

19 JULY 2021

ABOUT

Moody's is committed to helping market participants advance strategic resilience, responsible capitalism, and the greening of the economy. Our offerings span across credit, ESG, sustainable finance, and climate risk solutions and help our customers identify risks and opportunities and provide meaningful performance measurements and insights.

CONTACTS

Hélène Soyer Nogueira
Research Manager
Basic Resources Cluster
Moody's ESG Solutions
helene.soyer-nogueira@vigeo-eiris.com

Sebastian Alvear
ESG Analyst
Moody's ESG Solutions
sebastian.alvear@vigeo-eiris.com

Sara Bouabdalli
Specialised Researcher
Moody's ESG Solutions
sara.bouabdalli@vigeo-eiris.com

CONTACT US

Email us at MESG@moodys.com

ESG Measures – Global

Rising litigation, tighter regulation pose risks for PFAS producers and users

Summary

Many PFA producers face significant costs associated with rising litigations and remediation projects and tighter regulation. Per- and polyfluoroalkyl substances (PFAS) are synthetic chemicals widely used across industry that can have long-lasting negative impacts on human health and the environment. PFAS producers are increasingly exposed to financial, legal and reputational risks associated with rising controversies and tighter regulation. Furthermore, with downstream users committing to phase-out deadlines and adapt to new regulations, PFAS producers will face greater calls to move into safer alternatives.

PFAS-related water contamination scandals and lawsuits are rising. According to our database, there were a total of 86 active PFAS-related controversies in June 2021, a sharp increase from 22 PFAS controversies in June 2018. Chemicals companies are most exposed to PFAS controversies, followed by industrial goods and services companies. Most recorded PFAS-related controversies concern activities in the US (94% of total).

Regulatory efforts to restrict or ban PFAS are also accelerating, representing an additional liability for companies. Proposed or adopted legislation can be seen across the European Union, US (both at a federal and state level) and Asia, including Korea, China and Japan. South American countries such as Brazil, Argentina, and Mexico are working independently on chemical frameworks, while Chile and Colombia published a commitment to establish chemical regimes.

Rising risks will heighten pressure on companies to enhance transparency and focus on safer alternatives. Despite the material risks associated with PFAS controversies, companies' overall responsiveness is mostly assessed as "Non-communicative" in our analysis. However, we expect rapid and effective changes from PFAS manufacturers and users as they adapt to increased scrutiny from stakeholders and comply with upcoming regulatory frameworks.

PFAS-related water contamination scandals and lawsuits are rising

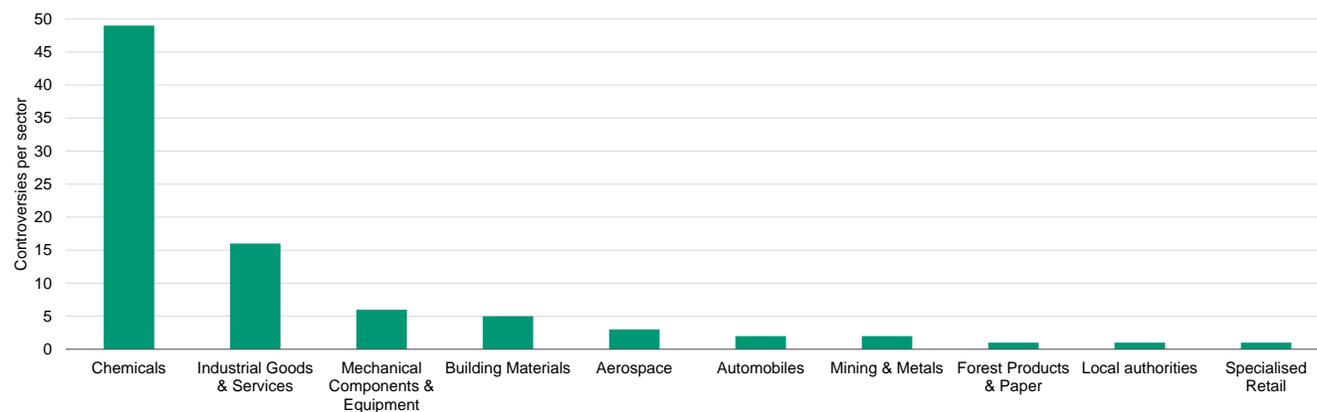
Per- and polyfluoroalkyl substances (PFAS) are a large family of 5,000 synthetic chemicals widely recognised for their ability to repel both grease and water to make non-staining, waterproof, friction and heat resistant products.¹ Their uses include food packaging, clothing, cosmetics, household products, electronic devices and building materials.² Some of their applications are considered essential, such as use in medical treatment, pharmaceutical manufacturing, surgical articles and renewable energy.³

