Sustainability Report
2017

JX Nippon Mining & Metals Corporation

We contribute to the development of a sustainable economy and society through innovation in the areas of resources and materials.

Editorial Policy
The JX Nippon Mining & Metals Group is committed to fulfilling its corporate social responsibility (CSR) in all its business endeavors toward the sustainable development of society.

We issue a sustainability report each year to disclose appropriate corporate information to a broad range of stakeholders, including customers, suppliers, shareholders and investors, employees, industry-government-academia groups, and local communities. As an important communication tool, this report is designed to enhance stakeholders' understanding of our CSR activities.

Sustainability Report 2017 has been prepared in accordance with the GRI G4 Guidelines* and the GRI Mining and Metals Sector Disclosures document, as required by the 10 Principles of the International Council on Mining and Metals (ICMM) and by the ICMM's Assurance Procedures.

* International guidelines issued by the Global Reporting Initiative, incorporating standard items for CSR reporting.

☑ The indicators in this report that are assured by a third-party organization are marked with a check ☑.

Publication Date
November 2017 (publication date of previous report: November 2016; publication date of next report: November 2018)

Reporting Period
In principle, this report covers our business activities for the period from April 2016 to March 2017 (fiscal 2016). To ensure comprehensive disclosure, however, it also includes certain information regarding important events that occurred prior to or after this period.

Definitions of Terminology
"The Company" ("JX Nippon Mining & Metals"): The terms "the Company" or "JX Nippon Mining & Metals" refer to JX Nippon Mining & Metals Corporation.
"The JX Nippon Mining & Metals Group" ("the Group"): The terms "the JX Nippon Mining & Metals Group" or "the Group" refer to JX Nippon Mining & Metals Corporation and all its subsidiaries, as well as Toho Titanium Co., Ltd., a JXTG Holdings subsidiary engaged in the metals business, and its subsidiaries. However, the companies subject to reporting vary among different sections of the report (see "Boundary of the Report" for details).
"The JXTG Group": The term "the JXTG Group" refers to the corporate group formed by JXTG Holdings, Inc., the parent company of JX Nippon Mining & Metals Corporation. Along with the Company, the core operating companies of the JXTG Group are JX Nippon Oil & Energy Corporation and JX Nippon Oil & Gas Exploration Corporation.

Boundary of the Report
This report covers JX Nippon Mining & Metals Corporation as well as domestic and overseas Group companies.

The companies for which main indicators must be reported are detailed below, according to the corresponding sections of the report.

Corresponding Sections	Boundary of the Report
Business Overview	Companies included in the consolidated financial statements of JX Nippon Mining & Metals. (The Company and its consolidated subsidiaries on the right indicated by ●.)
Environment	The Company, its directly controlled operating sites that engage in production activities, and companies that operate factories classified as Type 2 Designated Energy Management Factories under the Act on Rationalizing Energy Use or operating sites of equivalent scale. (Companies on the right indicated by *.)
Employees, Society, Corporate Governance	The Company and 68 companies in which the Company has 50% or greater voting rights directly or indirectly. (The main companies covered by this report are those on the right indicated by *.)

