methanex
the power of agility

Safety at Methanex

A SAFETY CASE SUMMARY

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

Methanex New Zealand

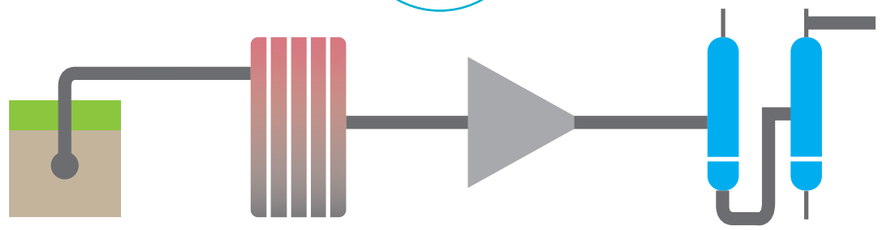
We're the world's largest producer and supplier of methanol to major international markets.

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 manufacturing is a four-stage process:



1 Desulphurisation

Sulphurous components are removed from the natural gas as it comes into the plant via pipeline.

2 Reforming

Natural gas, steam and oxygen are combined and passed over a catalyst at high temperature inside a reformer furnace to produce synthesis gas.

3 Compression

Synthesis gas is compressed and sent to the methanol reactor where it passes over another catalyst. When cooled, the result is crude or raw methanol.

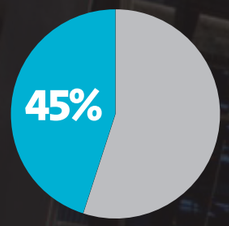
4 Distillation

Crude methanol is heated in distillation towers to separate water and small amounts of impurities. The vapour is cooled and condensed to produce pure methanol.

For more technical and safety information about methanol, see the *Safe Handling of Methanol* page under the About Us section on our website: www.methanex.com.

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.

Methanex is New Zealand's **only** methanol producer, exporting up to **2.4 million tonnes per year** from our two sites in Taranaki.



We underpin the New Zealand gas market, using approximately 45% of the country's natural gas output.

Our contributions to the economy total

8% of Taranaki GDP

$834m Nationally

Methanol demand is growing at 5% p.a.

We employ over

270 jobs directly & 3,000 jobs indirectly.

Our key markets for New Zealand methanol are China, Japan and Korea.

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.

How methanol production is used:

55% HIGH TECH HIGH DEMAND PRODUCTS

45% EMISSION REDUCING ENERGY APPLICATIONS

Pharmaceuticals, wind turbines, solar panels, paint, clothes, electronics and medication.

Marine fuel, transport fuels, biodiesel, industrial boilers and Methanol to Olefins.

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 pipe 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 Taranaki Methanol Tank Farm

Port Taranaki Ltd, Breakwater Road New Plymouth 4310

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

What is a Safety Case?

A Safety Case is a written report that WorkSafe requires from a Major Hazard Facility (like our sites) for it to be able to operate.

Our Safety Cases demonstrate how we keep our sites safe at all times. They include descriptions of our safety systems, showing how we eliminate or minimise hazards/risks that have the potential to cause a major incident, and how we have fully prepared to respond to any potential major incidents.

We have produced a Safety Case for each of our four Taranaki sites. Once a Safety Case is accepted by WorkSafe, it is reviewed every five years.

What's in our Safety Cases?

Each of our Safety Cases is between 250 and 380 pages long with detailed plans, scenarios and procedures regarding our operations. Each Safety Case includes four main sections covering a description of our facilities, our safety management systems, how we assess safety 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 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.

Methanol

Methanol (CH_3OH) is a clear colourless biodegradable alcohol. It can be toxic if swallowed, inhaled or absorbed through the skin, and is 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, several tonnes may be present.

Chlorine

Chlorine is a greenish-yellow gas with a pungent, irritating odour. It is used in limited quantities at Methanex's production sites.

Hydrofluoric Acid

Hydrofluoric Acid is used to clean equipment occasionally, such as boilers, at our Motunui and Waitara Valley sites. It is brought onsite by specialist contractors and following the cleaning process it is neutralised with caustic soda and then disposed of at a disposal facility.

