



Safety at Methanex

A SAFETY CASE SUMMARY

Our number one priority is the safety of our people, our community and our environment.

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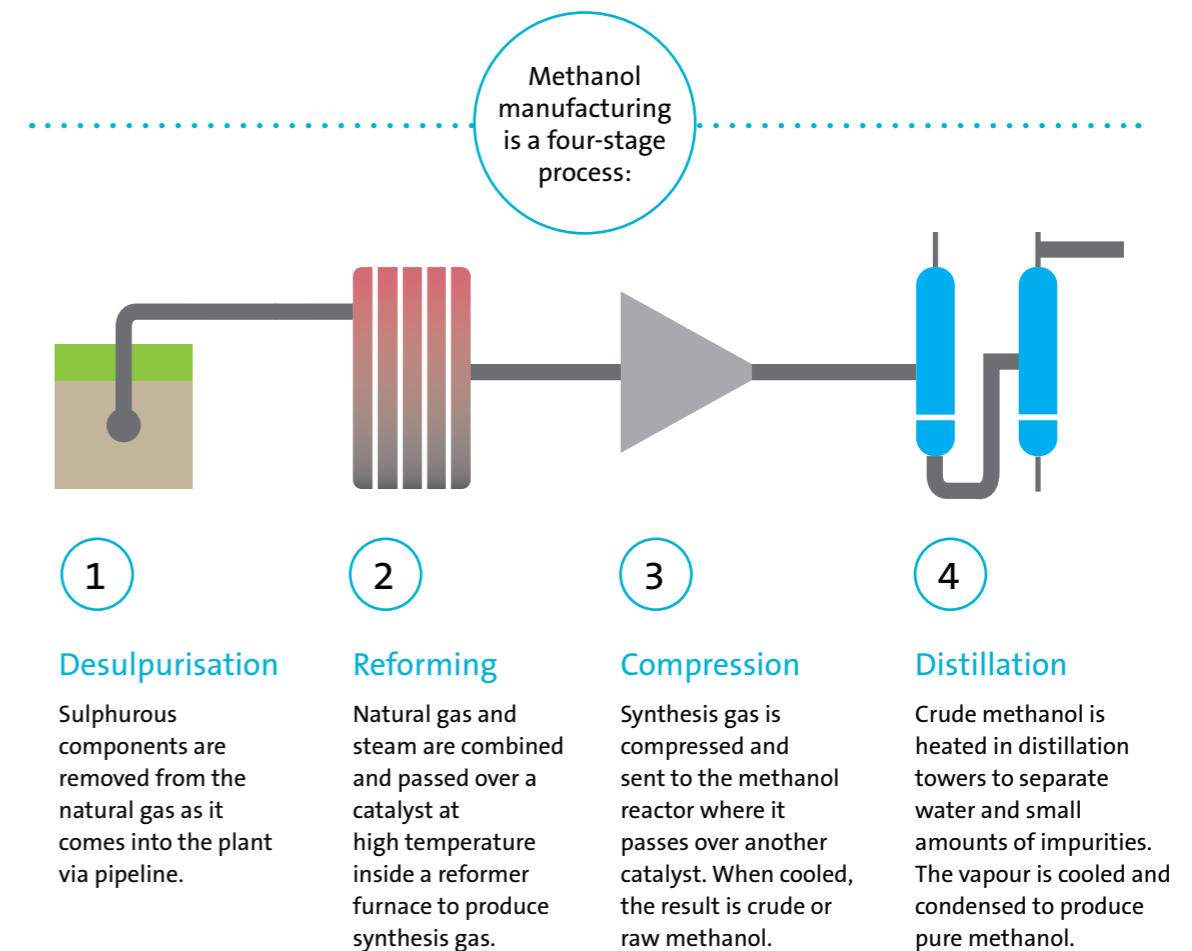
Methanex New Zealand

Methanex is the world's largest producer and supplier of methanol to major international markets.

We've been a proud member of the Taranaki community since 1984, where we operate two methanol production sites and two methanol storage/transfer sites.