Group Companies Covered by This Report

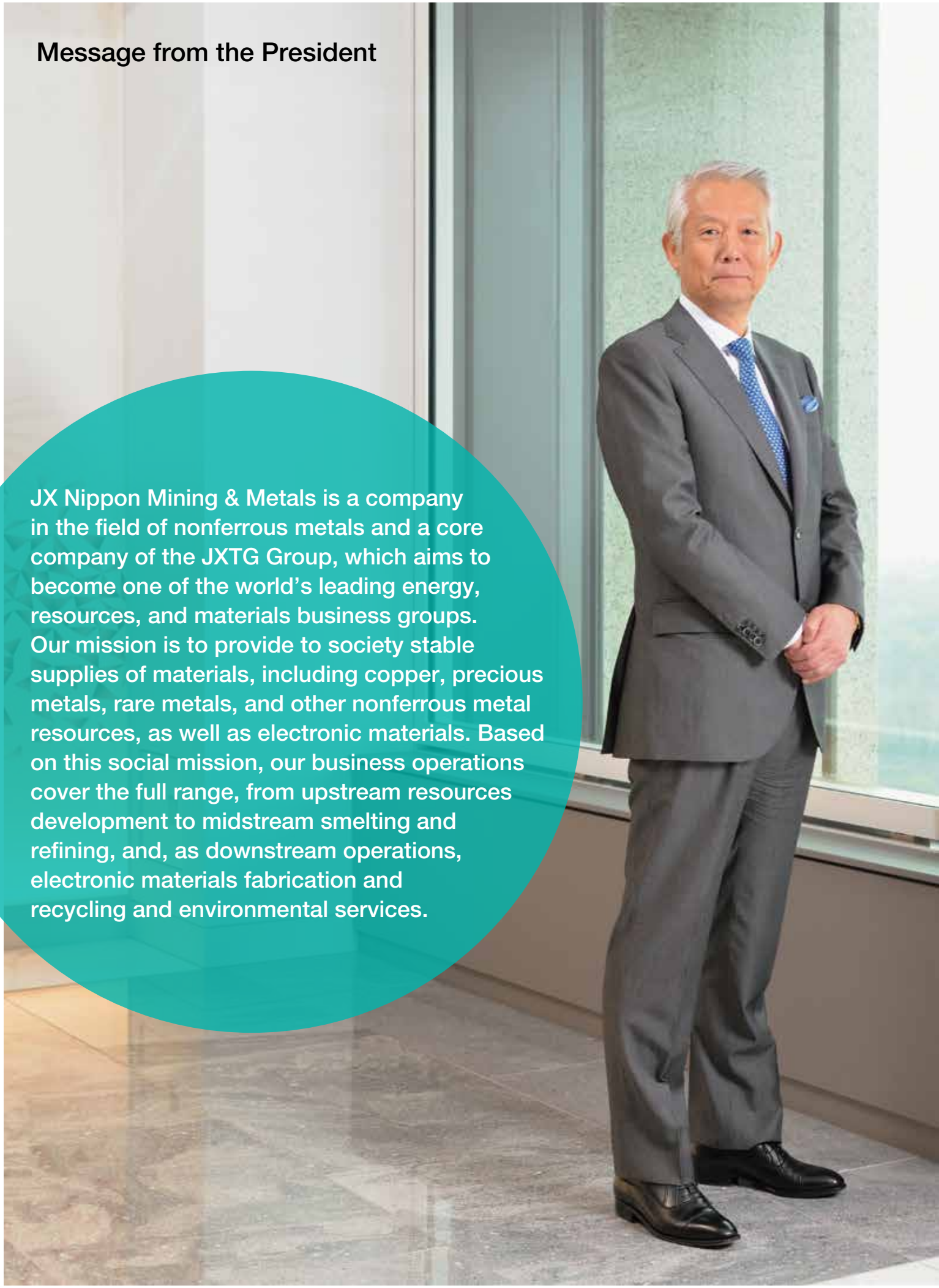
Domestic

Oya Mines Co., Ltd. ★
Kasuga Mines Co., Ltd. ●★
Kaneuchi Mining Co., Ltd. ★
Kamikita Mines Co., Ltd. ★
Shakanai Mines Co., Ltd. ★
Shin-Takatama Mining Co., Ltd. ★
Toho Titanium Co., Ltd. ●*★
Toyoha Mine Co., Ltd. ★
Namariyama Mining Co., Ltd. ★
Japan Copper Casting Co., Ltd. ●*★
Nippon Marine Co., Ltd. ●★
Hanawa Mines Co., Ltd. ★
Pan Pacific Copper Co., Ltd. ●*★
Hitachi Mines Co., Ltd. ★
Hibi Kyodo Smelting Co., Ltd. ●*★
Hokushin Mining Co., Ltd. ★
Hokuriku Mines Co., Ltd. ★
JX Nippon Mining & Metals Corporation ●*★
JX Nippon Mining Ecomanagement, Inc. ★
JX Nippon Environmental Services Co., Ltd. ●*★
JX Nippon Coil Center Co., Ltd. ●★
JX Metals Trading Co., Ltd. ●★
JX Nippon Takasho Co., Ltd. ●★
JX Nippon Exploration and Development Co., Ltd. ●★
JX Nippon Tsuruga Recycle Co., Ltd. ●*★
JX Nippon Tomakomai Chemical Co., Ltd. ●*★
JX Metals Precision Technology Corporation ●*★
JX Nippon Mikkaichi Recycle Co., Ltd. ●*★

