



**December 18, 2023**

# **Management Briefing**

**KURARAY CO., LTD.**

# U.S. EVAL Plant Fire Incident Investigation Results

## **Hitoshi Kawahara**

President and Representative Director

## **Satoshi Tanaka**

Outside Director

## **Akira Omura**

Managing Executive Officer

Officer Responsible for Technology Division;

Officer Responsible for Plants in Japan;

Officer Responsible for Environment and  
Industrial Safety Management Center

## ■ Purposes of the Investigation

- Identify the root causes of the Incident, compile measures to prevent recurrence, and share within the Kuraray Group
- Fulfil accountability to stakeholders

### Summary of the Incident

- On May 19, 2018, a fire incident occurred at the EVAL plant of Kuraray America, a U.S. subsidiary.
- Investigation by U.S. authorities has already been completed.
- Settlements have been reached with all of the plaintiffs on the civil lawsuit that had been brought against Kuraray America.

**We will steadily implement preventive measures and aim to further strengthen safety and risk management systems throughout the Group.**

### ■ Incident Investigation Committee (established May 2023)

- Comprised of five members, primarily of outside officers (independent officers)

Chair	Outside Director	Satoshi Tanaka
Member	Outside Director	Jun Hamano
Member	Full-time Member of Audit & Supervisory Board	Kazuhiro Nakayama
Member	Outside Member of Audit & Supervisory Board	Tomomi Yatsu
Member	Outside Member of Audit & Supervisory Board	Kenji Komatsu

### ■ Investigation Team

- Established under the Incident Investigation Committee
- Comprised of in-house members who are well-versed in the company's affairs and have expertise in their respective fields
- Investigated from the perspectives of technology, governance, and dealing with litigation



### ■ Summary of Fire Incident

Time and Date: 10:28am on May 19, 2018

Place: Polymerization process area of the second production line of Kuraray America's EVAL Plant

- Progress:
- 1) As pressure rose in the polymerization reactor due to ethylene, the ethylene condensed due to refrigerant flow.
  - 2) Temperature inside the reactor abnormally dropped due to ethylene condensation.
  - 3) Operators began to heat the polymerization reactor jacket in response to the drop in temperature.
  - 4) Heating of the polymerization reactor jacket caused the ethylene liquid to vaporize, and pressure in the reactor began to rise.
  - 5) Operators released the pressure control valve (PCV), but the ethylene release limit guide alerted, and they hesitated to release PCV further.
  - 6) Before activating the emergency open valve to reduce pressure in the reactor, pressure within the reactor reached the setting value for the pressure safety valve (PSV), and ethylene was then discharged into the atmosphere from the PSV discharge port.

Investigation Results	Recurrence Prevention Measures
<p>Abnormal rise in pressure in the polymerization reactor due to erroneous manual operation</p>	<ul style="list-style-type: none"> <li>• Switched to safety apparatus designed not to rely on human actions</li> <li>• Established standards for operational tasks. Implemented measures to address unclear work instructions</li> <li>• Implemented measures to compensate for insufficient understanding among operators (visualizing condition inside the polymerization reactor on a control computer)</li> <li>• Bolster involvement of Corporate HSE (Health, Safety, Environment) at Kuraray America in safety activities at plants and engage in activities to improve communication with each plant</li> </ul>
<p>Insufficient risk assessment for the positioning of the discharge port in the safety valve</p>	<ul style="list-style-type: none"> <li>• Changed the position of the discharge port to a safer one that is unlikely to cause human harm</li> </ul>
<p>Lax enforcement of restrictions on work-related permissions including for fire-using operations and access by unrelated personnel during high-risk startup operations</p>	<ul style="list-style-type: none"> <li>• Strengthened the organization by putting personnel with seasoned knowledge of production technology into the roles of president and business heads at Kuraray America</li> <li>• Establish and enact the rules such as restrictions on access by personnel other than those related to startup operations, and standards for evacuation warnings when problems occur at the plant</li> </ul>

