RIKEN KEIKI

Applications in Oil and Fossil Fuel Market and Introduction to Gas Detectors and Alarms for Safety and Security

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Document contents

- About Riken Keiki
- Why do we need gas detectors?
  Risks associated with toxic gases
- Applications in oil and fossil fuel market
- Major examples of accidents
- Product information
- International agents

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About Riken Keiki

About Riken Keiki

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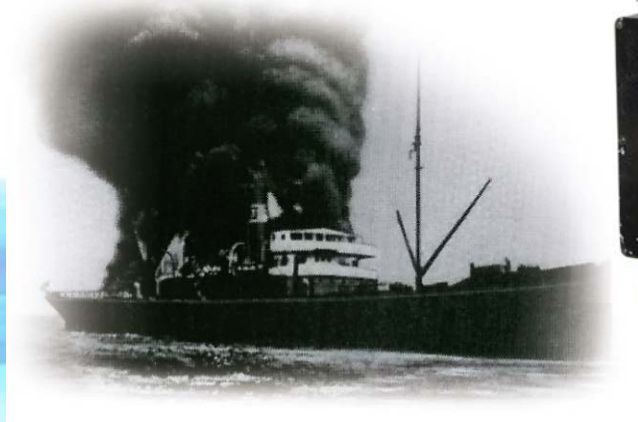
1939

Riken Keiki

Headquarters
To be completed in September 2018 (conceptual drawing)

Riken Keiki was originally established to commercialize and sell detectors for preventing explosions in coal mines and on oil tankers.



About Riken Keiki

Methane gas measurements in coal mine

Optical Gas Indicator Model 3 (1939)

Certification
National heritage of analytical and scientific instruments
2014

Company profile

Company name	Riken Keiki Co., Ltd.	
Established	March 15, 1939	
Location	Headquarters: Development Center:	2-7-6 Azusawa Itabashi-Ku, Tokyo 2-3 Minamisakae-cho, Kasukabe-shi, Saitama
Factories	Hakodate-shi, Hokkaido; Sakurai-shi, Nara (affiliated company)	

Headquarters

To be completed in September 2018 (conceptual drawing)

Development Center

About Riken Keiki

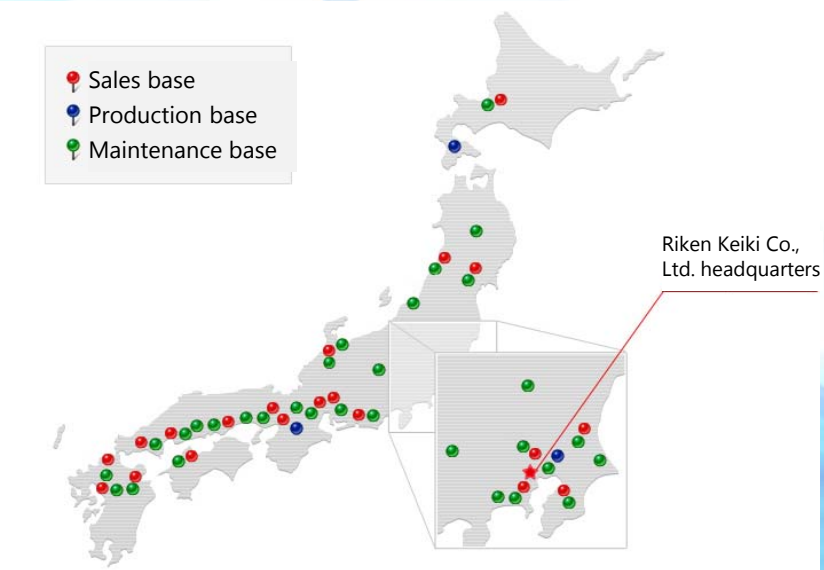
Headquarters
(Itabashi-Ku, Tokyo)

Development Center
(Kasukabe-shi, Saitama)

To be completed in September 2018
(conceptual drawing)

Locations of sales offices

◆Domestic◆



◆Global◆

Company profile

Various bases	Domestic sales and branch offices: 20 locations Service stations: 32 locations Global bases: 7 locations
Major sales items	Combustible gas detectors and alarms Gas detectors and alarms designed to prevent oxygen deficiency accidents Toxic gas detectors and alarms Combined gas detectors and alarms Various measuring instruments for environmental measurements and other instruments
Capital	2,565.5 million yen
Number of employees	965 (non-consolidated), 1,127 (consolidated) * As of September 30, 2017

Hakodate Factory
(Hakodate-shi, Hokkaido)

Nara Factory
(Sakurai-shi, Nara)

Company history

1939	Riken Keiki Co., Ltd. established to produce and sell optical gas detectors, photo-elasticity apparatuses, and other precision instruments invented and developed by RIKEN
1959	Start production and sale of combustible gas alarms and detectors (catalytic combustion type).
1967	Start production and sale of oxygen measuring instruments (OX-1).
1970	Start production and sale of monitoring tape type measuring instruments (FP-200).
1972	Start production and sale of non-dispersive infrared measuring instruments (RI-550).
1975	Start production and sale of electrochemical type measuring instruments (EC-231).
1986	Start production and sale of photoemission yield spectrometers (AC-1).
2009	70th anniversary of founding
2014	Start production and sale of portable X-ray diffractometers equipped with XRF (DF-01).
2015	Start production and sale of portable multi gas detectors (GX-6000), first product of its kind in Japan capable of housing photoionization detectors (PID).

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Why Do We Need Gas Detectors?
Risks Associated with Toxic Gases

Need for gas detectors (combustible gases)

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Criteria set by United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS)

According to the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals (GHS), a combustible gas (or flammable gas) is defined as follows:

A combustible or flammable gas is a gas having an explosive (flammable) range when mixed with air under atmospheric conditions of 20°C and standard pressure of 101.3 kPa.

Gases falling under this definition are further subdivided into the following two categories based on the severity of the associated risk:

Category 1 (Danger: Extremely flammable gas)

Gases capable of igniting at 20°C and standard pressure of 101.3 kPa when occurring in a mixture of 13% or less by volume with air or having an explosive (flammable) range of at least 12% when mixed with air regardless of the lower explosion (flammable) limit

Category 2 (Warning: Flammable gas)

Gases, other than those in Category 1, which are gaseous at 20°C and a standard pressure of 101.3 kPa and have an explosive (flammable) range when mixed with air

We need gas detectors because flammable gas leaks can lead to explosions.

Need for gas detectors (definition of permissible concentration)

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Definition of permissible concentration

Even when workers are exposed to hazardous substances at work sites, no adverse health effects should emerge as long as the airborne concentration of the **hazardous** substance remains below the permissible concentration.

Recommended permissible concentrations have been set by the American Conference of Governmental Industrial Hygienists (ACGIH) and the Japan Society for Occupational Health. We use the **ACGIH** permissible concentrations.

Types of permissible concentrations

- **TWA (Time Weighted Average)**
  Time Weighted Average refers to time-weighted average concentrations over an 8-hour workday and 40-hour workweek of routine work to which workers may be repeatedly exposed without adverse health effects.

- **STEL (Short Term Exposure Limit)**
  Short Term Exposure Limit refers to exposure that does not lead to adverse health effects if each exposure does not exceed 15 minutes, the number of daily exposures does not exceed four, and the exposures are separated by at least one hour.

- **C (Ceiling value)**
  Ceiling Value refers to the upper limit that can never be exceeded.

We need gas detectors because leaks exceeding permissible concentrations can lead to accidents.

How human body reacts to oxygen-deficiency

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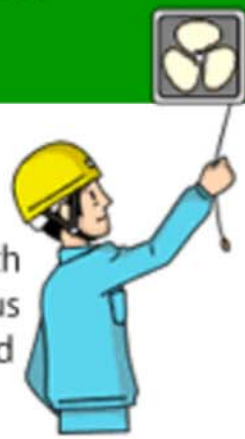
O2 Concentration 21%

Symptoms

Natural air

O2 Concentration 18%



Symptoms

Limit level for not causing serious health problems. Continuous ventilation is required

O2 Concentration 16%-12%

Symptoms

Rapid breathing, Increase in pulse rate, Loss of concentration, Headache, Nausea, Ear ringing

O2 Concentration 14%-9%

Symptoms

Stupor, Headache, Nausea, Cyanosis, Faintness on the entire body

O2 Concentration 10%-6%

Symptoms

Comatose, Loss of consciousness, Muscle spasm on the entire body

O2 Concentration 6% or less

Symptoms

Unconsciousness, Comatose, Cessation of breathing, Cardiac arrest, Die in 6 minutes

Effects of hydrogen sulfide (H_2S) on human body

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Concentration (ppm)	Effects and Toxicity
0.025	Smell vaguely. (It varies according to the individual.)
0.3	Smell clearly.
3 - 5	Smell moderate degree of objectionable odor.
10	Lower-level to irritate eyes' mucus membranes.
20 - 40	A strong odor. Lower-level to irritate lungs' mucous membranes.
100	Sense of smell is impaired in 2 - 15 minutes. Eyes and respiratory tract are irritated in 1 hour. 8 - 48 hours continuous exposure can lead to death.
170 - 300	1 hour exposure is the limit for not causing serious health problems.
400 - 700	Life-threatening exposure in 0.5 - 1 hour.
800 - 900	Bring on loss of consciousness, cessation of breathing and death.
1000	Bring on immediate loss of consciousness and death.

Effects of carbon monoxide (CO) on human body

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Concentration (ppm)	Effects and Toxicity
100	No noticeable effects even after breathing for a few hours.
200	A mild headache in around 1.5 hours.
400 - 500	Headache, nausea and ear ringing in around 1 hour.
600 - 1000	Loss of consciousness in around 1 - 1.5 hours.
1500 - 2000	Headache, vertigo and disabling nausea in around 0.5 - 1 hour, and losing consciousness.
3000 - 6000	Headache, vertigo, disabling nausea...etc. in a few minutes. 10 - 30 minutes exposure can lead to death.
10000	Bring on immediate loss of consciousness and death.