Methanex New Zealand is part of Methanex Corporation, headquartered in Vancouver, Canada, with production sites in six countries. Our global operations are supported by an extensive global supply chain of terminals, storage facilities and the world's largest dedicated fleet of methanol tankers.

We adhere to the highest principles of health, safety, environmental stewardship and social responsibility and are constantly seeking to improve our performance. We care deeply about the people and the environment in which we live, work and play and we believe our business should have a positive impact on people's lives.



Methanol demand is growing at between 4-5% per annum. There is no replacement for it today and it continues to be used in a range of products necessary for a low-emissions economy.

Methanex is New Zealand's **only** methanol producer, with the ability to export **2.2 million tonnes per year** from our two sites in Taranaki.



Our **key markets** from New Zealand are **China, Japan and Korea.**

How methanol production is used:

HIGH-TECH APPLICATIONS
Methanol is used in technologies that keep us connected—like laptops and cellphones—and in clean energy applications such as in solar panels, wind turbines, and lithium batteries.

VEHICLE FUEL
A cleaner-burning fuel than diesel or gasoline, methanol is used to power cars, buses, and trucks.

MARINE FUEL
As a marine fuel, methanol can reduce emissions of SO_x and particulate matter by more than 95% and NO_x by up to 80%

CONSTRUCTION MATERIALS
Methanol is used to make plywood and medium-density fibreboard (MDF) and is an essential ingredient in sealants, paints, and solvents.

CLOTHING AND TEXTILES
Chemicals made with methanol can extend the durability and life of consumer products like fleece clothing and carpeting.

PLASTICS
The methanol-to-olefins (MTO) process creates polymers such as polypropylene, which is used to create items such as bottles and food containers.

AUTOMOTIVE MANUFACTURING
Methanol is used to produce plastics that make cars lighter and more fuel efficient, helping to reduce CO₂ emissions.

HEATING FOR DOMESTIC AND INDUSTRIAL APPLICATIONS
Methanol can help improve local air quality by reducing emissions compared to traditional fuels such as diesel or coal.



Methanol is a **clean-burning**, clear liquid chemical that is water soluble and readily **biodegradable**. Like most chemicals and fuels, methanol must be used and handled with care.



Methanol is one of the top five chemicals transported around the world. Globally, 70 million metric tonnes are safely produced and shipped to market each year.



TRADITIONAL CHEMICAL APPLICATIONS

~55% of global methanol demand



ENERGY RELATED APPLICATIONS

~30% of global methanol demand



METHANOL-TO-OLEFINS (MTO)

~15% of global methanol demand



Our Sites



Motunui Manufacturing Facility

409 Main North Road, Motunui 4383

Our larger methanol production site with two production trains and two distillation units.



