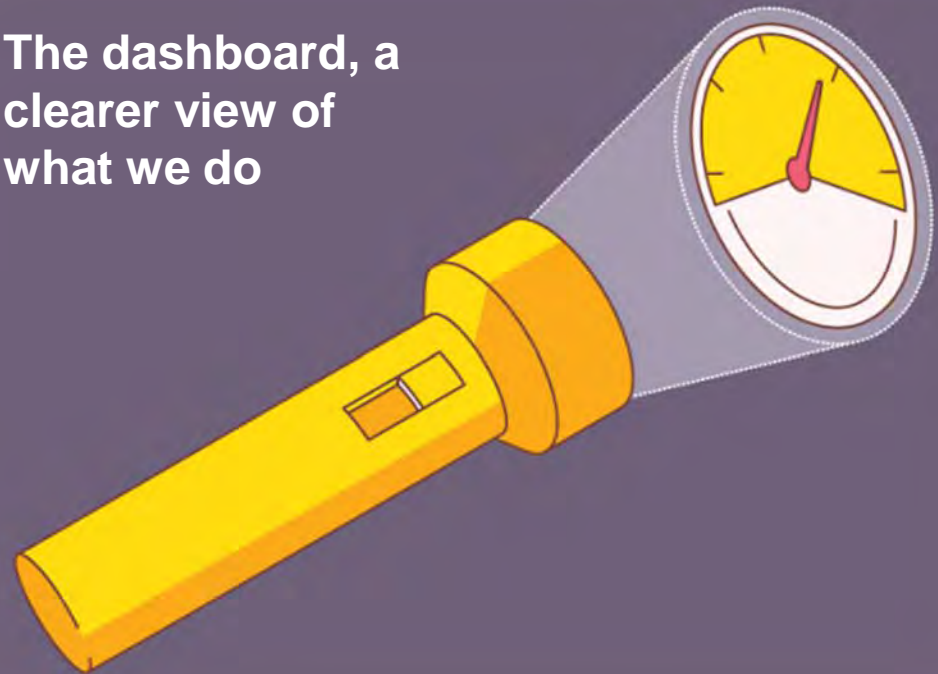
Do we have information to assure us our systems are working effectively?



7. Change has to be supported by good measurement

So, in parallel with our other process safety initiatives we developed a Process Safety dashboard.

The dashboard, a clearer view of what we do





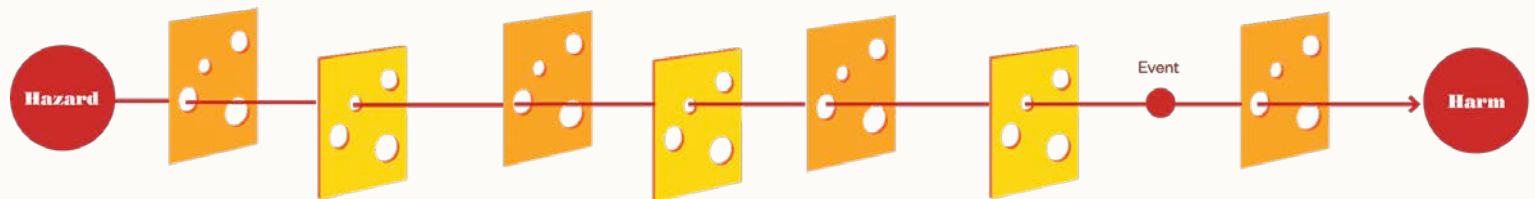
**7. Change has to
be supported by
good
measurement**

You can't fix what you can't see

The dashboard gives us visibility of the health and strength of the barriers/controls we have in place to keep us safe from major hazards. We use it to help measure and manage our process safety performance.