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Applications in Oil and Fossil Fuel Market

Applications in oil and fossil fuel market (Overview of processes)

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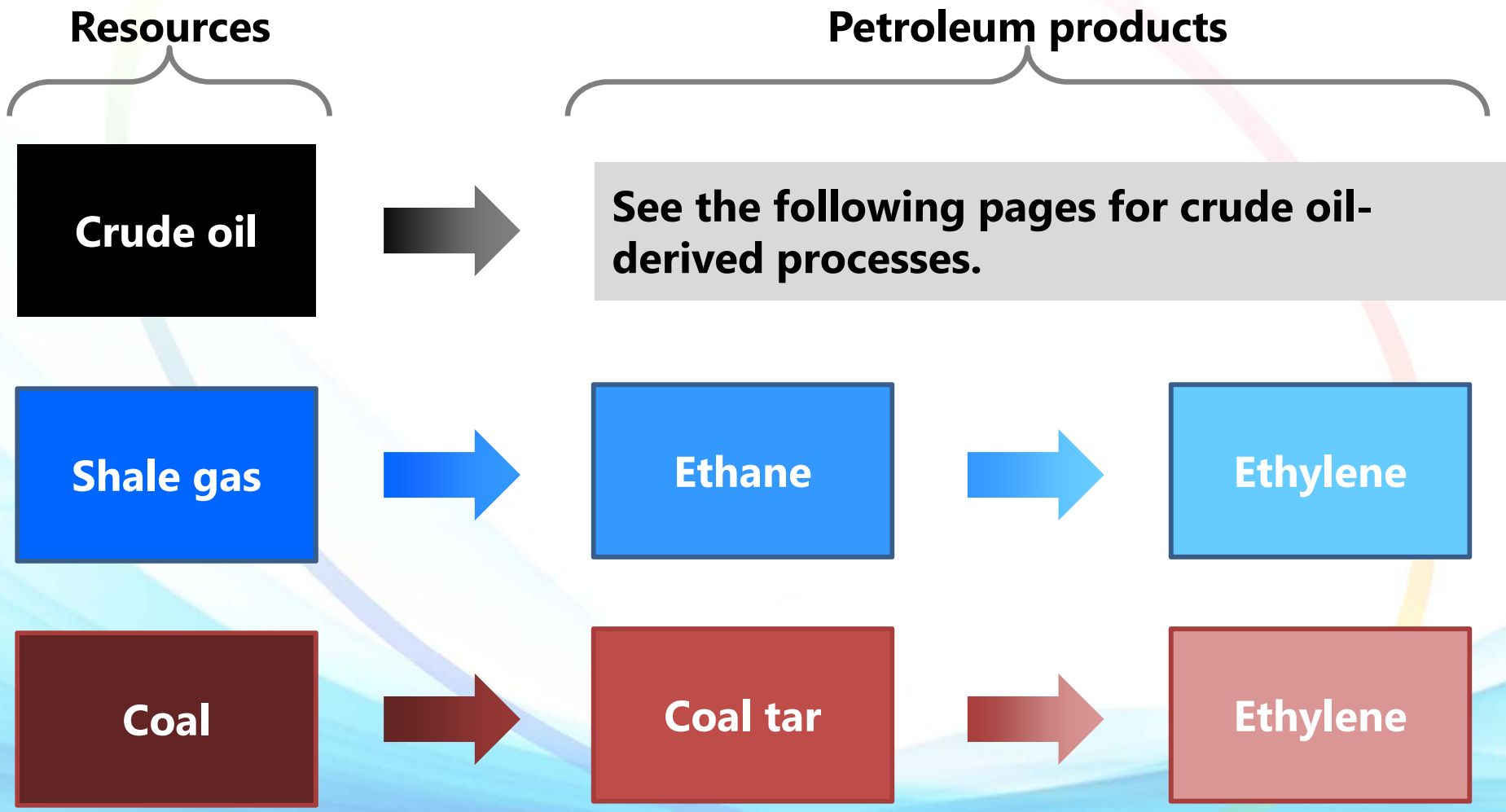
An overview of the oil and fossil fuel market is given below. The oil and fossil fuel market involves the manufacture of various petroleum products from natural resources such as crude oil, shale gas, and coal.



Applications in oil and fossil fuel market

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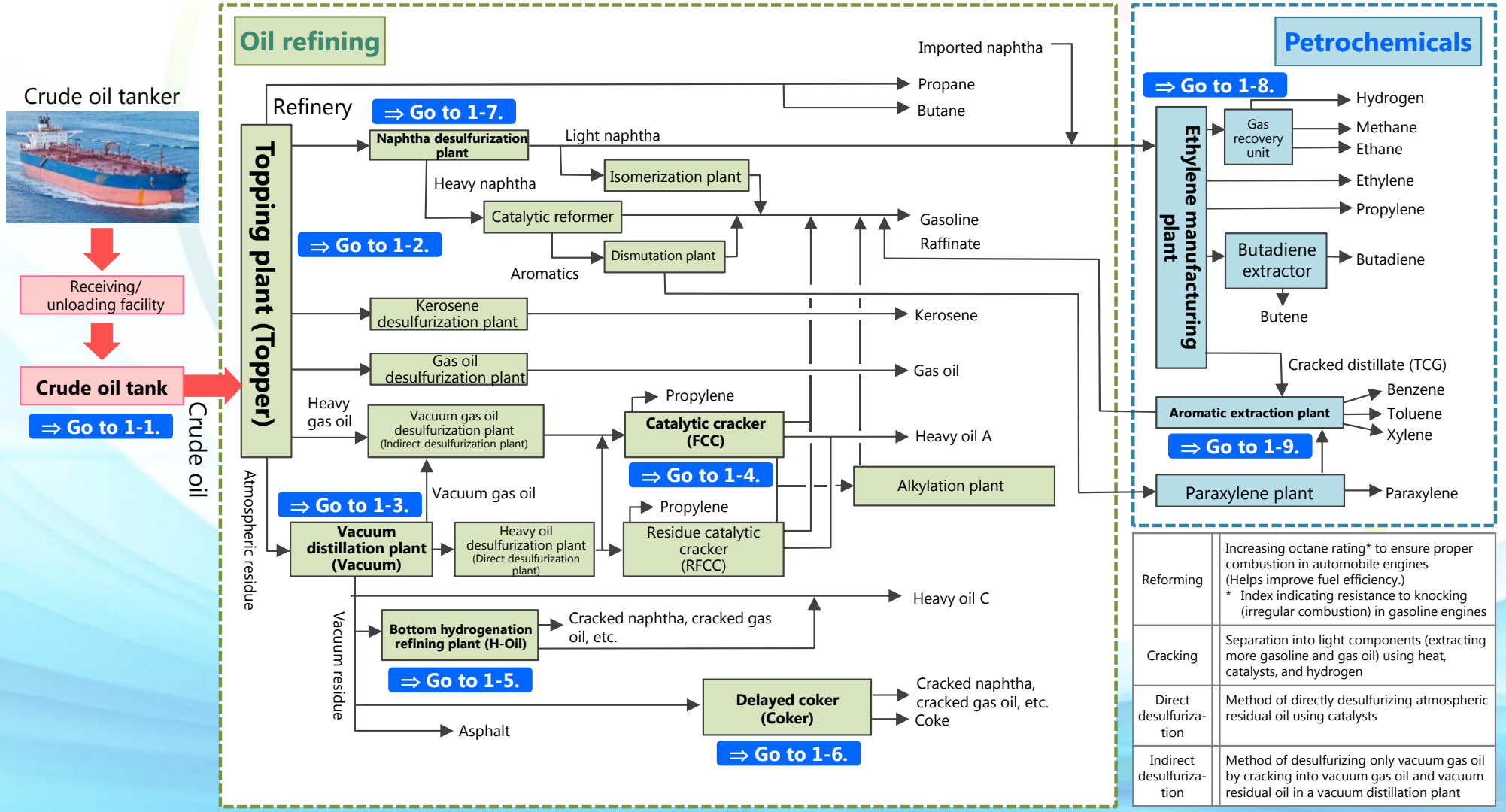
1. Crude oil-derived processes
   - 1-1: Crude oil tank
   - 1-2: Topping plant (Topper)
   - 1-3: Vacuum distillation plant (Vacuum)
   - 1-4: Catalytic cracker (FCC)
   - 1-5: Bottom hydrogenation refining plant (H-Oil)
   - 1-6: Delayed coker (Coker)
   - 1-7: Naphtha desulfurization plant
   - 1-8: Ethylene manufacturing plant
   - 1-9: Aromatic extraction plant
2. Shale gas-derived processes
3. Coal-derived processes
4. Overall plant safety management

1. Crude oil-derived processes

The typical manufacturing processes used to derive products from crude oil are shown below. Gas detectors and alarms are used in each of these processes. The subsequent pages discuss specific risks associated with leaking combustible and toxic gases produced in each process, alongside examples of the installation of various gas detectors and alarms.