Omata 1 Methanol Tank Farm

115 Centennial Drive, Omata, 4310

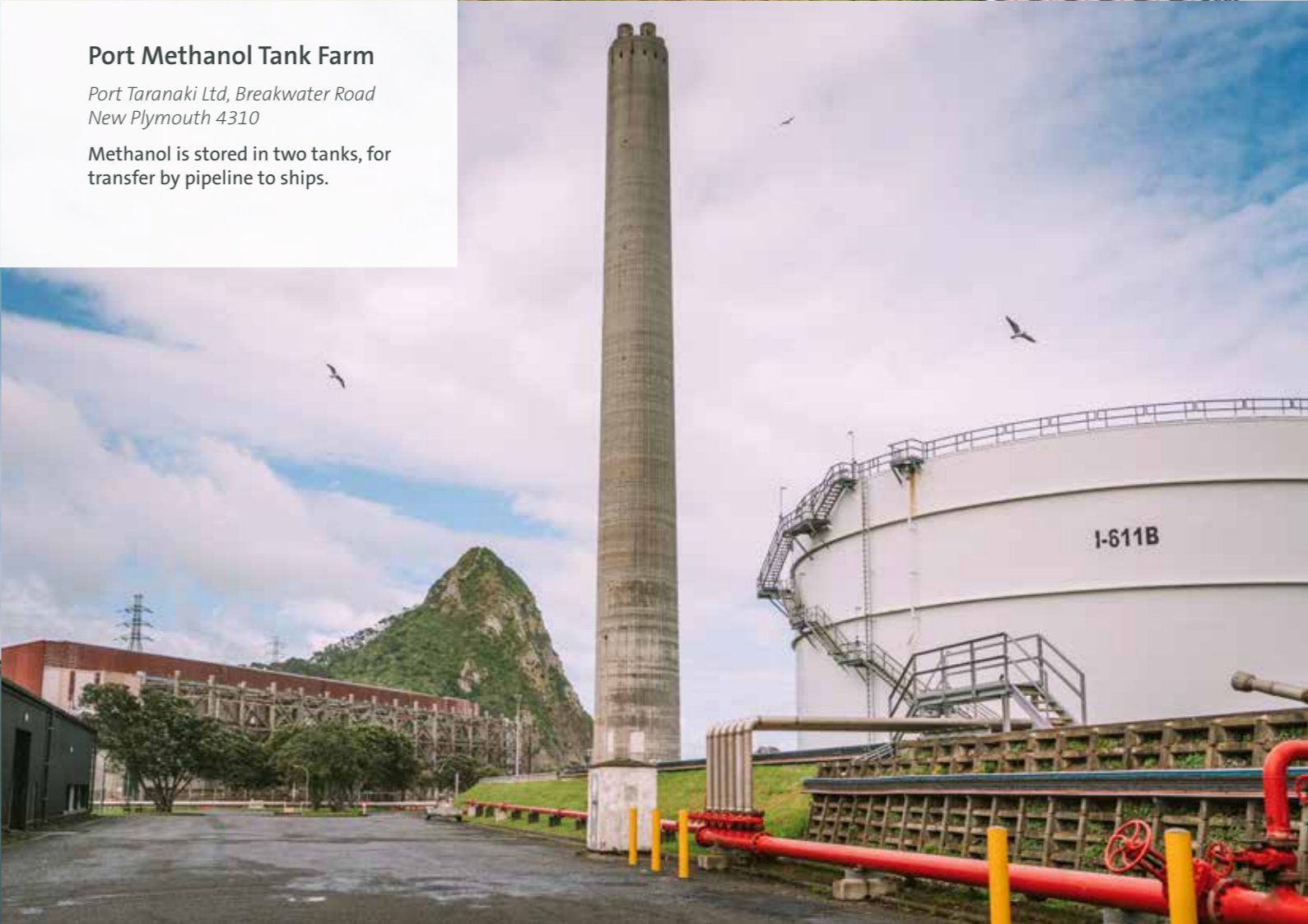
Methanol is stored in two tanks, prior to transfer by pipeline to the Port Methanol Tank Farm.



Waitara Valley Manufacturing Facility

Mamaku Road, Waitara 4383

Our smaller methanol production site with one production train and two distillation units.



Port Methanol Tank Farm

Port Taranaki Ltd, Breakwater Road New Plymouth 4310

Methanol is stored in two tanks, for transfer by pipeline to ships.



What is a Safety Case?

A Safety Case is a written demonstration that we have the ability and means to control major incident hazards effectively.


Designated Upper Tier Major Hazard Facilities must have an accepted Safety Case, as required by Health and Safety at Work (Major Hazard Facilities) Regulation 2016. It provides assurance to workers, emergency services, the community, and others that the potential for major incidents has been systematically assessed and that effective and suitable controls are, or will be, in place.

What's in our Safety Cases?

Our four sites in Taranaki - Motunui and Waitara Valley manufacturing plants, Omata 1 and Port Tank Farms - have been designated as Upper Tier Major Hazard Facilities with Safety Cases in place that have been accepted by WorkSafe New Zealand.

Our Safety Cases demonstrate how we assess safety and risks and our emergency planning.

Within these main sections are sub-sections based around the six broad topics (shown below).