Overseas

Changzhou Jinyuan Copper Co., Ltd. ●*★
Nikko Metals Taiwan Co., Ltd. ●★
Japan Korea Joint Smelting Co., Ltd. ●★
Nippon Mining & Metals (Suzhou) Co., Ltd. ●*★
Pan Pacific Copper (Shanghai) Co., Ltd. ●★
Nikko Fuji Precision (Wuxi) Co., Ltd. ●★
Caserones Finance Netherlands B.V. ●
Compania Minera Quechua S.A. ●★
Gould Electronics GmbH ●★
Gould Electronics Inc. ●★
Japan Frontera Resources B.V. ●
JX Nippon Mining & Metals Dongguan Co., Ltd. ●★
JX Nippon Mining & Metals Europe GmbH ●★
JX Nippon Mining & Metals Korea Co., Ltd. ●★
JX Nippon Mining & Metals Philippines, Inc. ●*★
JX Nippon Mining & Metals USA, Inc. ●★
Materials Service Complex Malaysia Sdn. Bhd. ●★
MFN Investment LLC ●
MLCC Finance Netherlands B.V. ●
Nippon LP Resources B.V. ●
Nippon Mining of Netherlands B.V. ●
Osorno Ship Holding S.A. ●
PPC Canada Enterprises Corp. ●
Rupanco Inc. ●
SCM Minera Lumina Copper Chile ●*★

Message from the President



JX Nippon Mining & Metals is a company in the field of nonferrous metals and a core company of the JXTG Group, which aims to become one of the world's leading energy, resources, and materials business groups. Our mission is to provide to society stable supplies of materials, including copper, precious metals, rare metals, and other nonferrous metal resources, as well as electronic materials. Based on this social mission, our business operations cover the full range, from upstream resources development to midstream smelting and refining, and, as downstream operations, electronic materials fabrication and recycling and environmental services.

Current State and Challenges of the Copper Business

Copper is central to our business operations. It is widely used in electrical wires and electrical circuits for electronic products, vehicles, and other applications because of its good electrical conductivity, ease of processing, thermal conductivity, and other advantages. Fundamental to human culture, copper is an indispensable metal resource for the future growth of society. Yet its deposits are distributed unevenly and reserves are finite. We therefore need to make effective use of the reserves available by increasing the extraction percentage and pursuing recycling initiatives, among other means.

Solving the Problems of Society through Our Business Activities

Against this background, the JX Nippon Mining & Metals Group considers its corporate social responsibility to be the stable and efficient supply of high-quality copper through innovation in the productivity of resources and materials. Based on our understanding that CSR activities are "nothing more or less than our business activities," we pursue such innovation by drawing on the technology and knowledge we have accumulated over our history spanning more than a century.

In our resources development business and smelting and refining business, we pursue the efficient mining, concentration, and refining of copper ores, a finite natural resource. In our recycling and environmental services business, we seek to supplement natural resources by making use of end-of-life products discarded by society from so-called urban mines. In our electronic materials business, we support progress in state-of-the-art devices, and contribute to the development of a society using Internet of Things (IoT) and artificial intelligence (AI) technologies, by supplying advanced-function metallic materials.

In carrying out these business operations, we take all due care to minimize any negative impact on society. We also endeavor to deepen communications with relevant stakeholders in order to ensure that we protect the environment, maintain occupational health and safety, enhance compliance, coexist and prosper along with local communities, and respect human rights.

Carrying Out Operations Based on a Corporate Code of Conduct That Meets International Standards

The business operations of the Group are carried out in accordance with the JX Nippon Mining & Metals Code of Conduct created in line with the JXTG Group Philosophy. This Code of Conduct—which is shared by both management and employees—is also compliant with international guidelines, including the principles of the International Council on Mining and Metals (ICMM), of which we are a member, and the Ten Principles of the United Nations Global Compact. We believe that carrying out our daily operations with a common sense of purpose will maximize the success of the Group as a whole in our quest for innovation in the productivity of resources and materials. We are therefore focusing efforts on instilling the Code of Conduct even more deeply, through such means as distributing this sustainability report to all employees and conducting training.