The main concerns with PFAS are their potential to leave long-lasting negative impacts on human health and their high persistence in the environment. PFAS have been found in blood and breastmilk,⁴ in rainwater, soils, sediments and in urban and remote areas.⁵ Evidence shows that PFAS consumption can lead to adverse health outcomes in humans and animals. Indeed, the accumulation of these substances in the body has been linked to diseases such as kidney cancer and thyroid diseases, among others.⁶

Water contamination scandals and lawsuits related to PFAS are increasing. Over the last decade, PFAS-related controversies have increased, placing heightened public and regulatory pressure on PFAS manufacturers and purchasers. As of June 24, 2021, we recorded a total of 86 active PFAS related controversies in our database, a sharp increase from 22 PFAS controversies recorded as of June 24, 2018. In 2021 to date, PFAS-related controversies have impacted 26 companies from 10 different sectors.

At a sector level, chemical companies are most exposed to PFAS controversies with active involvement in 49 individual cases, followed by industrial goods and services companies with 16 cases (Figure 1). While PFAS manufacturers are particularly vulnerable, claimants also pursue companies and products in industries using PFAS for other applications, such as, mechanical components and equipment, building materials and aerospace sectors.

Figure 1 Sector distribution of controversies on PFAS



Note: Data from June 24, 2021. Launched in 2015 The Controversy Risk Assessment Database captures over 20,000 cases logged and analysed across a broad range of ESG issues.

Source: Moody's ESG Solutions Group

Most recorded PFAS-related controversies concern activities in the US (94% of total). In terms of ESG topics impacted (Figure 2), lawsuits and campaigns by NGOs, the US Environmental Protection Agency (EPA), and US states indicate that there has been "widespread exposure" to certain PFAS in the US population, likely through PFAS-contaminated water or food. Many US states have raised claims over environmental contamination and related health injuries to local communities from PFAS exposure in drinking water, diminished property values due to the PFAS presence in soil and water wells and excessive clean-up costs where PFAS have been detected. Residents injured due to contaminated public water have also sought lawsuits against PFAS manufacturers for engaging in negligent manufacturing processes and disposal practices.

¹ [Emerging chemical risks in Europe — 'PFAS'](#), European Environment Agency, accessed May 19 2021.

² [Fluorotechnology Makes Important Products for Vital Industries Possible, American Chemistry Council website](#), accessed May 5 2021.

³ Ibid.

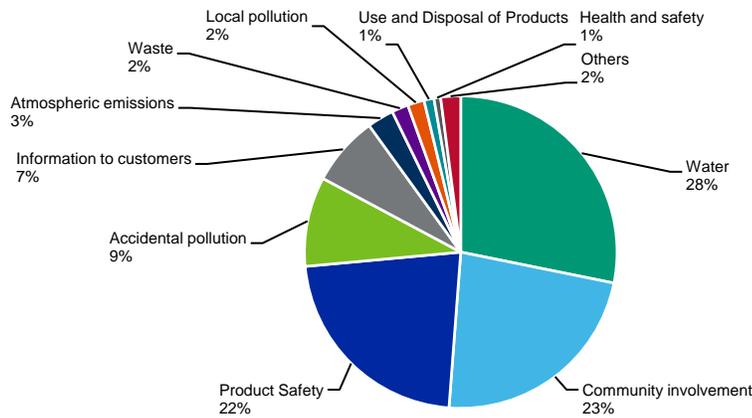
⁴ [PFAS in breast milk, Food Packaging Forum](#), accessed April 16 2021.

⁵ [Rainwater in parts of US contains high level of PFAS chemicals, says study, The Guardian](#), accessed April 16 2021.

⁶ [Información básica sobre PFAS, Agencia de Protección Medioambiental de Estados Unidos](#), accessed April 16 2021.

Other regions have been affected as well. In October, the European Commission revealed evidence of contamination in Europe's drinking water and soil, reporting an estimated 100,000 sites potentially emitting PFAS in the continent.⁷ However, unlike in the US, legal proceedings against PFAS manufacturers in Europe are not commonplace.

Figure 2 Thematic distribution of controversies on PFAS



Note: Data from June 24, 2021. Launched in 2015 The Controversy Risk Assessment Database captures over 20,000 cases logged and analysed across a broad range of ESG issues.

Source: Moody's ESG Solutions Group

Regulatory efforts to restrict or ban PFAS are accelerating

Regulatory efforts to restrict or ban PFAS are accelerating, representing an additional liability for companies that is likely to lead to increasing research and development (R&D) into safer products.