	Facilities Description	Safety Management System	Safety Assessment	Emergency Plan
	A description of our facility, its operational strategy and processes, the substances we keep on site, the local community, and the environment.	Our plans, processes and resources that provide each site with multiple layers of safety protection.	Our identification and assessment of the hazards, risks, and potential major incidents at each site; and the controls we use to prevent potential major incidents.	Our strategy for coordinating people and resources in an emergency response; in the unlikely event of a major incident at one of our sites.
	Knowledge and Skills	Our people, their skills and engagement and how communication functions throughout Methanex.		
	Design and Analysis	We analyse the equipment and conditions, risk, and all potential consequences, to ensure our systems' design and operations will be as safe as possible, for example automatic plant shut-down systems.		
	Safety Systems	Our Safety Management System encompasses all areas of our business, including our operating strategy, managing change, eliminating and minimising risk, and how we respond to any failures.		
	Emergency Response	Our emergency response covers training of our people, how we manage incidents, how we assess what could go wrong and how we would support an emergency.		
	Safety Verification	We verify how we operate safely by ensuring key standards are in place and updated and through performance monitoring.		
	Audit and Review	Our systems, standards and performance are regularly reviewed, verified and updated. Internal and external audits across the business ensure we are doing what we are saying we do.		

Hazardous substances

Our sites are classified as Major Hazard Facilities under the Health & Safety regulations due to the amount of hazardous substances we hold and store.

Our Safety Management System and Safety Assessment processes ensure that we store all hazardous substances in the most suitable equipment, designed and built to the highest safety standards. The hazardous substances that we have at our sites are:

Synthesis gas

Synthesis gas (CO, H₂, CO₂) is created during the conversion of natural gas to methanol. Its constituents include hydrogen and carbon monoxide, both of which are colourless, odourless and flammable. Carbon monoxide is also toxic.



Synthesis gas is made at our Motunui and Waitara Valley sites as part of the methanol process. It is not stored on-site, however, up to four tonnes may be present within the processing units.

Nitrogen

Nitrogen (N₂) is a colourless, odourless, non-flammable gas. Liquid nitrogen is created at our Motunui site and stored in limited quantities at our Motunui and Waitara Valley sites, where it is heated into a gas and used as a part of our equipment maintenance programme. Liquid nitrogen must be handled with care, due to its extremely low temperature (≈ -200 degrees Celsius).



Methanol

Methanol (CH₃OH) is a clear colourless biodegradable alcohol. It can be toxic if swallowed, inhaled or absorbed through the skin, and is highly flammable. It is produced and stored in liquid form.

Natural gas

Natural gas is colourless, odourless and flammable. It is delivered and used under pressure at our Motunui and Waitara Valley sites as the raw feedstock in the methanol manufacturing process and for process heat. Its main component is methane, which, while not toxic, may present a fire and explosion risk. Natural gas is not stored on site but, as part of the methanol making process, up to one tonne at Waitara Valley and up to 10 tonnes at Motunui may be present.



Chlorine

Chlorine (Cl₂) is a greenish-yellow gas with a pungent, irritating odour. It is used in limited quantities at Methanex's production sites, compressed to a liquid, as a disinfectant for treating water.

Potential major incidents

We've identified the following potential major incidents that could occur at one of our sites:



Fire

From a flammable liquid or gas release



Explosion

From a flammable liquid or gas release



Toxic release

Gas release





Our incident prevention strategy

Our incident prevention strategy forms part of our Safety Assessment. We continually identify, assess, and control the hazards on our sites – anything that can potentially lead to a major incident – through our Safety Management System and Safety Assessments.

Below is an overview of our process for preventing incidents.



Our Safety systems

We hold ourselves to the highest standards of safety and integrity; to ensure the safety of our people, the community, and the environment.

Our sites are classed as Major Hazard Facilities – we use hazardous substances, extreme temperatures, and high-pressure gas and steam run through our pipes. We regularly review our sites, procedures, equipment, and all hazards/risks, and update our safety systems so that they meet the highest possible standards.

1

Identify

We continuously record and review information about our sites, processes and equipment to identify hazards.

2

Assess

We review new and existing hazards, their level of risk, and potential major incident scenarios that might impact people and the environment.

3

Control

We use proven and tested controls to eliminate or minimise the risk from the hazards. These include alarms, trips, pressure relief, isolation and emergency shutdown systems, as well as fire and gas detection, automatic deluge, and fixed firefighting systems.