Nickel Carbonyl

Nickel Carbonyl is a flammable and toxic liquid. It can form through a chemical reaction in the reforming process as a plant is being shut down and temperatures are less than 160°C. Extensive measures are in place to ensure no carbon monoxide is present for Nickel Carbonyl to form.

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 safety systems

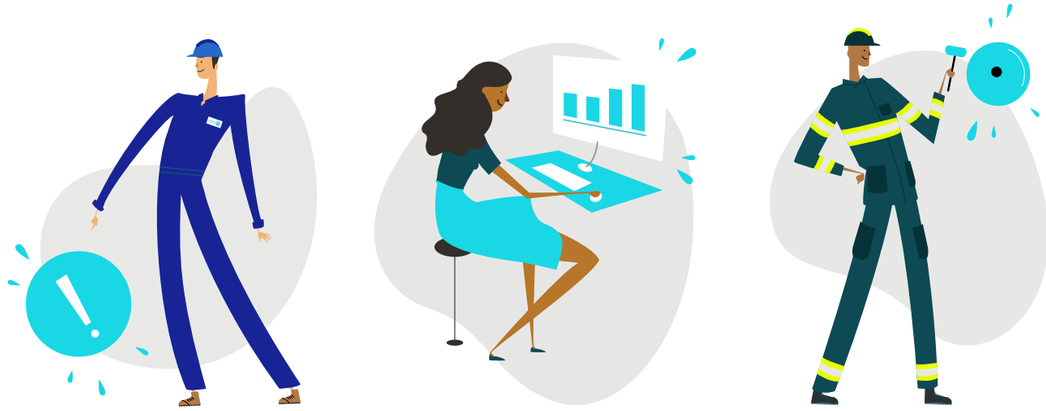
We hold ourselves to the highest standards of safety and integrity; to ensure the safety of our people, the community, and the environment.

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.

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.



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.

We have 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, equipment, and processes; to ensure that our people and our community return to their homes safely, every day.

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

We have comprehensive operational procedures, double checks, and equipment maintenance programmes, which give us full and visible control of our day-to-day work. Changes to our processes or equipment go through stringent change management procedures to ensure there are no unintended consequences. Investigation reports about all onsite incidents are used to identify potential emergency scenarios and to update response plans. In addition, we constantly monitor and review all our systems, to ensure our work meets or exceeds the highest national and international standards.

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:

1 IDENTIFY → 2 PREVENT → 3 PLAN

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 the highest standards, combined with a rigorous inspection and maintenance programme carried out by experienced and qualified personnel. We're confident that these tanks, and the work we do, are as safe as 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, foam pourers, 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, CO_2 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 we send out newsletters and operate an e-text alert system. We also hold Open Days every few years for the public to visit our sites. If you'd like to be kept informed and go on our e-text database please contact our manager of Public Affairs.

Residents may be notified during a major incident by:

- PHONE
- DOOR KNOCKING
- TV, RADIO AND NEWSPAPERS
- SOCIAL MEDIA
- LEAFLET DROPS
- E-TEXT SYSTEM

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, the Methanex NZ website*, social media 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/Taranaki Civil Defence and Emergency Management.

Check the Methanex NZ website* 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.**
- **Do not call Methanex.**
- **Call Emergency Services on 111.**
- **Follow Emergency Services' directions.**
- **Monitor local and online media for information.**
- **If in doubt, leave the local area.**

* www.methanex.com/location/new-zealand

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

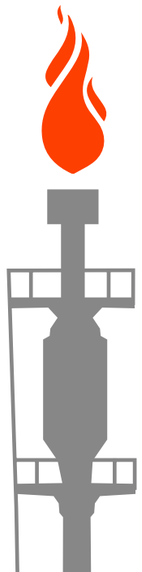
A single-tone siren signals that the site is safe (this siren is tested every Wednesday morning at 11 am).

Potential off-site impacts

Our Safety Assessments show that potential fire or explosions will be mostly contained within our sites' boundaries.

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.



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 gasses 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
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