In October 2020, the European Union adopted the Chemical Strategy for Sustainability in support of its Green Deal objective, with the aim to ban all PFAS from non-essential uses and to develop methods for rectifying PFAS contamination in the environment.⁸ Within the strategy, the EU aims to address global PFAS concerns through bilateral dialogue and policies, to establish an EU approach and provide financial support for research and innovation programmes.⁹ A cornerstone of the new chemicals' strategy is the concept of "essential use" of hazardous chemicals; the adoption of which could determine the future of certain products, companies and industries.¹⁰

In the US, there are new legislative proposals in discussion at both a state and federal level. The federal PFAS Action Bill requires the EPA to designate PFAS as "hazardous substances",¹¹ and a draft action plan aims to implement regulations over PFOA and PFOS¹² water pollution. Experts consider that PFAS "could be much more a consideration at the state level because of contamination hotspots that will drive the agenda."¹³ In California, the Department of Toxic Substances Control has proposed a designation which would require manufacturers of plant-based food packaging treated with PFAS to conduct researches for alternatives; Indiana and California implemented regulatory limits on drinking water;¹⁴ the states of Washington and Maine have also acted on PFAS in food packaging; and New York's governor recently signed a bill to ban the full substance class. Several food chains and grocery stores have committed to phase out or reduce PFAS in some of their packaging materials, including McDonald's, Amazon, Sweetgreen, Taco Bell, Ahold Delhaize and Trader Joe's.¹⁵

⁷ [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of regions, European Commission](#), accessed June 10 2021.

⁸ [Chemicals Strategy for Sustainability Towards a Toxic-Free Environment, European Commission](#), 2020.

⁹ [Chemicals Strategy for Sustainability Towards a Toxic-Free Environment, European Commission](#), 2020.

¹⁰ [Global Service Providers Guide 2021, Chemical Watch](#)

¹¹ [Biden's presidency could mean action on toxic "forever chemicals", AXIOS website](#), accessed April 16 2021.

¹² Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS).

¹³ [Global Service Providers Guide 2021, Chemical Watch](#)

¹⁴ [PFAS, Safer States website](#), accessed April 16 2021.

¹⁵ [Article on trending phase out of PFAS in food packaging, Food Packaging Forum](#), accessed May 5 2021.

While there are no regulations in place across Latin American and Caribbean, new coordination and cooperation among environment ministers aims to develop a common framework on hazardous chemicals following the North American model. South American countries such as Brazil, Argentina, and Mexico are working independently on chemical frameworks, while Chile and Colombia published a commitment to establish chemical regimes.¹⁶

In Asia, countries such as China and Korea have ratified the Stockholm Protocol on Persistent Organic Pollutant. Moreover, the Ministry of Environmental Protection of China published a "Prioritised List of Substances to be Subject to Control", including PFOS and its salts and PFOSE.¹⁷ In Japan, where the Stockholm Convention listing of PFOS went into legal force in 2010,¹⁸ only some regulations partially cover PFOA, PFHxA, PFHxS¹⁹, and PFOS.

Rising risks will heighten pressure on companies to enhance transparency and focus on safer alternatives

Exposed companies face significant costs associated with PFAS-related litigations and remediation projects. Coupled with tighter regulation, PFAS producers are therefore increasingly exposed to financial, legal, and reputational risks associated with such controversies. Furthermore, with downstream users also committing to phase-out deadlines and adapt to new regulations,²⁰ PFAS producers will likely face greater calls to move into safer alternatives.

The definition of the criteria for "essential use" will be critical in this sense.²¹ Such criteria aim to ensure that the most harmful chemicals are only allowed if their use is necessary for health and safety and if no alternative is acceptable. Increasing chemical alternatives assessments (CAAs) are carried out to identify substitutes on compounds, materials, or product designs. However, studies show the main obstacles on the path to substitution are the limited and underdeveloped state of the research,²² and higher production costs (CAAs are typically 11%-32% more expensive, according to recent analysis).²³

Our data identifies 92% of PFAS controversies that have either "High" or "Critical" severity. PFAS litigations have centred on lawsuits filed against PFAS manufacturers for environmental clean-up and remediation.²⁴ Several high-value fines and settlements have gathered considerable attention, representing high material, reputational and legal risks for companies and their investors.