Our people are trained to ensure we can provide a fast and effective emergency response in the unlikely event of a major incident.



Our Safety Management System

Our comprehensive, multi-layered Safety Management System (SMS) combines objectives and standards covering everything from training to how we design, operate and maintain critical equipment.

In our Safety Cases we prove we are operating safely via a range of policies, objectives and standards covering everything from training to how we design, operate and maintain critical equipment. These are living documents, audited against and communicated with personnel through a range of forums, such as meetings, training sessions and document updates. We also carry out regular safety and risk assessment of all our systems.

We have comprehensive operational procedures, double checks, and equipment maintenance programmes that give us full and visible control of our day-to-day work. Changes to our processes or equipment goes through stringent change management procedures to ensure there are no unintended consequences. Investigation reports about all onsite incidents are used to identify potential system deficiencies or emergency scenarios with gaps addressed accordingly to minimise recurrence. In addition, we constantly monitor and review all our systems to ensure our work meets or exceeds good industry practices.

Our Safety Assessment

We regularly undertake detailed assessments of our sites and their operational safety; to identify and study new and existing hazards, risks, and potential major incident scenarios.

Our Safety Assessment Teams are made up of specialists from the different operational areas of Methanex, and selected external experts. They choose the most effective ways of eliminating or minimising hazards and potential major incident scenarios; we implement these to ensure we have reduced the risk to people and the environment, so far as is reasonably practicable.

As well as detailed assessments, Methanex employees and contractors regularly carry out 'hazard observations,' recording any unsafe acts or conditions relating to a job and actions to improve the situation.

A Safety Assessment scenario

Let's look at a real Safety Assessment scenario to demonstrate how our Safety Management System works:



We identify a hazard and potential major incident scenario.

Our Safety Assessment team uses a combination of techniques to identify 'methanol stored in tanks' as being a hazard that has the potential to cause a major incident. The potential major incident would be a methanol fire.

We prevent the hazard from becoming a major incident.

We eliminate or minimise the risks associated with our methanol storage as much as possible. We've undertaken every practicable measure to ensure the tanks can hold the methanol safely, including being able to withstand shocks and earthquakes.

Our Safety Management System ensures that all our tanks and equipment are designed to good industry practice, combined with a rigorous inspection and maintenance carried out by experienced and qualified personnel. We're confident that these tanks, and the work we do, are as safe as they can be.

We plan responses for any potential major incident.

Our Safety Assessment modelling demonstrations have shown that any tank fire would be confined to well within the site, and an emergency response team would respond to the incident within minutes. We've developed the Full Surface Tank Fire emergency response document – what we call a 'pre-plan' – specifically for this scenario. Our staff train for this plan – they will be able to contain any effects from a fire. We have suitable emergency response equipment ready onsite, including fire detection, fire-fighting foam, and firewater hydrants and hoses.