<b>Investigation Results</b>	<b>Recurrence Prevention Measures</b>
<ul style="list-style-type: none"><li>• Kuraray America’s EVAL plant had an autonomous safety and disaster prevention system in which almost all operational decisions were made by the plant manager.</li><li>• There was a strong element of decisions being made by the plant manager on a personal level, resulting in a governance system that was easily influenced by the demands of the local business.</li></ul>	<ul style="list-style-type: none"><li>• Assign dedicated persons in charge of safety management for production processes (Process Safety Management) and occupational safety in production processes. Establish common guidelines and arrange standards that should be met for all Kuraray America plants</li><li>• Strengthen the safety governance system of Kuraray America as a whole<ol style="list-style-type: none"><li>1) Bolster the corporate support structure by reassigning technical personnel and assigning more of them</li><li>2) Improve employee safety awareness and risk prediction capabilities</li><li>3) Produce thorough documentation of safety systems</li><li>4) Clarify the hiring requirements for plant executives</li></ol></li></ul>

### ■ Lawsuit

- 34 lawsuits from 164 plaintiffs brought against Kuraray America
- Sought to make the court proceedings more efficient and quicker through a court procedure before the trial by a jury, but some of the lawsuits took around five years to settle. The amount needed to pay off the settlements was approx. ¥80 billion (of which approx. ¥10 billion was covered by insurance).

### Investigation Results

Plaintiffs had little incentive to reach a quick settlement.

- Not being able to individually verify the details of the harm suffered by the plaintiffs when the Incident occurred
- Verdicts in Texas injury cases were climbing into high dollar amounts
- Court procedures were suspended due to the COVID-19 pandemic, etc.



## Recurrence Prevention Measures

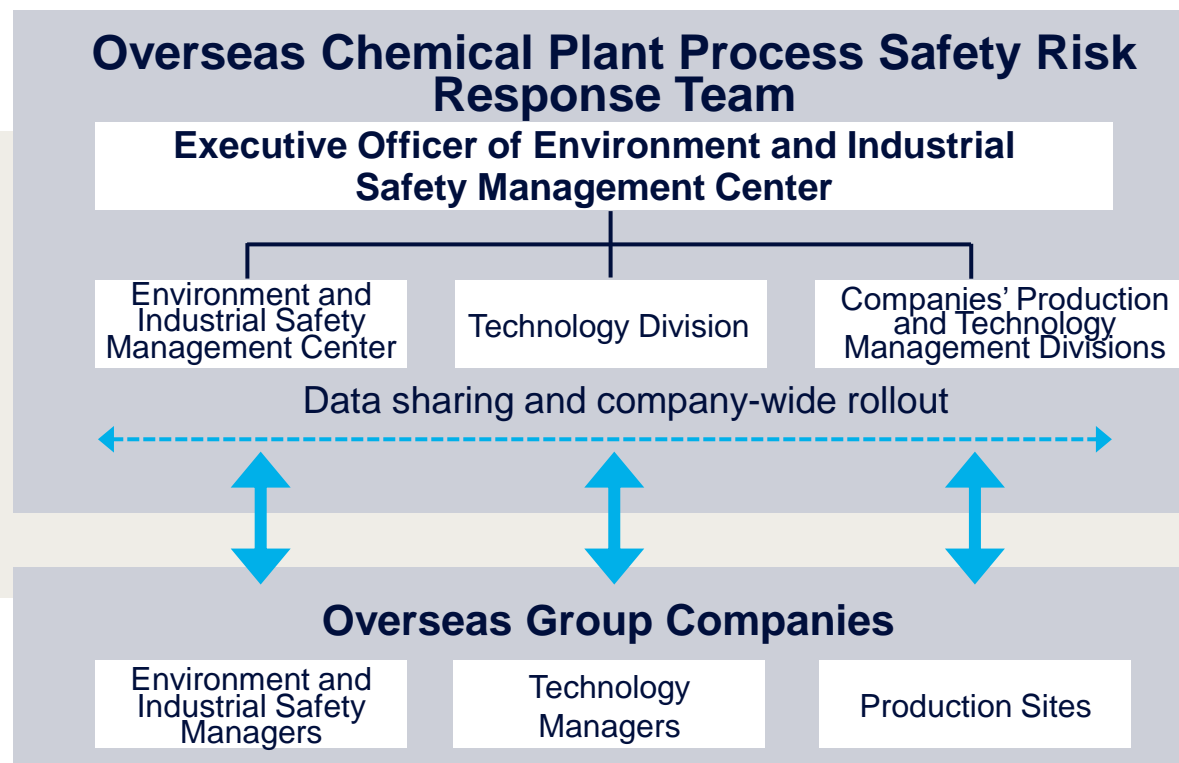
Take the following measures to mitigate the risk of future litigation and damages from the perspectives of insurance strategy, comprehending the damage when an incident occurs, and dealing with litigation risk particular to the U.S.