Review of Fiscal 2016

The Group's ordinary income in fiscal 2016 (excluding inventory valuation factor) was ¥25.0 billion, a year-on-year increase of ¥11.7 billion. Although profits in the electronic materials business were lower due mainly to a stronger yen, this decline was more than offset by increased profits from the higher operating rate of the Caserones Copper Mine and from the smelting and refining business. (See pages 19–20 for details.)

Medium-Term Management Plan for Fiscal 2017 to 2019

(FY)	2016 Actual	2017 Plan*	2018 Plan*	2019 Plan*
Operating income (excluding inventory valuation factor) (¥ billions)	22.0	44.0	65.0	90.0
LME copper price (US cent/pound)	234	250	260	270
Exchange rate (JPY/USD)	108	110	110	110

* The planned figures for fiscal 2017 to 2019 are as announced in May 2017. The Company has applied IFRS from fiscal 2017.

Medium-Term Management Plan for Fiscal 2017 to 2019

The Medium-Term Management Plan for the three years from fiscal 2017 to 2019 adopts fundamental policies for building a stronger and more stable business foundation on which to pursue the Group aim of becoming a global resources and materials company centering on copper.

These policies are described as follows.

❶ Prioritizing Compliance and Safety

Based on the belief that compliance, occupational health and safety, and environmental protection should be priorities in all our operations, we have established a Compliance Committee, a Safety and Environment Committee, and other relevant committees and meetings. These venues are used to confirm the status of compliance, and share information about addressing accidents, violations, and other issues within the Group. In such ways we seek to prioritize and instill the importance of compliance and safety. We also established a Risk Management Council to identify risks in our business administration and draw up measures for handling them.

In the area of occupational health and safety, regrettably, one fatal accident occurred at a Group company in fiscal 2016. While the number of occupational accidents was lower than in the previous fiscal year, the number of accidents with lost workdays or more severe accidents has not declined. We will therefore give the highest priority to eliminating fatal or otherwise serious accidents, by redoubling our efforts to counter major risks, and by raising safety awareness and risk sensitivity through such means as experiential risk training at operating sites.

❷ Making Core Businesses More Profitable

In our resources development business, increasing the profitability of the Caserones Copper Mine in Chile is a top priority for making our core businesses more profitable. Both the volume of crude ores processed and copper content produced have reached levels exceeding 90% of the planned amounts, but we will continue improving operations to achieve sustained stability.

In the copper smelting and refining business, the priority is on ensuring stable operation and boosting cost competitiveness. At the Saganoseki Smelter & Refinery, we will be carrying out large-scale regular maintenance; while at the Tamano Smelter we plan to make a capital investment in reducing bottlenecks and making other improvements. We are also seeking to reduce costs by actively employing IoT and AI technologies in operations management and in equipment maintenance.

While leveraging the strengths of the respective smelters and refineries, we will boost their collaboration with the Head Office, aiming for stable and efficient operations.

For the electronic materials business, the period of the current Medium-Term Management Plan is seen as a preparation time during which we will be strengthening our business foundation before the IoT society arrives in earnest.

Besides strengthening the profitability of our existing business segments, we are undertaking a number of measures to enable major advances during and after the next Medium-Term Management Plan. These include promoting technology development, considering mergers and acquisitions (M&As) and partnerships, and strengthening the individual functions of the sales and marketing, manufacturing, and development divisions. The climate for the recycling and environmental services business is a difficult one, marked by fierce competition to collect the limited resources available. Our answer to this situation is to further set apart our services from those of other companies, by raising the level of separation and analysis technologies, and by building a resource collection network through partnerships with recyclers and other sources in various parts of the world.

❸ Cultivating and Strengthening Next-Generation Core Businesses

The current Medium-Term Management Plan calls for focused investment in midstream and downstream operations, where demand is expected to expand greatly with the advance of IoT and other new technologies, as well as in other growth fields.