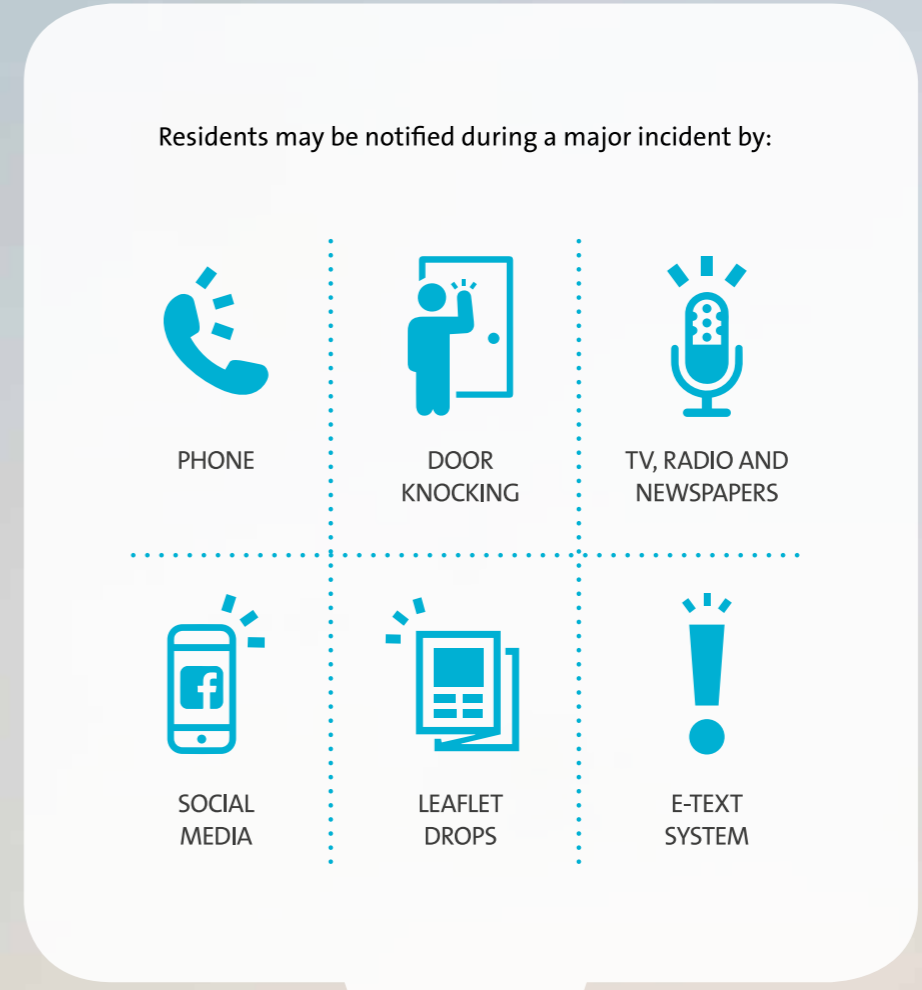
If there is an emergency, follow directions from the Emergency Services.

Methanol fire characteristics

A key feature of a methanol fire is that it burns with a clear blue flame, which makes it difficult to see in bright light.

The most effective means of extinguishing a methanol fire is the application of alcohol resistant firefighting foam. Methanol fires can also be fought using dry chemical powder, CO₂ extinguishers and water.