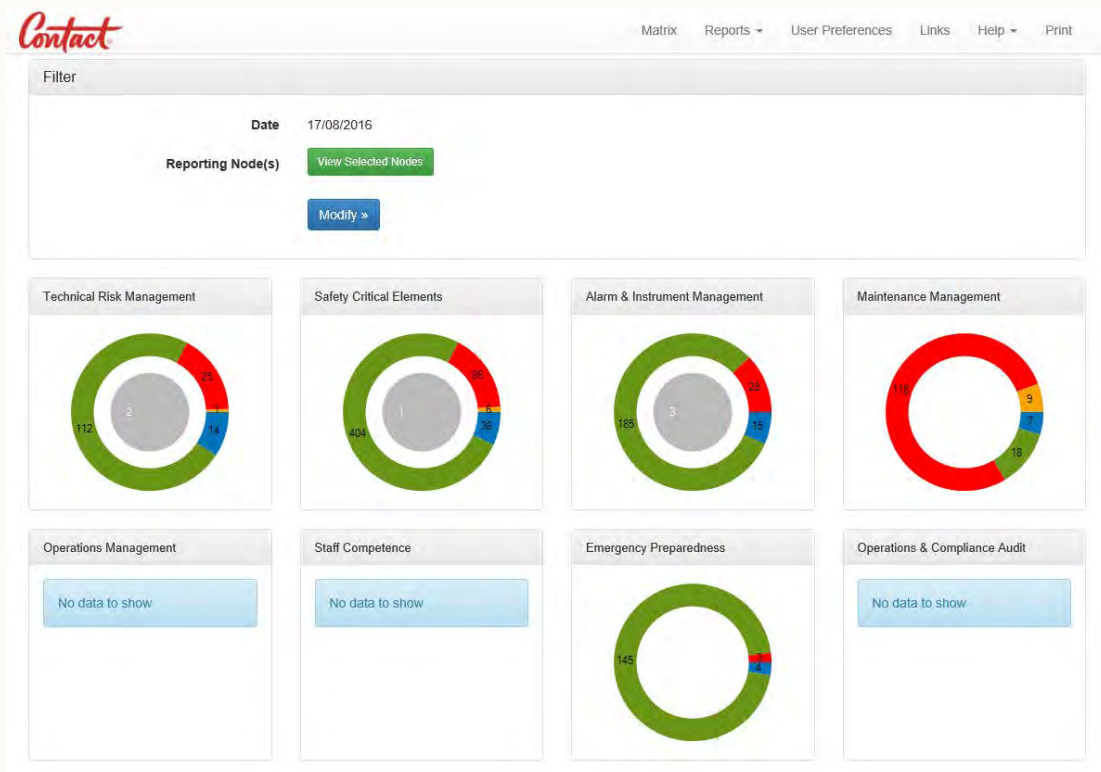


We use the **Swiss Cheese Model** to illustrate what can happen when there's failures or deficiencies in the risk controls