- 1) Increase the maximum limit of the comprehensive general liability insurance commonly applicable throughout the Group and have Kuraray America introduce an owner-controlled insurance program (OCIP)
- 2) Install additional surveillance cameras around the perimeter of plants and at entrances at Kuraray America, introduce a strict access control system, and implement processes to get testimony from related personnel at the sites
- 3) Education about litigation risks particular to the US (particularly information management and communication designed on the assumption of the discovery process)

## Technology-related Initiatives (standpoint of “three M’s”)

### 1) Man-related Measures

- Education and training to improve capabilities at determining causes and identifying risks
- Bolster our safety management system through the involvement of occupational safety management organizations that are independent from the production departments



Newly launched  
in 2022



### Global PSM※ Audit Team

Assess and share process safety and disaster prevention management issues at each base from multiple perspectives

Share and utilize insights from various backgrounds to improve identified issues



※PSM: Process Safety Management

### ■ Technology-related Initiatives (standpoint of “three M’s”)

#### 2) Machine-related Measures

- Check and adjust the position and direction of the discharge ports in safety valves at other plants
- Establish plant access management and standards for evacuation warnings when problems occur
- Automate and improve the reliability of highly important emergency operations and safety apparatus

#### 3) Management-related Measures

- Make organizational and HR-related improvements for proper operation at overseas plants
- Improve employee engagement
- Introduce KPIs to track safety circumstances
- Review appropriate number of employees at overseas plants

### ■ Governance-related Initiatives

- (In progress) Build a safety auditing program organization directed by our Environment and Industrial Safety Management Center to monitor the state of overall safety governance from an objective perspective.
- Consider further strengthening our auditing program organization by involving Group employees with extensive experience and advanced communication skills
- Horizontally roll out what we learned through our investigations to improve the safety governance of the Group overall, while also utilizing these lessons in building the safety system for a new EVAL plants currently under consideration.

### ■ Initiatives for Dealing with Litigation

- Build systems to respond to emergencies swiftly and accurately by enlisting the proper law firms, particularly where plants of our US companies are located.

## Safety is the Cornerstone of Everything We Do

### Action Courses on Ensuring Safety (FY2023)

- 1 Ensure and Practice “Safety First, Production (Construction, R&D) Second”
- 2 Ensure and Practice that Predict Hazards and Make Sure the Safety Before Taking Action, and Confirm If the Action Results are What You Expected
- 3 Each Employee Should Think of Safety as “Their Own Issue” and Act Accordingly

### Safety Promotion Committee

- Chaired by the President and active Company-wide
- Formulates safety-related action principles and policies
- Formulates targets related to safety priority activities for process safety and disaster prevention

### On-site verification of safety activities

- Regular safety activity verification and opinion exchanges at production sites (the President and safety executives visit all complexes in Japan and major overseas bases)

# kuraray

## Possible starts here

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- All figures are rounded to the nearest hundred million yen.
  - This presentation contains various forward-looking statements which are based on the current expectations and assumptions of future events. All figures and statements with respect to the future performance, projections, and business plans of Kuraray and its group companies constitute forward-looking statements. Although Kuraray believes that its expectations and assumptions are reasonable, actual results and trends of Kuraray's performance could differ materially from those expressed or implied by such figures or statements due to risks and uncertainties in the future business circumstances. The factors which may cause such difference include, without limitation: (1) general market and economic conditions in Asia including Japan, the U.S., Europe and other regions; (2) fluctuations of currency exchange rates, especially between the Japanese yen and the U.S. dollar and other foreign currencies; (3) changes in raw material and fuel costs; (4) industrial competition and price fluctuations in Japan and international markets; (5) advance or delay in the construction of new plants and production lines; (6) successful development of new products and technologies; and (7) changes in laws and regulations (including tax and environmental) and legal proceedings.