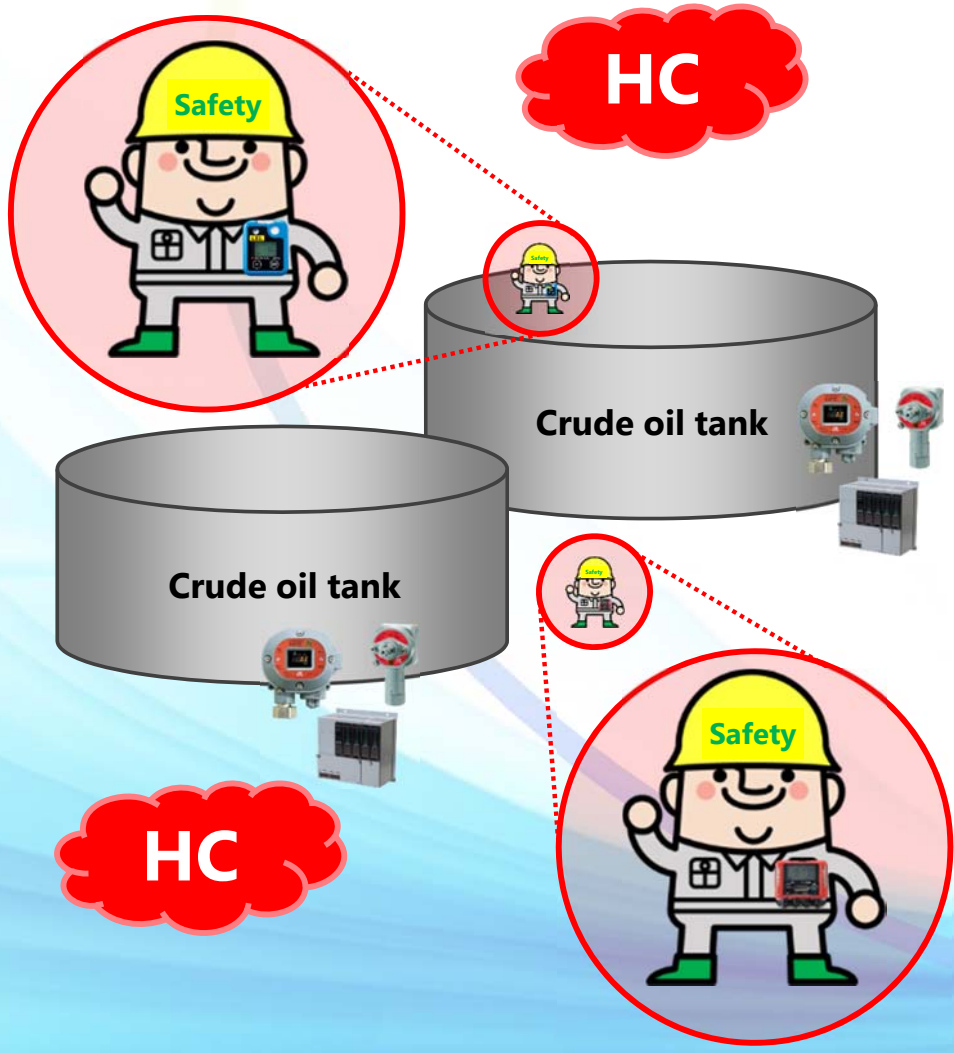


Reforming	Increasing octane rating* to ensure proper combustion in automobile engines (Helps improve fuel efficiency.) * Index indicating resistance to knocking (irregular combustion) in gasoline engines
Cracking	Separation into light components (extracting more gasoline and gas oil) using heat, catalysts, and hydrogen
Direct desulfuriza-tion	Method of directly desulfurizing atmospheric residual oil using catalysts
Indirect desulfuriza-tion	Method of desulfurizing only vacuum gas oil by cracking into vacuum gas oil and vacuum residual oil in a vacuum distillation plant

1-1: Crude oil tank

Description: Crude oil transported is stored in the crude oil tank.

Hazardous risks: **Leaks from the crude oil tank pose explosion risk.** ⇒ **Detecting combustible gas (HC) to prevent explosions**



Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

Personal gas detectors for workers

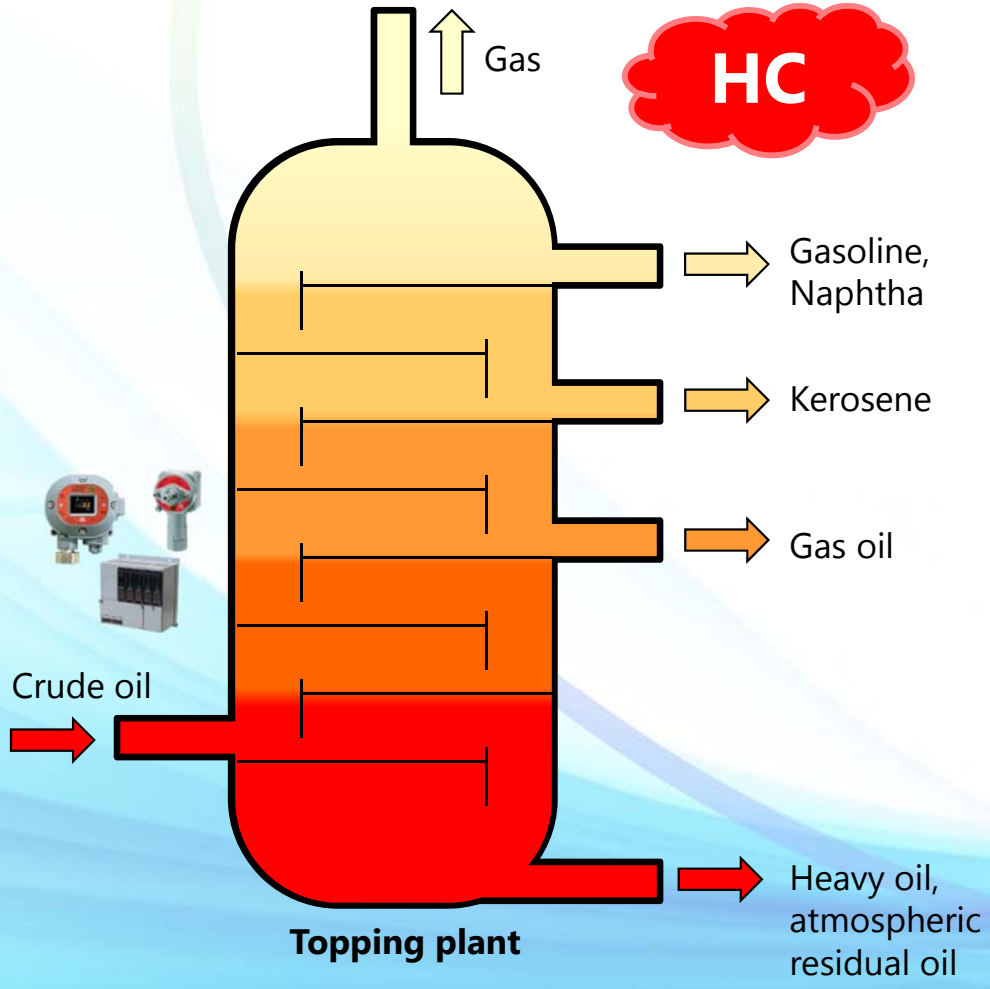
Personal Single Gas Monitors
Model: 03 series

Four Gas Personal Monitor
Model: GX-2009

1-2: Topping plant (Topper)

Description: The topping plant leverages the different boiling points of crude oil to separate components into semifinished products such as gasoline, naphtha, kerosene, gas oil, and heavy oil.

Hazardous risks: **Leaks from the topping plant pose explosion risk.** ⇒ **Detecting combustible gas (HC) to prevent explosions**



Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

Personal gas detectors for workers

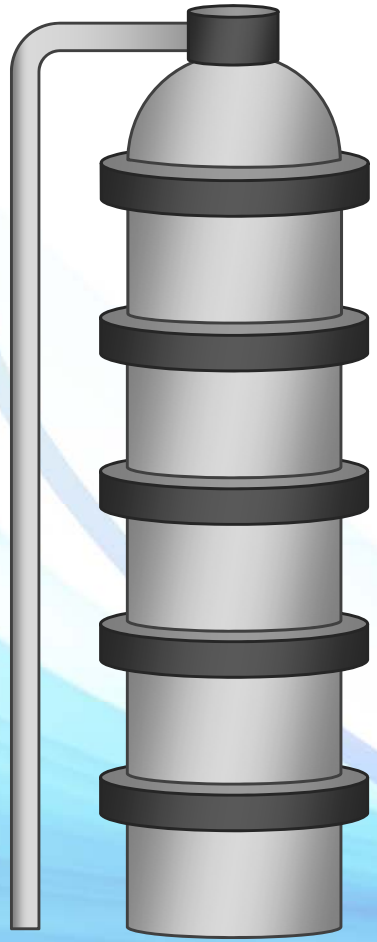
Personal Single Gas Monitors
Model: 03 series

Four Gas Personal Monitor
Model: GX-2009

1-3: Vacuum distillation plant (Vacuum)

Description: The vacuum distillation plant distills atmospheric residual oil from the topping plant under reduced pressure to separate it into vacuum residue, heavy oil, gas oil, and other components.