- » In 2021, DuPont, Chemours and Corteva reached a US\$4 billion settlement over PFAS liabilities,²⁵ in addition to a US\$83 million settlement with plaintiffs in Ohio for personal injury claims.
- » In 2019, Wolverine Worldwide reached a US\$69.5 million settlement over groundwater contamination in Michigan.²⁶
- » In 2018, 3M Company and Minnesota's attorney general agreed to settle a USD 5 billion lawsuit over polluted groundwater, with the company agreeing to grant US\$850 million to the state for groundwater projects.²⁷

Despite the material risks associated with PFAS controversies, companies' overall responsiveness is mostly assessed as "Non-communicative" (64%), which is reflected in the overall "Weak" risk mitigation score for 63% of affected companies.

¹⁶ [Latin America and Caribbean cooperation, US states action on PFAS, EU plan for FCM rules update, Chemical Watch Podcast](#), accessed February 2 2021.

¹⁷ [Chemical Regulations Updating in Asia Pacific, CRS](#), 2017.

¹⁸ [Japan PFAS Situation Report, Japan Endocrine Disruption Prevention Action](#), April 2019.

¹⁹ Undecafluorohexanoic acid (PFHxA), Perfluorohexanesulfonic acid (PFHxS).

²⁰ [No to PFAS – ChemSec's corporate PFAS movement, ChemSec website](#), accessed May 18 2021.

²¹ [Defining Essential Use Of Chemicals – What Is At Stake?, CEFIC website](#), accessed May 5 2021.

²² [Alternatives to PFASs: Perspectives on the Science, Environmental Health Perspectives](#), accessed May 5 2021.

²³ [OECD report of PFAS alternatives for food packaging, Food Packaging Forum website](#), accessed April 16 2021.

²⁴ [ESG Controversies: Six Trends To Watch](#), Moody's ESG Solutions, June 2021

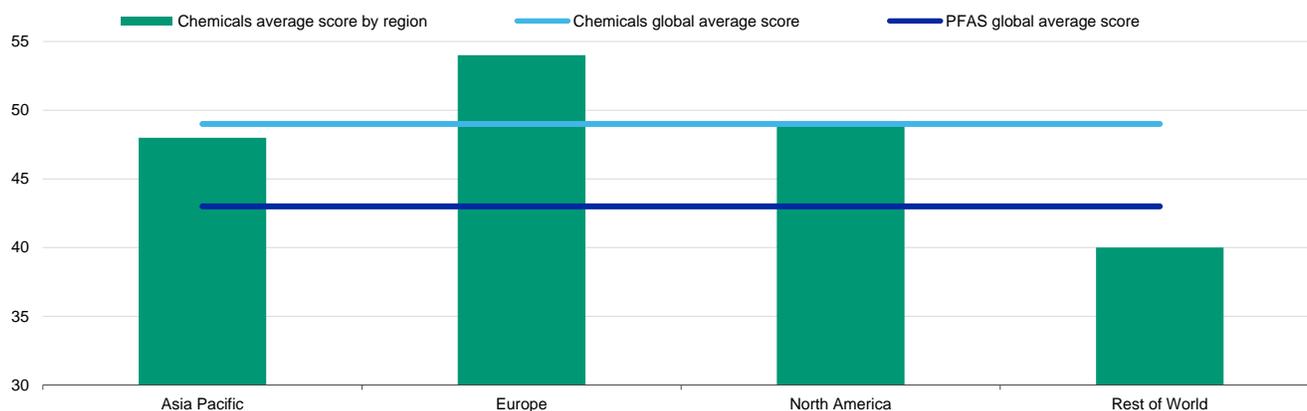
²⁵ [DuPont, Chemours and Corteva Reach \\$4 Billion Settlement on 'Forever Chemicals' Lawsuits, EWG](#), accessed June 10 2021.

²⁶ [MI AG Nessel outlines PFAS settlement framework for state, Plainfield & Algoma Townships, and Wolverine Worldwide, Mivhigan website](#), accessed June 10 2021.

²⁷ [3M, Minnesota settle water pollution claims for \\$850 million, Reuters website](#), accessed June 10 2021.

The need to adapt quickly to develop safer chemicals raises the question of whether PFAS producers are ready to move to safer alternatives. Our data shows that PFAS producers achieve a limited average score on 'Product safety' (43 /100), performing below their peers in the chemical industry (49/100).²⁸ European chemical companies display the highest average performance (54/100), compared to their peers from North America (49/100), Asia Pacific (48/100) and Rest of the World (40/100), as shown in Figure 3.

Figure 3 Average product safety score of chemical industry versus PFAS producers



Source: Moody's ESG Solutions Group

Additionally, only one third (33%) of PFAS producers have a commitment that includes the substitution of harmful compounds with alternative substances, and only 40% of these companies report measures in place to phase out hazardous chemicals. Despite the significant market risks linked to the restriction or ban of PFAS, added to reputational and financial risks linked to PFAS litigations, PFAS producers appear less transparent on the efforts invested to phase out their hazardous substances compared to the rest of the chemical industry.