We will endeavor to develop stable profit centers as the next-generation pillars of our business through ongoing and strategic implementation of such initiatives as harnessing technologies held by Group companies, leveraging corporate venture capital, developing technologies in-house, and carrying out M&As.

❹ Building the Organizational Structure for Achieving Management Targets

To achieve these management targets it is essential to develop human resources and energize organizations.

In fiscal 2016, we instituted measures for energizing individuals and organizations from two perspectives: strengthening personnel management and development, and creating environments in which a diverse range of personnel can do fulfilling work. While enhancing the education and training systems to develop human resources capable of excelling in our increasingly global business, we also seek to devise efficient work arrangements compatible with the various life styles of a more diverse workforce.

In addition to tackling the issues for each business segment by drawing on our human resources in such ways, we will be working to strengthen corporate division support of the business groups, and to build up an organizational structure in line with project needs.

Following an assessment of the materiality of our CSR issues from both internal and external standpoints in light of these management issues and the business climate, we selected the six items below as material issues for CSR activities during fiscal 2017.

❶ Innovating the productivity of resources and materials
❷ Insisting on full compliance
❸ Protecting the environment
❹ Using resources effectively
❺ Ensuring occupational health and safety
❻ Developing and utilizing human resources

As we go forward carrying out our business with these six themes as focal points, we will strive to raise our corporate value, while contributing to the sustainable growth of society and meeting various other needs.

Shigeru Oi
President and Chief Executive Officer
Chairman of the CSR Committee
JX Nippon Mining & Metals Corporation

In accordance with the JXTG Group Philosophy and JX Nippon Mining & Metals Code of Conduct, we engage in CSR activities on the understanding that they are nothing more or less than our business activities.

JXTG Group Philosophy

Mission

Harnessing the Earth's power
for the common good and for the day-to-day life of each individual,
we will contribute to the development of our communities
and help to ensure a vibrant future
through creation and innovation in energy, resources, and materials.

Our Five Core Values

As a member of the community

High ethical standards
Based on our core principles of integrity and fairness, we conduct all of our business activities in accordance with our high ethical standards.

Health, safety, and environment
We give the highest priority to health, safety, and environmental initiatives, which are vital to the well-being of all living things.

Supporting day-to-day life

Focus on customers
We strive to meet the expectations and evolving needs of our valued customers and of society as a whole through the stable provision of products and services while creating new value as only we can.

For a vibrant future

Taking on challenges
Taking changes in stride, we rise to the challenge of creating new value while seeking innovative solutions for today and tomorrow.

Moving forward
Looking to the future, we continue to grow, both as individuals and as a company, through the personal and professional development of each and every employee.

With the launch of the JXTG Group in April 2017, the JXTG Group Philosophy was newly formulated.

The JX Nippon Mining & Metals Code of Conduct remains consistent with the JXTG Group Philosophy, and our CSR activities will continue to be carried out based on this Code.

JX Nippon Mining & Metals Code of Conduct

Ensuring a stable supply of nonferrous resources and materials is our social mission. We are engaged in a wide range of operations from exploration, mining, smelting & refining to metal fabrication and electronic materials production. Based on "JXTG Group Philosophy" and complying with Code of Conduct stipulated below, we will continue to pursue technical rationality and efficiency and make improvements in quality & product properties and other matters in all aspects of our operations from development, production and marketing. At the same time, we will continue to promote recycling of resources and materials to achieve zero emission. This is our way of achieving continuous innovation in the productivity of resources and materials.

In the conduct of our business, we are committed to maintaining and enhancing a harmonious relationship with a wide range of stakeholders, including our customers and the communities in which we operate. We are committed to contributing to the sustainable development of society on a global scale.