Hazardous risks: **Leaks from the vacuum distillation plant pose explosion risk.** ⇒ **Detecting combustible gas (HC) to prevent explosions**



Vacuum distillation plant

Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

Personal gas detectors for workers

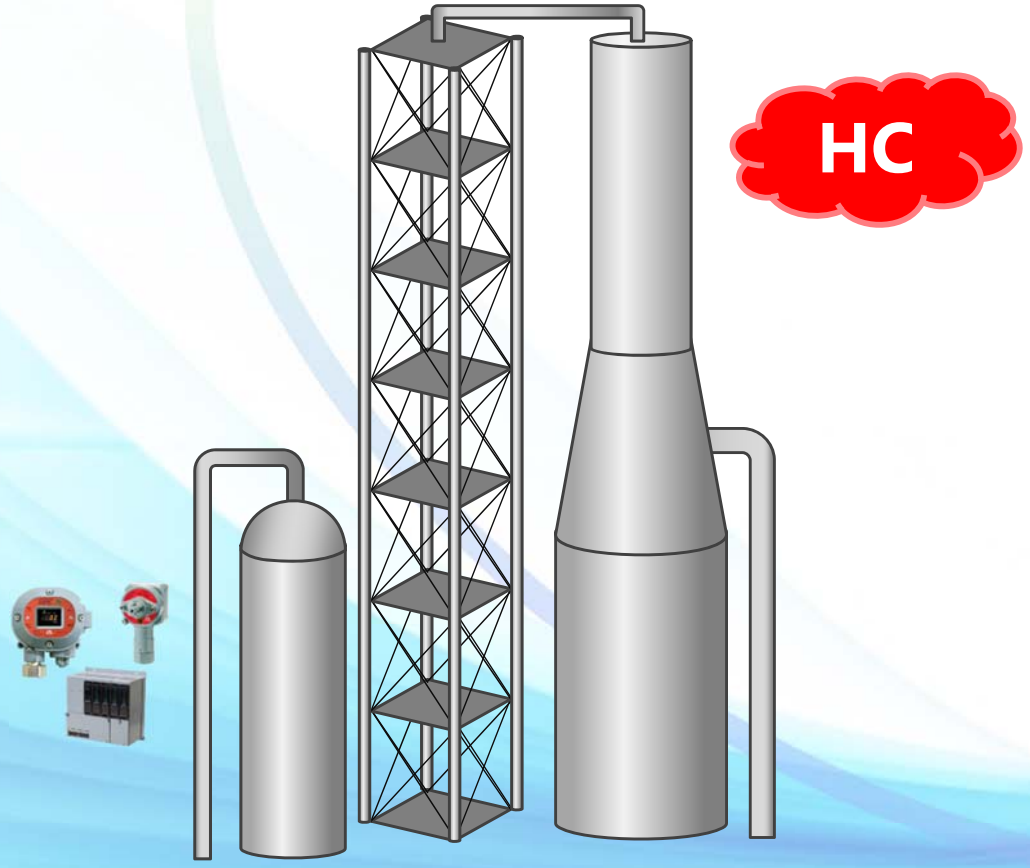
Personal Single Gas Monitors
Model: 03 series

Four Gas Personal Monitor
Model: GX-2009

1-4: Catalytic cracker (FCC)

Description: The catalytic cracker (FCC) cracks residual heavy oil into light residual components using a high-temperature catalyst. This plant increases gasoline extraction rates at oil refineries.

Hazardous risks: **Leaks from the catalytic cracker pose explosion risk.** ⇒ **Detecting combustible gas (HC) to prevent explosions**



Catalytic cracker

Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

Personal gas detectors for workers

Personal Single Gas Monitors
Model: 03 series

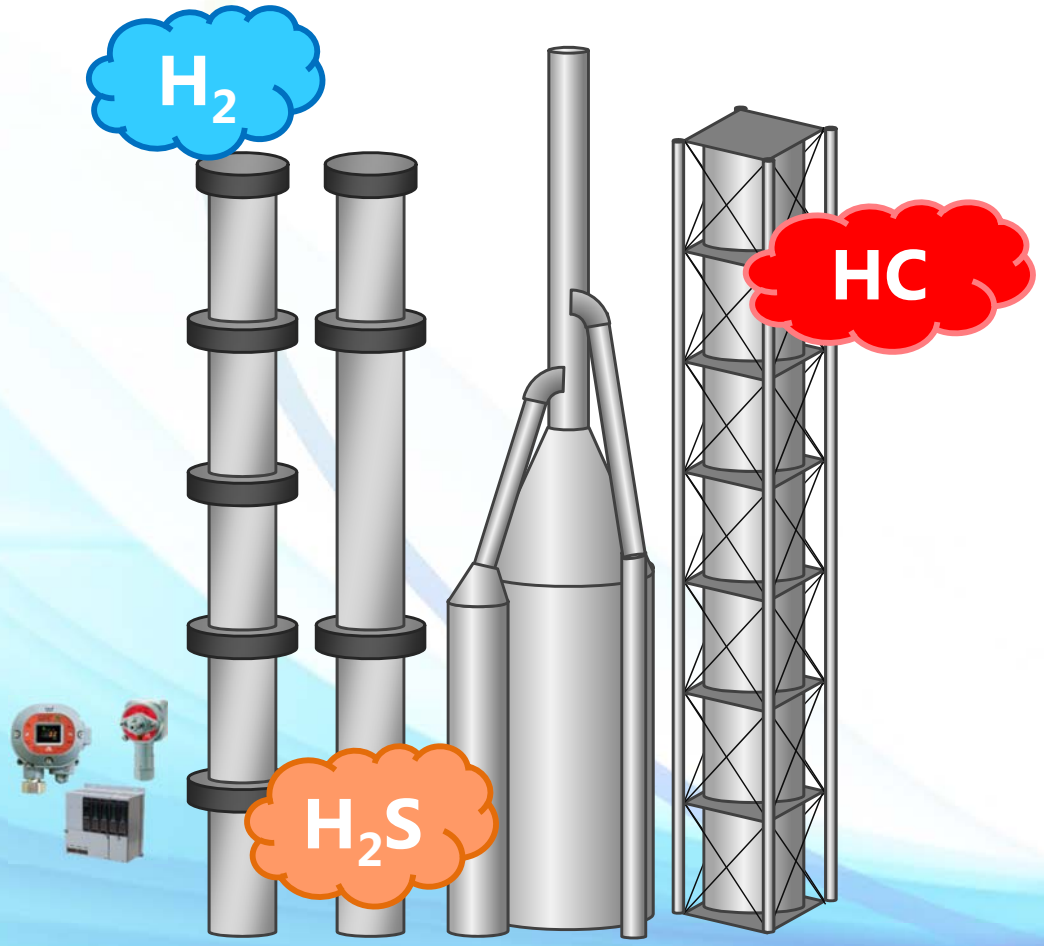
Four Gas Personal Monitor
Model: GX-2009

1-5: Bottom hydrogenation refining plant (H-Oil)

Description: The bottom hydrogenation refining plant (H-Oil) produces cracked naphtha and cracked gas oil by removing sulfur within the residual oil by hydrogenation reaction with a catalyst.

Hazardous risks: **Leaks from the bottom hydrogenation refining plant pose explosion risk and poisoning risk.**

⇒ **Detecting combustible gas (HC, H_2) to prevent explosions**
Detecting H_2S to prevent poisoning



Bottom hydrogenation refining plant

Combustible gas (HC, H_2) detector heads

Smart Transmitter/ Gas Detector
Model: **SD-1**

Combustible Gas Detector Head
Model: **GD-A80**

H_2S detector head

Smart Transmitter/ Gas Detector
Model: **SD-1EC**

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: **GP-5001**
Model: **NC-5001**

Personal gas detectors for workers

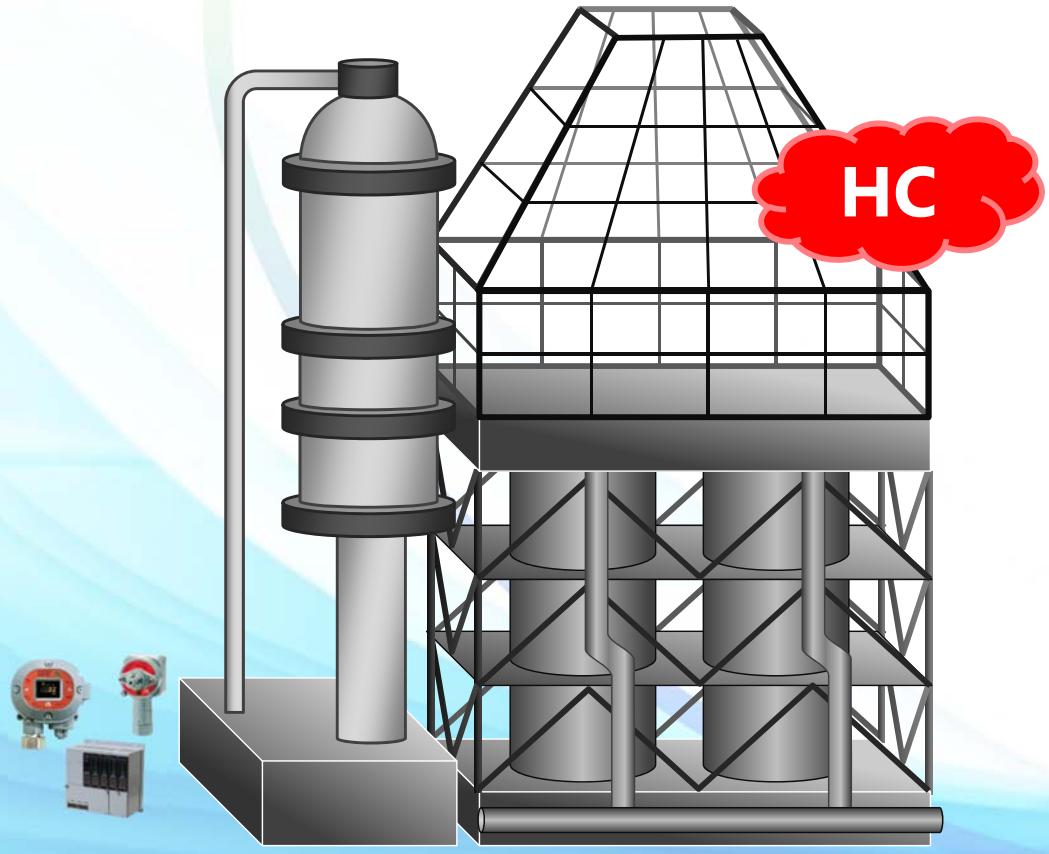
Personal Single Gas Monitors
Model: **03 series**

Four Gas Personal Monitor
Model: **GX-2009**

1-6: Delayed coker (Coker)

Description: The delayed coker (coker) produces gasoline and gas oil by thermal cracking of the vacuum residual oil at high temperature, which otherwise only becomes heavy oil C base material or asphalt.