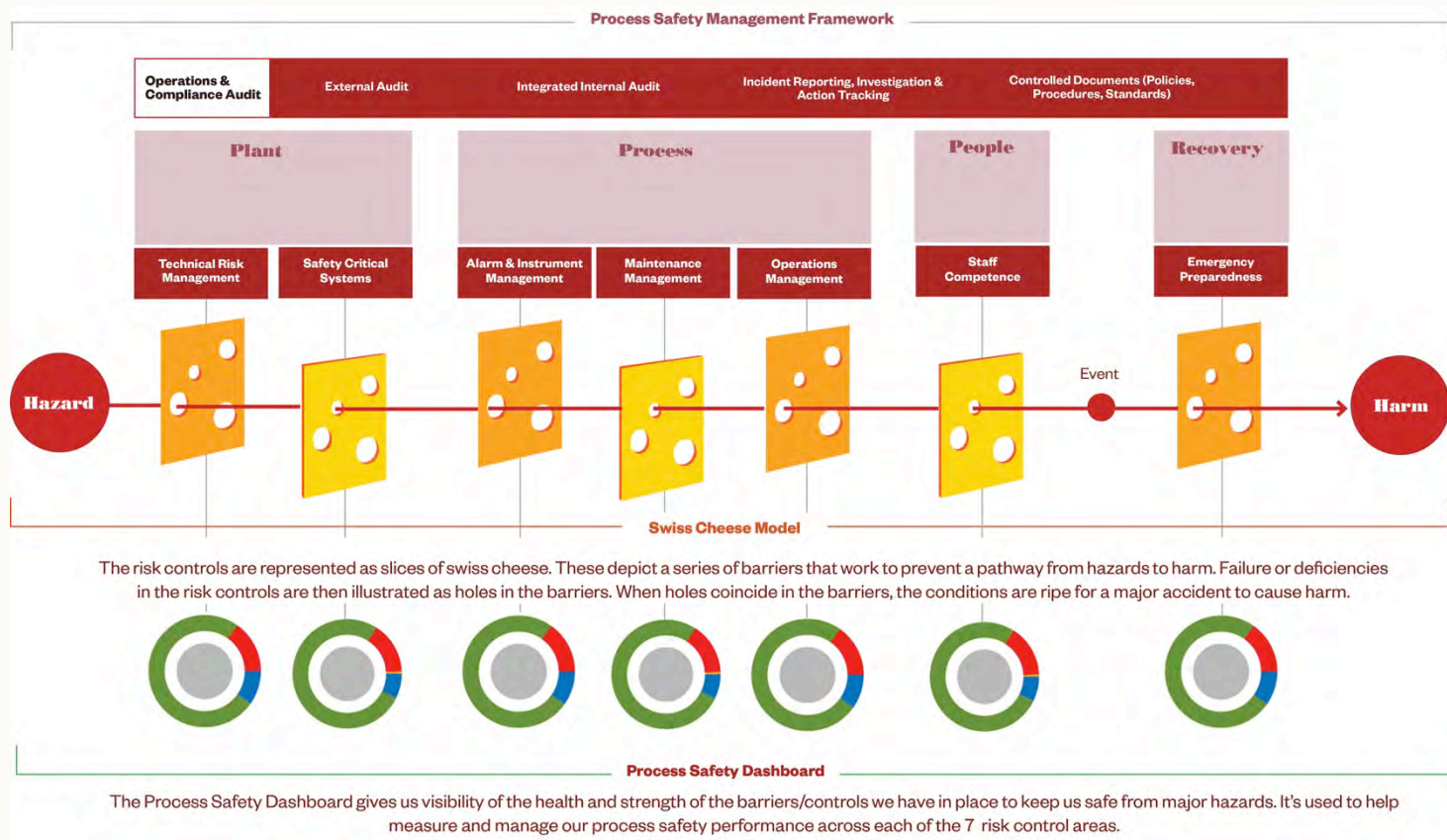
Swiss Cheese Model, James Reason,
1990

We use the Process Safety Dashboard to give us visibility of the health and strength of the barriers/controls we have in place to keep us safe from major hazards.





How it all fits together



Red is good, it helps build a picture of where to prioritise resources

Dennis Barnes

Dennis Barnes
Chief Executive Officer



What we've learned so far, and how we can help



What we've
learned



How we can
help



Where to next
for us?



What we've
learned



How we
can help



Where to
next for us?



What we've learned so far

It starts from the top

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

You need the right info

- Benchmark to understand current state.
- Process Safety dashboard.

It has to be integrated

- Integrate Process Safety with other safety disciplines.
- Safety is just how we do things round here.

It's about people

- Enable your people to be part of the improvement.
- Enable leaders to support, rather than direct, the change.
- Show people where they make the difference.



What we've
learned



How we
can help



Where to
next for us?



What we've learned so far

At its heart is engagement

- It's a lot more than processes and procedures.
- From getting buy-in to getting input, it's about engagement.

Make it simple

- Processes and procedures need to be simple to use and easy to find.
- Use simple language and catchy metaphors.
- Plan on a page.

Don't wait til it's perfect

- Aim for perfection, but be practical about it.
- 80/20.

Visualise it for people

- Bowtie diagrams are a great way to explain management systems.



What we've
learned



How we
can help



Where to
next for us?



Where to next for us...

Process Safety has been a catalyst for broader improvements across Contact:

- culture
- leadership
- breaking down siloes
- business process efficiencies
- new ways of working
- transitioning into a culture of 'continuous improvement'.