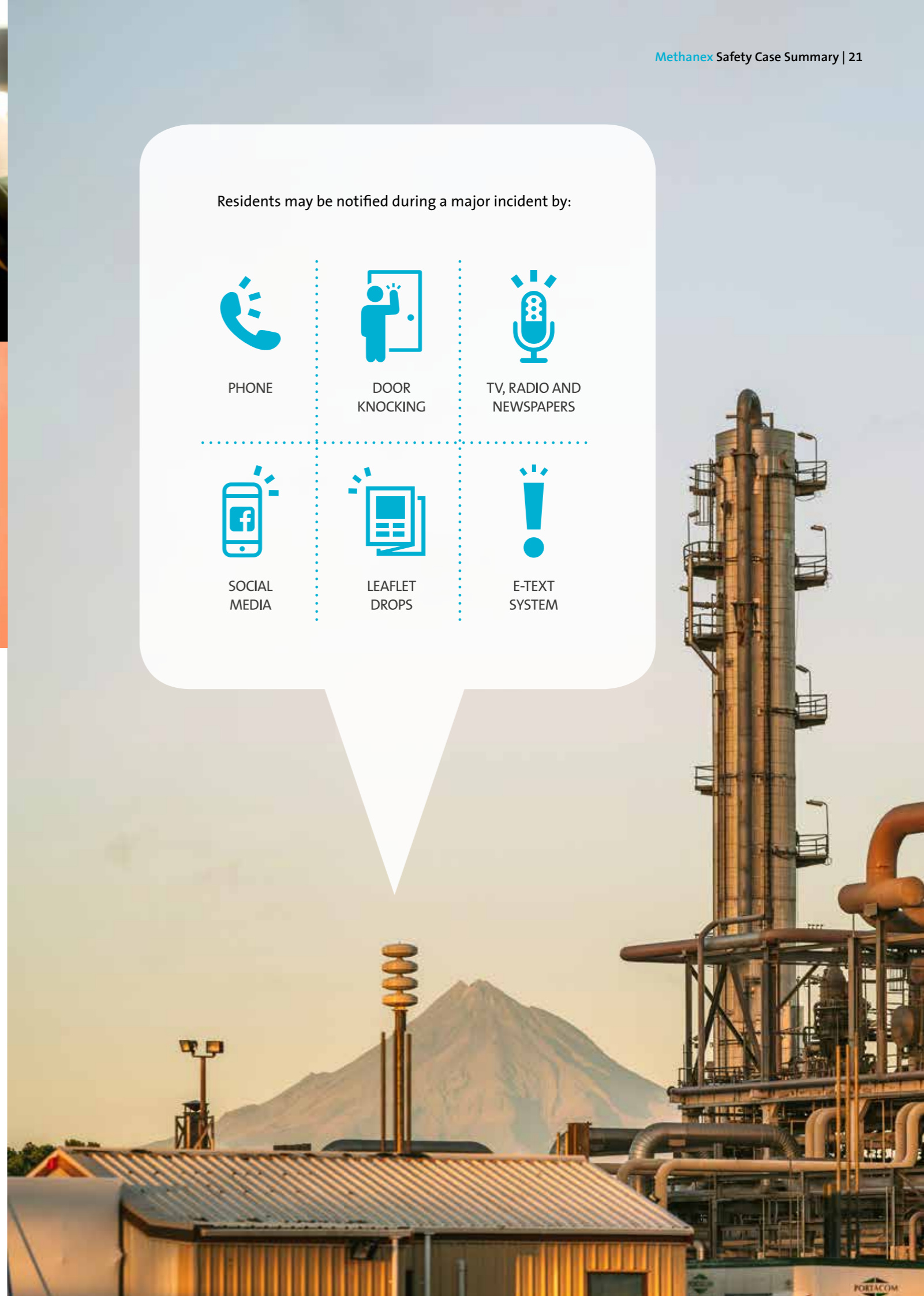


Keeping the community informed

Every year we review our crisis communications plan – this describes how we’ll keep the community informed in the event of a major incident.

We have a well-established relationship with emergency services and local authorities, and will work in coordination with them to ensure the community is kept well informed. Residents may be notified by phone, door-knocking, or leaflet drops, and media releases will be sent to media outlets and posted on social media.

As part of our ongoing commitment to keep neighbours informed, during normal business hours we send out newsletters and operate an e-text alert system to our Motunui and Waitara Valley neighbours. If you’d like to be kept informed and go on our e-text database, please contact our Stakeholder Relations team.



What you should do in the event of an incident

In the unlikely event of a major incident (or if you think there may be any type of incident) do not come to our sites.

On-site incident

Incidents contained within the Methanex site boundary will be managed by our trained Emergency Response teams, and Fire and Emergency New Zealand units as required.

Communicating with the public

We will make information available to the public via local media, Methanex NZ Facebook page* and telephone.

Off-site incident

If the effects of an incident have the potential to extend beyond a Methanex site's boundary, you will be alerted by emergency services or Taranaki Civil Defence Emergency Management.

Check the Methanex NZ Facebook page* and local news sources in the first instance. If required, we will be in consultation with emergency services and will set up a media support team to respond to calls from the public or media.

In general, if you think there is a major incident:

- Do not come to the Methanex site.
- Call Emergency Services on 111.
- Follow Emergency Services' directions.
- Monitor local and online media for information.
- If in doubt, leave the local area.

*www.facebook.com/MethanexNZ/



Emergency response

We've prepared thoroughly so we can quickly and effectively respond to emergency situations, in the unlikely event of a major incident.

Our on-site Emergency Response Teams develop pre-planned response exercises and train on a regular basis, and in coordination with external agencies, such as Fire and Emergency New Zealand. In combination with our Safety Assessments this enables us to continually review and improve our emergency response capabilities.

We have a full range of specialised emergency response equipment available at each of our sites, including fixed and mobile firefighting equipment, hazardous material equipment, communications, medical and first aid resources.