Hazardous risks: **Leaks from the delayed coker pose explosion risk.** ⇒ **Detecting combustible gas (HC) to prevent explosions**



Delayed coker

Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

Personal gas detectors for workers

Personal Single Gas Monitors
Model: 03 series

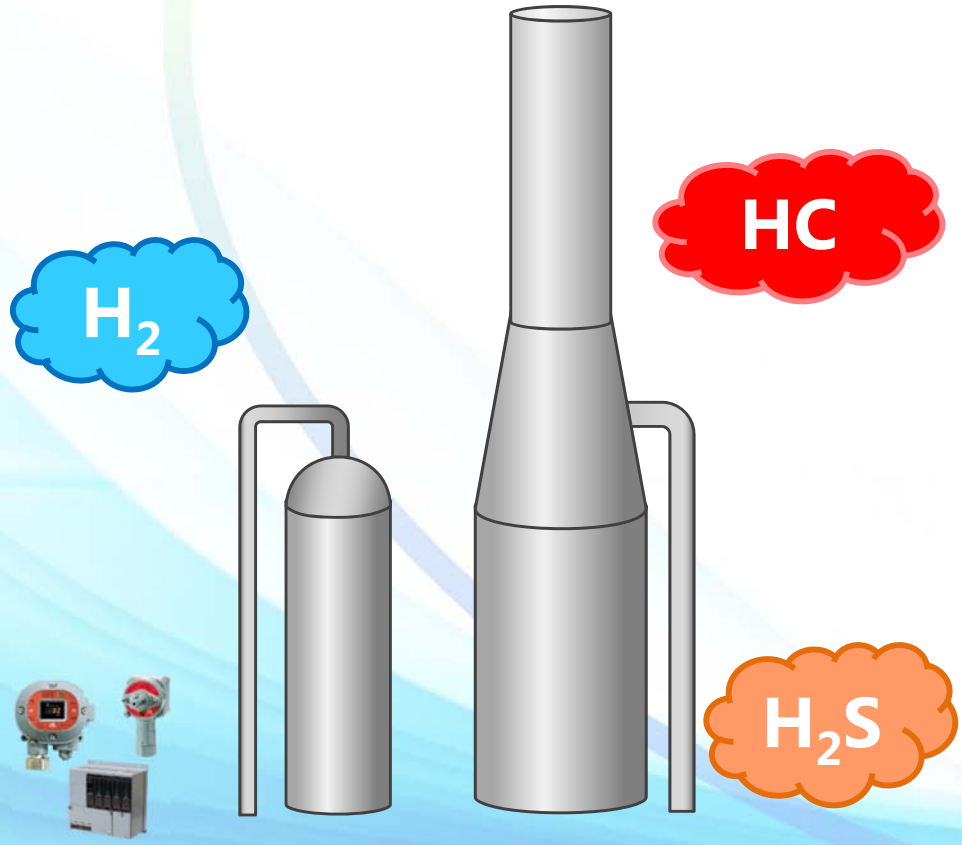
Four Gas Personal Monitor
Model: GX-2009

1-7: Naphtha desulfurization plant

Description: The naphtha desulfurization plant removes sulfur and other impurities from the naphtha fraction to produce raw materials for use in ethylene plants and catalyst reformers.

Hazardous risks: **Leaks from the naphtha desulfurization plant pose explosion risk and poisoning risk.**

⇒ **Detecting combustible gas (HC, H_2) to prevent explosions**
Detecting H_2S to prevent poisoning



Naphtha desulfurization plant

Combustible gas (HC, H_2) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

H_2S detector head

Smart Transmitter/ Gas Detector
Model: SD-1EC

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

Personal gas detectors for workers

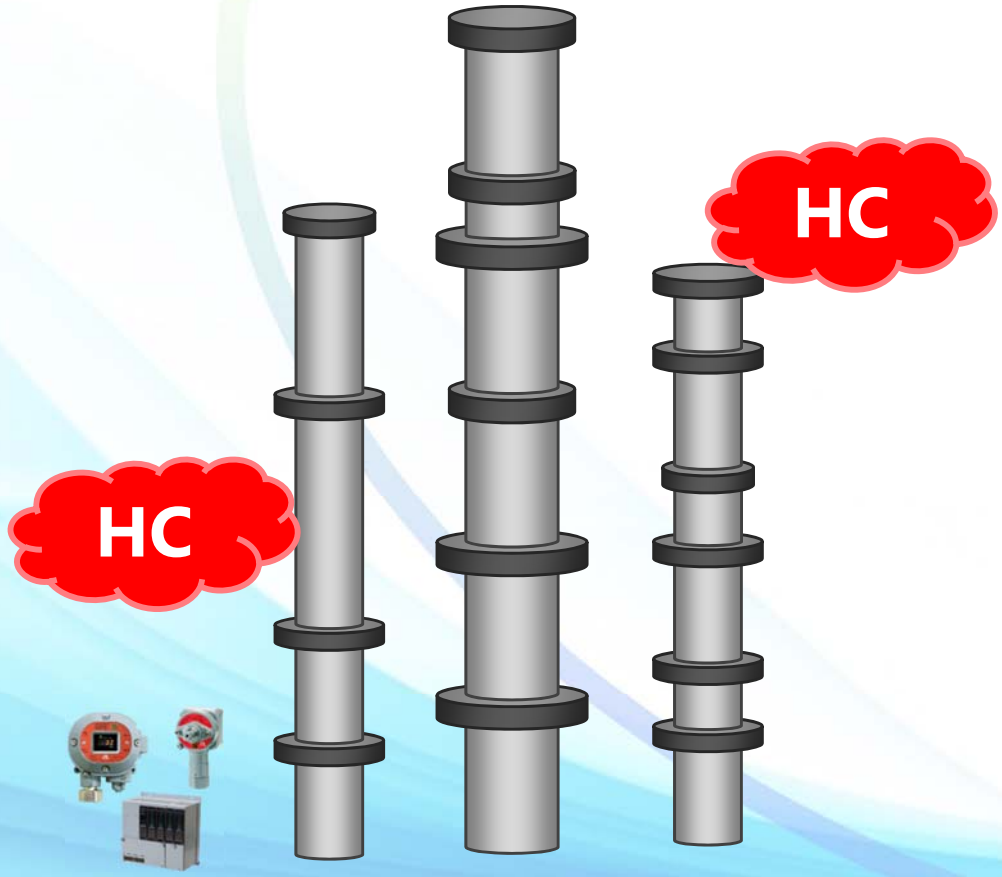
Personal Single Gas Monitors
Model: 03 series

Four Gas Personal Monitor
Model: GX-2009

1-8: Ethylene manufacturing plant

Description: The ethylene manufacturing plant thermally cracks naphtha into hydrocarbons of lower molecular weight containing olefins such as ethylene and propylene and separates them into their respective components.

Hazardous risks: **Leaks from the ethylene manufacturing plant pose explosion risk.** ⇒ **Detecting combustible gas (HC) to prevent explosions**



Ethylene manufacturing plant

Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: **SD-1**

Combustible Gas Detector Head
Model: **GD-A80**

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: **GP-5001**
Model: **NC-5001**

Personal gas detectors for workers

Personal Single Gas Monitors
Model: **03 series**

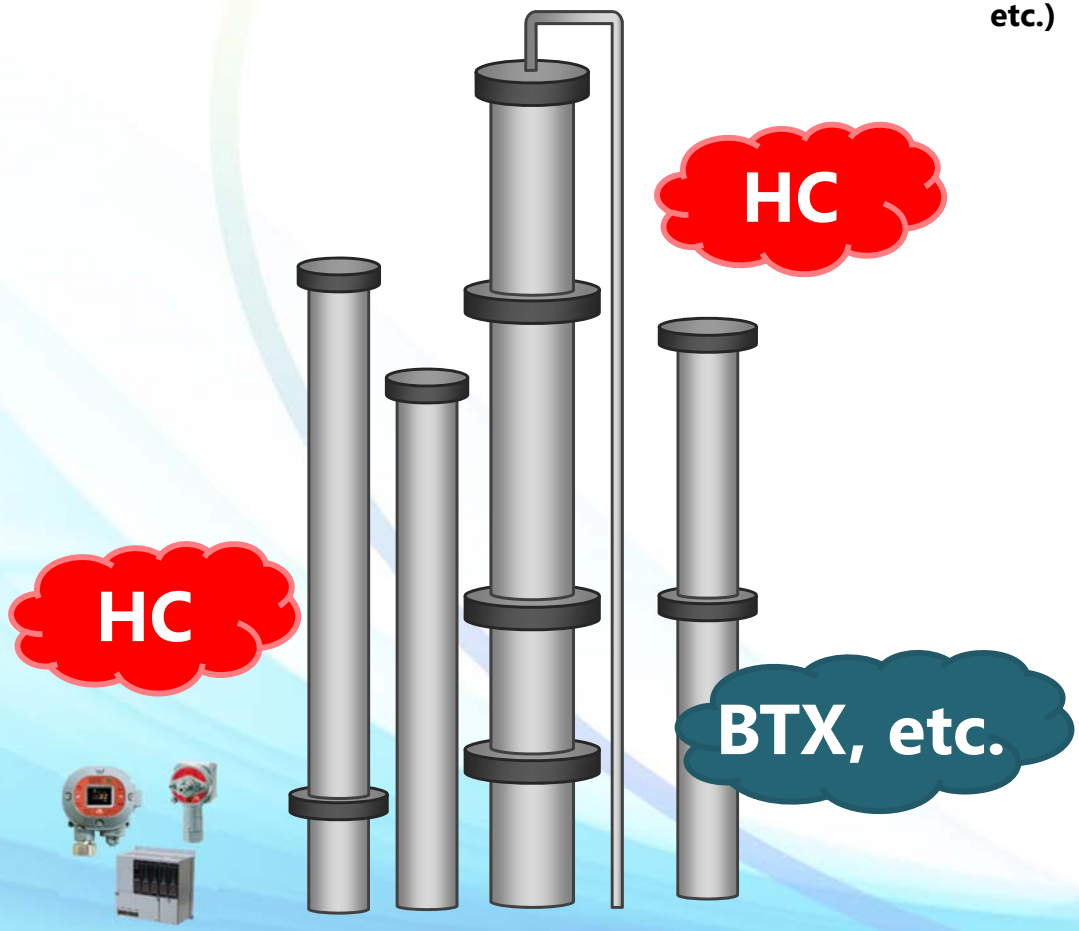
Four Gas Personal Monitor
Model: **GX-2009**

1-9: Aromatic extraction plant

Description: The aromatic extraction plant extracts benzene, toluene, and xylene from thermal cracking residual oil (oil produced as by-product in ethylene manufacture) and reformed gasoline.