1. **Our social mission**
   Based on continuous technological development and full awareness of our responsibilities in designing products, we will develop and produce a variety of products efficiently while minimizing waste. At the same time, we will promote recycling and reduce the impact of our operations on the environment. By doing so, we hope to obtain the satisfaction and trust of our customers and of society as a whole.
2. **Compliance with laws and regulations and engagement in fair trade**
   We will comply with domestic and/or overseas laws and regulations and will engage in fair, transparent, and free competition and trade based on the fulfillment of our social responsibilities.
3. **Disclosure of corporate information and protection of personal information**
   We will communicate not only with our shareholders, but also with the public at large, and will disclose corporate information in an active and equitable manner while focusing on the protection of personal information.
4. **Creation of an optimum health, safety and working environment**
   We will place top priority on health, safety, and disaster prevention and will ensure a comfortable working environment that respects employees' personality, human rights, and individuality.
5. **Environmental conservation**
   Based on the awareness that tackling environmental issues is an essential requirement for corporate existence, we will engage in activities aimed at conserving the global environment, including biodiversity, in a voluntary, active, and continuous manner.
6. **Enhancement and strengthening of risk management**
   We will establish a risk management system based on scientific data to enhance and strengthen risk management.
7. **Harmonious relationship with society**
   We will commit ourselves to social contribution activities and work as a good corporate citizen to achieve a harmonious relationship with the rest of the society of which we are part.
8. **International business operations**
   In international business operations, we aim to contribute to sustainable development by protecting the fundamental human rights of people in countries and areas where we operate, and by respecting their cultures and customs.
9. **Elimination of antisocial activities**
   We stand firm against all antisocial forces and groups that threaten social order and safety.
10. **Management responsibilities**
    Management executives will take the lead in implementing this code of conduct and ensure it is thoroughly implemented across the Group. In the event of any non-compliance with the code of conduct, the management executives will investigate the causes, work to prevent reoccurrence, disclose information to the public promptly and accurately, and be held accountable for the event.

Our Relationships with Stakeholders

Taking into consideration the JXTG Group Philosophy, the Code of Conduct, and the Group supply chain, the Group has identified the following stakeholders of relevance in undertaking its CSR activities:

Stakeholders	The Group's stance toward each stakeholder category
Shareholders and investors	As a core business company of the JXTG Group, we strive for proper and timely disclosure of information through JXTG Holdings, a publicly listed company.
Global society (Global environment)	We go beyond simply observing laws to respond proactively, paying close attention to issues affecting the world as a whole, such as global warming.
Nonprofit organizations (NPOs) and nongovernmental organizations (NGOs)	We reflect the approaches of NPOs and NGOs, undertaking distinctive programs in the Group's CSR activities as necessary.
Industry-government-academia groups	We recognize these groups as important partners in creating new technologies and nurturing the next generation of human resources. We cooperate with such groups in developing technologies and human resources in fields related to the Group's business.
Local communities*	We promote mutually beneficial coexistence with the community at all our locations, taking advantage of various opportunities for exchange to deepen understanding and build cooperative relations.
Customers/consumers*	We recognize that enhancing customer satisfaction by providing products and services reliably and improving their quality is a key issue in carrying out our business as well as in realizing an abundant society.
Employees*	We endeavor to provide a working environment and education programs that will empower employees to make the most of their abilities as the main participants in CSR activities.
Suppliers*	We seek to build relationships of trust with suppliers as partners in carrying out our business, and to realize fair and equitable trading throughout the supply chain.

* See pages 81–91 regarding the methods and results of communication with each stakeholder.

CSR Promotion System

CSR Committee and Subcommittees

The JX Nippon Mining & Metals Group has a CSR Committee, an advisory body to the president that formulates basic policies and action plans relating to its CSR activities. It also evaluates progress in implementing the plans and the Group's performance from economic, environmental, and social perspectives. The committee is chaired by the president and consists of the members of the Company's Executive Meeting. The committee meets twice a year in principle, and in addition to formulating basic policies, promotion systems, and action plans for CSR activities, it reviews progress in implementing the relevant action. The findings of these reviews are used when formulating new policies, systems, and plans. In fiscal 2016, the committee met twice, on April 25 and October 24, 2016.

Under the CSR Committee are the Compliance Committee, the Safety and Environment Committee, the Citizenship Committee, and the Energy Conservation Subcommittee. These committees formulate action plans for their respective areas of responsibility and review progress in implementing the relevant action, among other activities.

CSR Promotion System

President

CSR Committee (Secretariat: Public Relations & CSR Dept.)

Compliance Committee
Promotes compliance education and draws up action plans
Assesses and manages compliance status
(Secretariat: Legal Dept.)