Best Practices

Companies such as DuPont de Nemours, Corteva, Chemours and 3M, which are amongst the most involved in PFAS-related controversies, also display the weakest performances on 'Product safety' (with scores ranging from 10 to 28). However, some of these companies are putting in place end-of-pipe mechanisms including the absorption of PFAS emissions into the air,²⁹ remediation technologies³⁰, such as treatment mechanisms and cleaning systems,³¹ and water filtration systems,³² or the direct elimination of PFAS for some products (such as for firefighting foams).³³

Common best practices include the direct phase out of PFAS from the product and/or the replacement of the chemical with safer alternatives where possible. Direct PFAS phase out can be applied for food packaging, cosmetics and firefighting foam, among other applications. Other best practices include R&D on non-fluorosurfactant technologies to replace existent substances where the total phase out might change the final purpose of the product – for example, as reported by Solvay.³⁴ Arkema also reports on fluorosurfactant-free (FSF) processes to design some resin-based coating products.³⁵ Nevertheless, safer alternatives on stain resistant products still demonstrate a lack of, or undeveloped, substitutes.

While overall disclosure around commitments and actions to phase-out or substitute PFAS remains low, we expect increased transparency over time.

²⁸ The analysis covered 23 PFAS producers, mostly from the chemical sector and listed in Europe, North America, Asia-Pacific and Emerging Markets, identified through public sources and an analysis of products developed.

²⁹ [C3 Dimer Acid and PFAS, Chemours website](#), accessed May 4 2021.

³⁰ [Information on PFAS: Milestones, DuPont website](#), accessed May 4 2021.

³¹ [Remediation Technologies and Methods for Per- and Polyfluoroalkyl Substances \(PFAS\), ITRC](#), accessed June 10 2021.

³² [Sustainability Report, 3M Company](#), 2020.

³³ [Information on PFAS: Milestones, DuPont website](#), accessed May 4 2021.

³⁴ [Integrated Report, Solvay](#), 2020.

³⁵ [Arkema eliminates fluorosurfactants from Kynar 500® PVDF, Arkema website](#), accessed May 6 2021.

Growing public awareness on the potential health and environmental concerns linked to PFAS, coupled with the proliferation of PFAS-related litigations in recent years and the general move to stricter regulation regimes, expose the chemical industry and PFAS downstream users to high reputational, financial, legal and market risks.

We expect rapid and effective changes from PFAS manufacturers and users as they adapt to increased scrutiny from stakeholders and comply with upcoming regulatory frameworks. As the issue of chemicals management gains momentum, more investors are turning their focus to the risks associated with the manufacturing and use of hazardous chemicals. However, they still often lack the level of information they need to make effective decisions. We are collecting data on companies' strategy and efforts to adapt to these emerging risks. Our research also assesses in 'real-time' companies' involvement in controversies related to PFAS and other chemicals of concern and how they respond to such allegations.

CONTACTS

Hélène Soyer Nogueira

Research Manager – Basic Resources
Moody's ESG Solutions
helene.soyer-nogueira@vigeo-eiris.com

Sebastian Alvear

ESG Analyst
Moody's ESG Solutions
sebastian.alvear@vigeo-eiris.com

Sara Bouabdalli

Specialised Researcher
Moody's ESG Solutions
sara.bouabdalli@vigeo-eiris.com

© 2021 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S CREDIT RATINGS AFFILIATES ARE THEIR CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MATERIALS, PRODUCTS, SERVICES AND INFORMATION PUBLISHED BY MOODY'S (COLLECTIVELY, "PUBLICATIONS") MAY INCLUDE SUCH CURRENT OPINIONS. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE APPLICABLE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S CREDIT RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS, NON-CREDIT ASSESSMENTS ("ASSESSMENTS"), AND OTHER OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. AND/OR ITS AFFILIATES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS, ASSESSMENTS AND OTHER OPINIONS AND PUBLISHES ITS PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS, AND PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS OR PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing its Publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY CREDIT RATING, ASSESSMENT, OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any credit rating, agreed to pay to Moody's Investors Service, Inc. for credit ratings opinions and services rendered by it fees ranging from \$1,000 to approximately \$5,000,000. MCO and Moody's Investors Service also maintain policies and procedures to address the independence of Moody's Investors Service credit ratings and credit rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold credit ratings from Moody's Investors Service and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657 AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any credit rating, agreed to pay to MJKK or MSFJ (as applicable) for credit ratings opinions and services rendered by it fees ranging from JPY125,000 to approximately JPY550,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.