Hazardous risks: **Leaks from the aromatic extraction plant pose poisoning and explosion risks.**

⇒ **Detecting combustible gas (HC) to prevent explosions**
Preventing poisoning due to VOC (BTX, etc.)



Aromatic extraction plant

Combustible gas (HD) detector heads

Smart Transmitter/ Gas Detector
Model: SD-1

Combustible Gas Detector Head
Model: GD-A80

Combustible gas monitor

Multi-channel Gas Monitoring System
Model: GP-5001
Model: NC-5001

VOC monitor

Portable Multi Gas Detector
Model: GX-6000

Personal gas detectors for workers

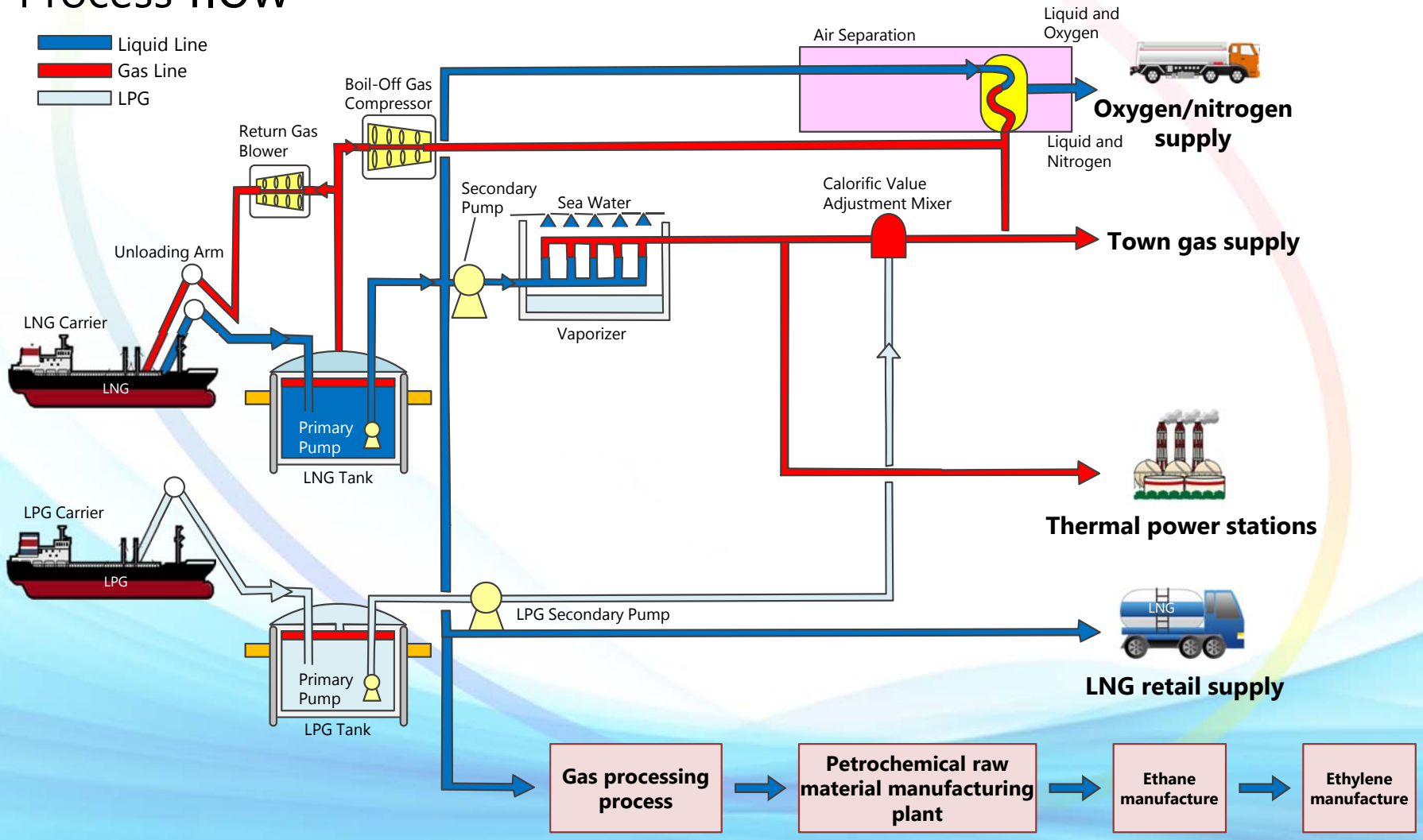
Personal Single Gas Monitors
Model: 03 series

Four Gas Personal Monitor
Model: GX-2009

2. Shale gas–derived processes

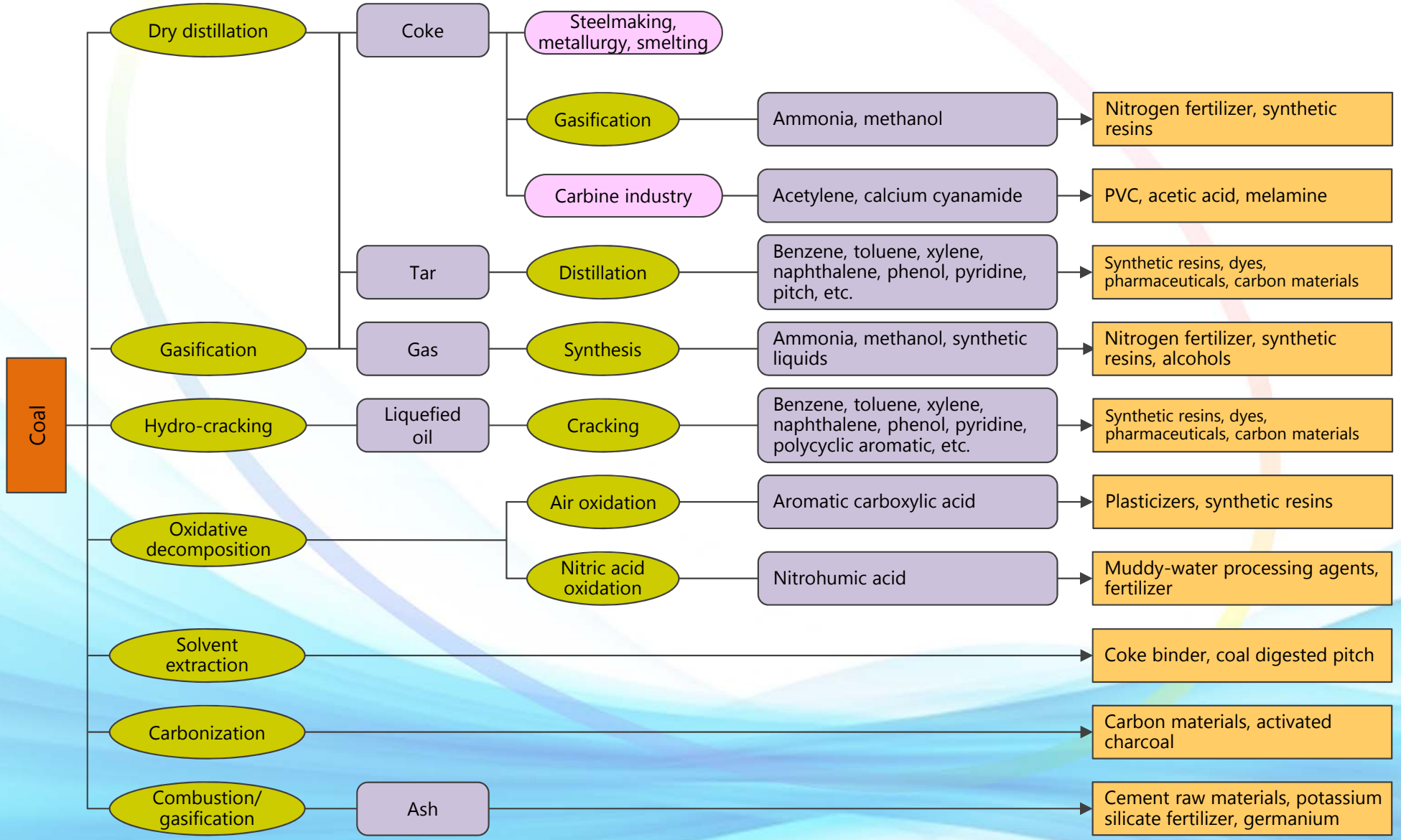
The typical manufacturing processes used to derive products from shale gas are shown below. Gas detectors and alarms are used in each of the processes.