Safety and Environment Committee
Draws up action plans on safety and health and on environmental protection
Reviews the status of activities in the areas of safety and health and environmental protection
(Secretariat: Environment & Safety Dept.)

Citizenship Committee
Draws up action plans on social contributions
Reviews the status of activities in the area of social contribution
(Secretariat: Public Relations & CSR Dept.)

Energy Conservation Subcommittee
Draws up action plans on energy conservation, CO_2 emissions reduction, etc.
Reviews the status of activities in the areas of energy conservation, CO_2 emissions reduction, etc.
(Secretariat: Facilities Engineering Dept.)

CSR Promotion Managers

CSR promotion managers are appointed at each of the Group's operating sites and companies. They are responsible for ensuring that basic policies, promotion systems, and action plans for CSR activities are implemented faithfully in line with the actual conditions at each site and company. They formulate their own individual CSR plans and report on progress at CSR promotion manager meetings held twice a year. These meetings also function as opportunities to exchange information among participants.

Initiatives for Increasing CSR Awareness

CSR Workshops

We offer ample opportunities for face-to-face CSR training targeting Group officers and employees. In fiscal 2016, the following training was provided.

Workshop on "The Nature of CSR Management Geared to the Times" (June 7, 2016)

An instructor from CSR consulting company E-Square Inc. was invited to conduct a training session on CSR as a management strategy, one that makes companies more competitive by solving issues faced by society.

Face-to-face training for managers

Training was provided for managers, who are in a position close to business administration while being responsible for managing actual business practice. The purpose was to have them understand the connection between CSR and business, and help them employ CSR practices in business activities.

CSR e-learning course

In fiscal 2016, we offered an e-learning course to Group officers and employees, continuing from the previous fiscal year. In a series of three lessons, the course reviewed the basics of CSR and introduced recent trends.

Publication of *Sustainability Report 2016*

Once a year, the Group publishes a sustainability report that compiles the policies and results of its CSR activities. This report is distributed to all Group officers and employees and to stakeholders. In fiscal 2016, 8,000 copies of the full report were printed in Japanese and 430 were printed in English. In addition, a total of 1,000 copies of the condensed digest version were printed in several languages, including English, Chinese (simplified and traditional), Korean, and Spanish.

CSR Surveys

Surveys of employees were conducted as described below to determine the extent of employee awareness of CSR and involvement in its practice.

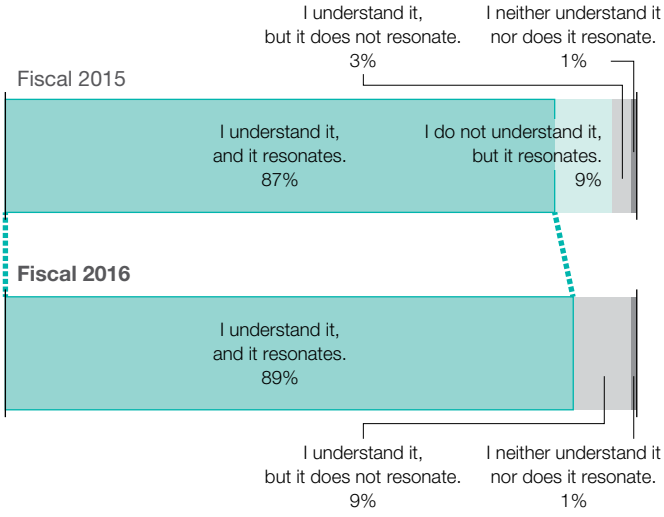
Companywide CSR Survey

Method	Conducted by means of a questionnaire distributed with *Sustainability Report 2016*
Timing	October to December 2016
Respondents	5,460 employees at 33 domestic operating sites (96% of the 5,689 employees who received the questionnaire)