Methanex sirens

Our sirens are used to alert our on-site personnel. They may sometimes be audible off-site, but do not require any action from the community. We use two types of siren at Methanex:



Incident siren

A two-tone siren (like an ambulance) tells non-essential on-site personnel to move to safe areas while we investigate and respond to the incident.



All clear siren

A single-tone siren signals that the site is safe (this siren is tested every Wednesday morning at 11 am).

Potential off-site impacts

Our Safety Assessments show that potential fire or explosions will be mostly contained within our sites' boundaries. At our Motunui and Waitara Valley sites our modelling shows there is potential in the case of a large explosion to reach Mamaku and State Highway 3 roads.

Local weather conditions at the time will influence if a toxic release would leave a site's boundary. Potential off-site consequences from a major incident include:

- visible flaring
- visible smoke
- odour, dependent on local weather conditions
- potential health effects from a toxic gas release
- local disruption – road closures, emergency services activity, evacuation.
- In the event of any suspected toxic release, leave the area or if you are unable to, stay indoors and seal any gaps in windows or doors with wet towels and wait for further instructions by emergency services.

Risk contour

These aerial photos of our four sites show a red line which indicates the reach of a potentially lethal fire, explosion or toxic release, if one were to occur on site, based on a one in one million per annum likelihood.

A toxic release could potentially move away from Methanex sites, although prevailing winds indicate it would dissipate offshore for the Motunui site and dissipate within the Waitara Valley farm land buffer zone.



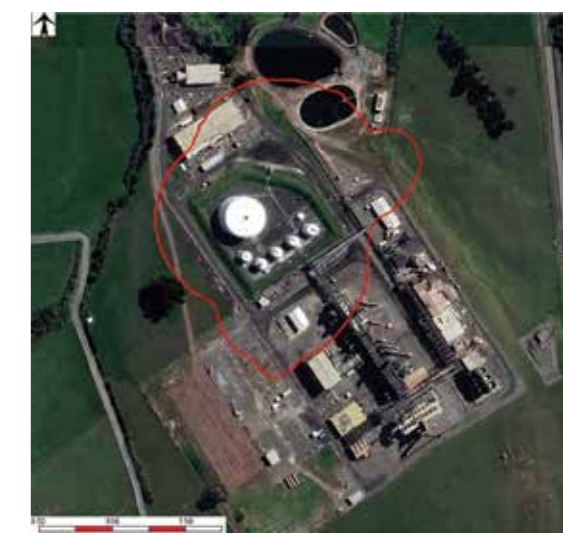
Motunui Manufacturing Facility



Omata 1 Methanol Tank Farm



Port Methanol Tank Farm



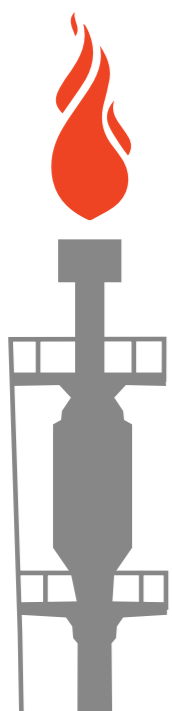
Waitara Valley Manufacturing Facility.

Plant flare

The flare visible at each of our Motunui and Waitara Valley sites is a vital safety feature and usually shows as a small pilot flame.

This burns continuously during normal operation – the flare will appear as a large flame when it burns off any gases from irregularities that can occasionally occur during the methanol production process.

This 'flaring-off' process prevents hazardous substances from being released into the atmosphere, and can last for several days at a time.



Methanex is a Responsible Care company.

That means we adhere to the highest principles of health safety, environmental stewardship and social responsibility.

To learn more about Methanex and our commitment to Responsible Care, visit us at www.methanex.com





Methanex New Zealand Ltd

Contact: Stakeholder Relations team
nzstakeholderrelations@methanex.com



Motunui Manufacturing Facility
409 Main North Road, Motunui 4383
Reception: 06 7549700

Omata 1 Methanol Tank Farm
115 Centennial Drive, Omata, 4310

Port Methanol Tank Farm
Port Taranaki Ltd,
Breakwater Road
New Plymouth 4310

Waitara Valley Manufacturing Facility
Mamaku Road, Waitara 4383