Process flow



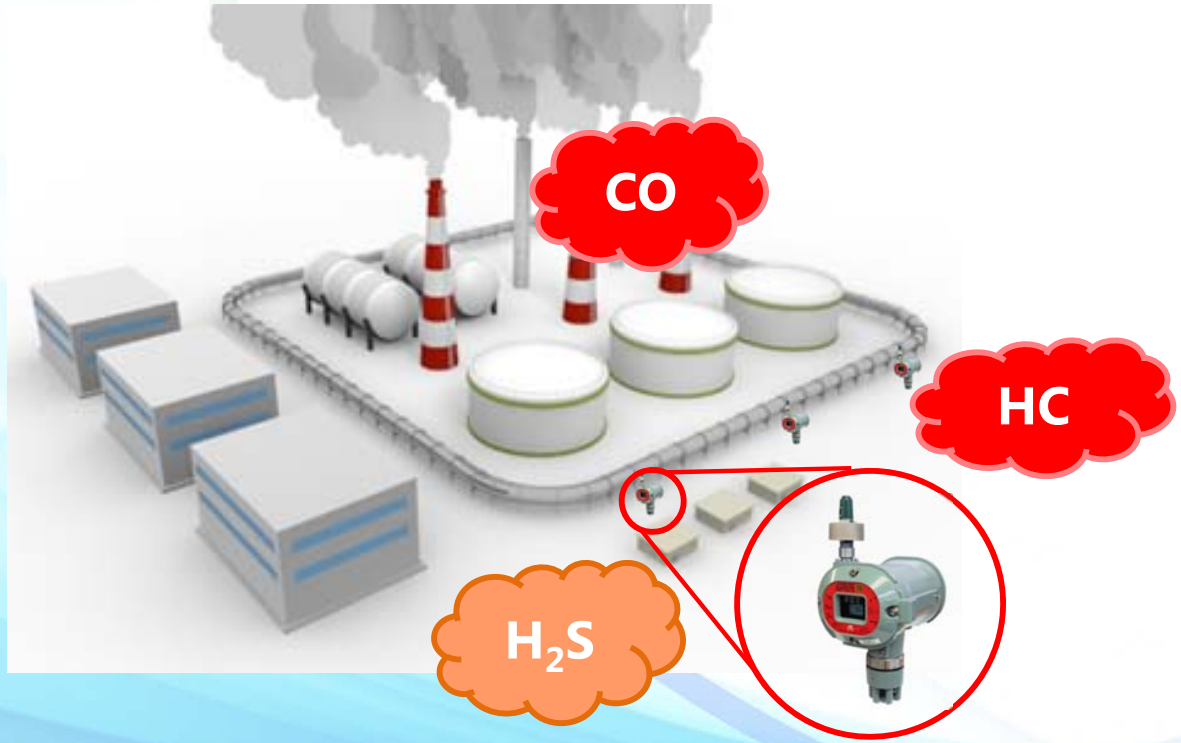
3. Coal-derived processes

The typical manufacturing processes used to derive products from coal are shown below. Gas detectors and alarms are used in each process.



4. Overall plant safety management

- A wide range of boundary monitors are used to manage overall plant safety.
- In addition to serving as boundary monitors, wireless gas detectors can also be used for monitoring wide areas and as temporary gas detectors.



Plant

Gas detector heads that can be used as boundary monitors

Fixed
Wireless
Gas Detectors
Model:
SDWL-1 series

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Major Examples of Accidents

Prepared by extracting and processing materials from the Safety at Work Site
(Ministry of Health, Labour and Welfare: http://anzeninfo.mhlw.go.jp/index.html)

Case of fatal carbon monoxide poisoning during recovery of cleaning wastewater from an LCG impurity removal plant

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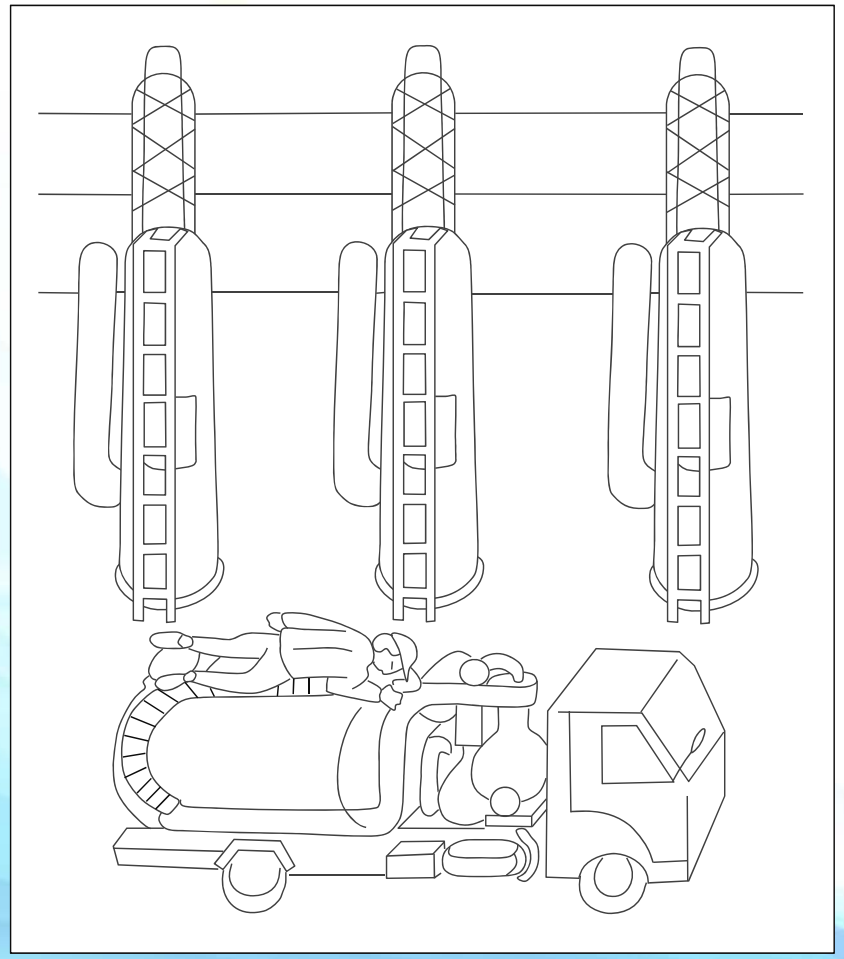


[Location of accident]

The accident occurred at an impurity removal plant for LCG (low-calorie gas containing 24.5% carbon monoxide) produced as a by-product in oil refining.

[Cause of accident]

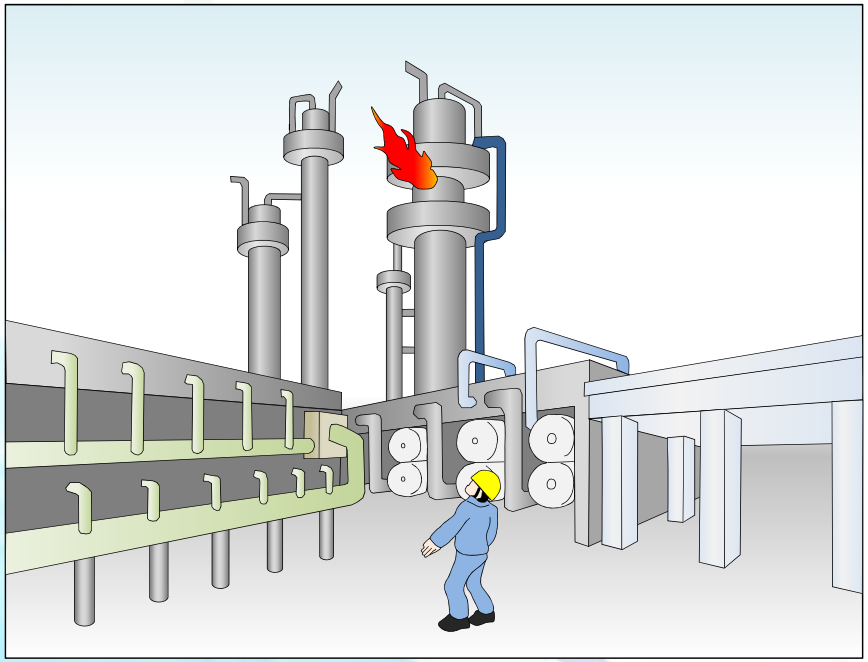
The top demister (metal mesh impurity remover) removes LCG impurities and needs to be cleaned when it clogs. This is typically once or twice a month. The wastewater here is transferred to the water tank until the water tank is 70% full, then discharged until the level falls to 10%. This keeps LCG from flowing from the water outlet. In this case, all water was drained from the water tank and LCG flowed through the connected pipe into the wastewater collection dump truck.

[Damage/injuries]

A worker near the inspection hatch on the top of the dump truck died after inhaling LCG.

Wearing gas detectors on a routine basis enables early detection of toxic gas leaks and improves work safety.

Case of naphtha leakage and fire at an oil refinery plant



[Location of accident]

The accident occurred in a desulfurization stripping tower at a heavy gas oil hydrogenation desulfurizing plant located inside an oil refinery plant (tower used to separate naphtha from oil at low pressure to extract desulfurized oil; operates at 228°C and 0.38 Mp).

[Cause of accident]

Hydrocarbons, primarily naphtha, leaked from a hole near the top of a desulfurization stripping tower. (This hole had formed from the interior due to corrosion at a location previously repaired by build-up welding.) A worker observed flames emanating from a gap in the window of the heat protection plate, close to the top of the tower.

[Damage/injuries]

The control center was immediately notified and the plant shut down because of the emergency. The fire was subsequently put out.

Wearing gas detectors on a routine basis enables early detection of combustible gas leaks and improves work safety.

Case of explosion while loading gas oil onto a tank truck

[Location of accident]

The accident occurred at a tank truck allocated to oil tank (with a load capacity of up to 20 kl of gasoline, kerosene, gas oil, or heavy oil).

[Cause of accident]

Gas oil was being loaded into the tank truck through the oil refinery loading hose without securing the electrical conduction of the hose and the tank of the truck. The gas oil inside the hose generated static electricity due to streaming electrification, and a spark occurred. Since the tank had not been flushed to remove kerosene vapor remaining from when the tank was last used to load kerosene, the spark ignited the kerosene vapor filling the tank, causing an explosion. The flames spread over the entire tank truck and to the work clothes of a worker standing on top of the truck. The fire on the work clothes was extinguished with tap water.

[Damage/injuries]

The victim was immediately taken to hospital and subsequently missed work for nine months for treatment for burn injuries.

Wearing gas detectors on a routine basis enables early detection of combustible gas leaks and improves work safety.

Case of hydrogen sulfide poisoning during pipe work

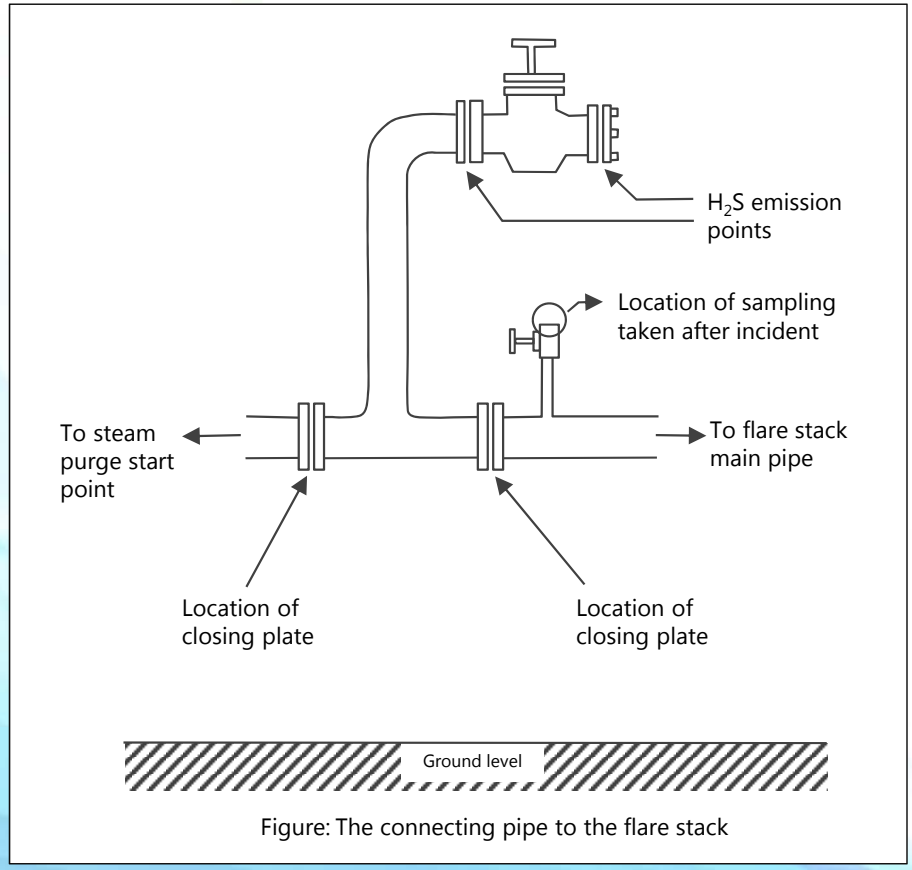


Figure: The connecting pipe to the flare stack

[Location of accident]

The accident occurred in a connecting pipe (large-diameter pipe and branches connected to various facilities within the site) mounted on a flare stack (facility for burning off waste combustible gas produced during oil refining) at an oil refinery.

[Cause of accident]

A worker was replacing a valve and its mounting flange. The flange had been installed improperly during the earlier installation of a connecting pipe to supply LPG from the LPG tank as supporting gas for the flare stack. The worker failed to close the connecting valve on the large-diameter pipe side while removing the closing plate on the connecting pipe during valve installation, resulting in the release of combustible gas containing hydrogen sulfide from the flange and valve. Another worker located downwind collapsed after inhaling the gas.

[Damage/injuries]

The victim was moved by other workers to a location seven to eight meters away and eventually regained consciousness. The victim complained of a headache; in response, oxygen was administered, and the worker was transported to the hospital by ambulance.

Wearing gas detectors on a routine basis enables early detection of toxic gas leaks and improves work safety.

RIKEN KEIKI

Product Information

RIKEN KEIKI

GP-03 (For combustible gases)

OX-03 (For oxygen)

HS-03 (For hydrogen sulfide)

CO-03 (For carbon monoxide)

Personal
Single Gas Monitors

Model:
03 series

Features

- Models powered by rechargeable batteries have been added to the product line.
- Standard protective cover protects the main unit from scratches, dirt, and impact.
- Compact, lightweight design doesn't interfere with work.
- Inherently safe and explosion-proof enclosure is ideal for use in hazardous locations.

RIKEN KEIKI

Four Gas Personal Monitor

Model: GX-2009

Features

- Explosion-proof product that can be used in hydrogen/acetylene atmospheres
- Protection rating equivalent to IP 67 ensures safe use for outdoor work.
- Three-direction alarm lamps and two-direction alarm buzzers to alert both the carrier and those in surrounding areas
- Buzzer volume of 95 dB or more can be clearly heard even in noisy factory environments.
- Simultaneous display of gas concentrations of up to four components on large LCD screen
- Also equipped with clock display and data logger functions

Type list

Components	Type	Gas types
4-component	TYPE A/H/T	O_2, LEL, H_2S, CO
3-component	TYPE B/H/T	O_2, LEL, H_2S
	TYPE C/T	O_2, LEL, CO
2-component	TYPE D/T	O_2, LEL
	TYPE E/H/T	O_2, H_2S
	TYPE F/T	O_2, CO
	TYPE I/T	LEL, CO
	TYPE J	H_2S, SO_2

RIKEN KEIKI

Portable
Multi Gas Detector

Model:
GX-6000

Features

- A single unit can simultaneously display up to six types of gases, including VOCs. This product is the first of its kind from a Japanese manufacturer.
- The PID sensor enables measurements of more than 200 types of target chemical substances.
- Ideal for checking the risks and hazards of chemical substances as required under the Industrial Safety and Health Act
- Support for multilingual display (Japanese, English, French, Spanish, etc.)
- Equipped with convenient new functions, including panic alarm and LED flashlight

RIKEN KEIKI

SD-1
SD-1RI
(For combustible gases)

SD-1GH
(For combustible/ toxic gases)

SD-1EC
(For carbon monoxide/ hydrogen sulfide)

SD-1OX
(For oxygen)

Smart Transmitter/
Gas Detectors

Model:
SD-1 series

Features

- Explosion-proof products that can be used in hydrogen/acetylene atmospheres
- Waterproof/dustproof enclosure (IP 65 equivalent) allows deployment in severe environments.
- Supports HART Communication Protocol, allowing transmission of more information over legacy analog 4-20 mA connections.

  * Excluding SD-1 (TYPE NC)
- SD-1RI, SD-1EC, and SD-1OX are SIL 2 certified in all parts of the functional safety standard, marking a first for Japanese manufacturers.
- Using the suction cap for the SD-1 series and connecting the detector to a suction pump or an aspirator unit enables suction type operation.

RIKEN KEIKI

SDWL-1RI
(For combustible gases)

SDWL-1EC
(For carbon monoxide/
hydrogen sulfide)

SDWL-1OX
(For oxygen)

Fixed Wireless
Gas Detectors

Model:
SDWL-1 series

Features

- Wireless transmission function makes these products ideal for improving safety management in locations where wiring presents problems.
- Conforms to ISA 100.11a standard specification, enabling connection to other manufacturers' instruments.
- Battery pack completely eliminates wiring. Fully standalone
- Mounting configuration allows easy installation anywhere.
  (with dedicated mounting bracket)
- Pressure resistant and inherently safe explosion-proof construction

  * TIIS explosion-proof certification pending

RIKEN KEIKI

GD-A80
(For combustible gases)

GD-A80V
GD-A80S*
(For combustible or toxic gases)
* The GD-A80S nameplate is blue.

Features

- Explosion-proof rating Exd II CT4 allows use in hydrogen and acetylene atmospheres.
- Suction type and aspirator suction type operations are supported.
  (* A pump unit and a power supply [available separately] are required.)
- The GD-A80-70 is also provided as a combustible gas detector head for use in high-temperature environments up to 70°C (normally 53°C).

Combustible/Toxic
Gas Detector Heads

Model:
GD-A80 series

RIKEN KEIKI

Multi-case

Single case

Features

- System options include a wide range of gas detector heads.
- Gas concentrations are displayed in two ways: bar meter and digital display.
- High-contrast three-color LCD improves visibility of detected state.
- Equipped with RS-485 communication function (optional)

Multi-channel Gas Monitoring Systems

Model: RM-5000 series

RIKEN KEIKI

International Agents

RIKEN KEIKI

International Agents

North America

South America

Asia and Pacific

Russia and Central Asia

Europe

Middle East

Africa

RIKEN KEIKI

International agents (table of contents)

North America	U.S.A.				
South America	Brazil	Argentina	Peru	Chile	Uruguay
Asia and Pacific	China	South Korea	Taiwan	Singapore	Malaysia
	Indonesia	Thailand	India	Vietnam	Philippines
	Australia				
Europe	Germany	Greece	THE NETHERLANDS	Norway	Turkey
	U.K.				
Middle East	U.A.E.	Israel			
Africa	South Africa				
Russia and Central Asia	Russia				

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RIKEN KEIKI

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