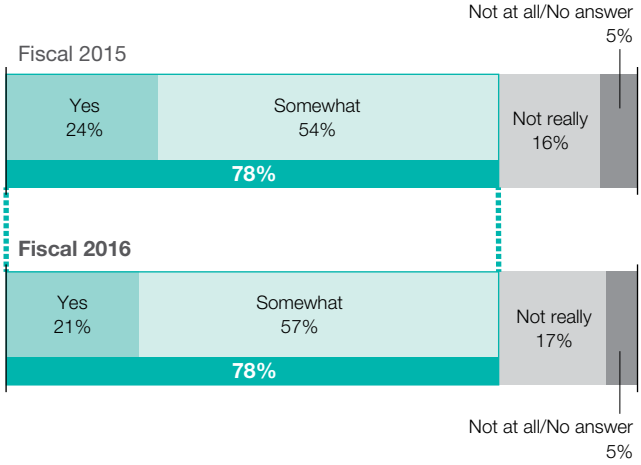
(1) Results relating to employee understanding and awareness of the JXTG Group Philosophy and JX Nippon Mining & Metals Code of Conduct

Awareness remained at a similar high level as in the fiscal 2015 survey, while even more employees than before felt that they understood the guidelines and they resonated with them.

A. Understanding/resonance
(whether respondents felt that they understood the Code of Conduct and it resonated with them)



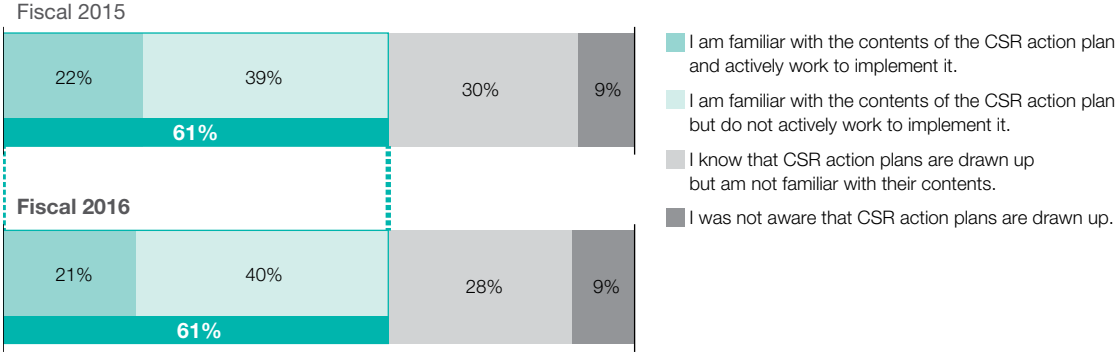
B. Employee awareness
(whether respondents felt that all employees were aware of the Code of Conduct in their own organizations and workplaces)



(2) Results relating to employee awareness of CSR action plans

Awareness of the CSR action plans was at the same level as in fiscal 2015.

The JX Nippon Mining & Metals Code of Conduct is implemented by drawing up CSR action plans.
Are you familiar with the CSR action plan in your own organization, and how are you putting it into practice?



Our Six Material Issues

In accordance with the GRI G4 Guidelines, the JX Nippon Mining & Metals Group selected six CSR issues considered particularly material to the Group's business activities in fiscal 2015 as material issues.*1 During the selection process, we investigated and identified the G4 Aspects and their Boundaries that relate to the Group's material issues.

Our Six Material Issues

*1. For details on the Group's approach and initiatives with regard to each issue, refer to the relevant pages indicated above.
*2. We regard this issue as conditional to the other five material issues, and as a challenge that the Group must constantly seek to address for as long as it is operating its business. This issue is not therefore treated as a separate issue for reporting purposes within this sustainability report.

Procedure for Selecting Material Issues

JX Nippon Mining & Metals periodically revises the material issues to reflect changes in both the Group's business activities and the needs of society. The procedure followed is shown below. In fiscal 2016, we reinvestigated and reassessed the issues revised in fiscal 2015 and decided to continue with the same issues.

1. Identifying CSR issues relevant to the Group's business activities

Based on the CSR issues emphasized in the GRI G4 Guidelines and ISO 26000,* we identified 14 matters that are CSR issues relevant to the Group.

* An international standard of the ISO (International Organization for Standardization) providing guidelines relating to social responsibility.

2. Assessing and identifying the materiality of the CSR issues from internal and external standpoints

The materiality of the 14 CSR issues listed below was quantitatively assessed from internal and external standpoints, using the following resources.

Internal (Company) standpoint:

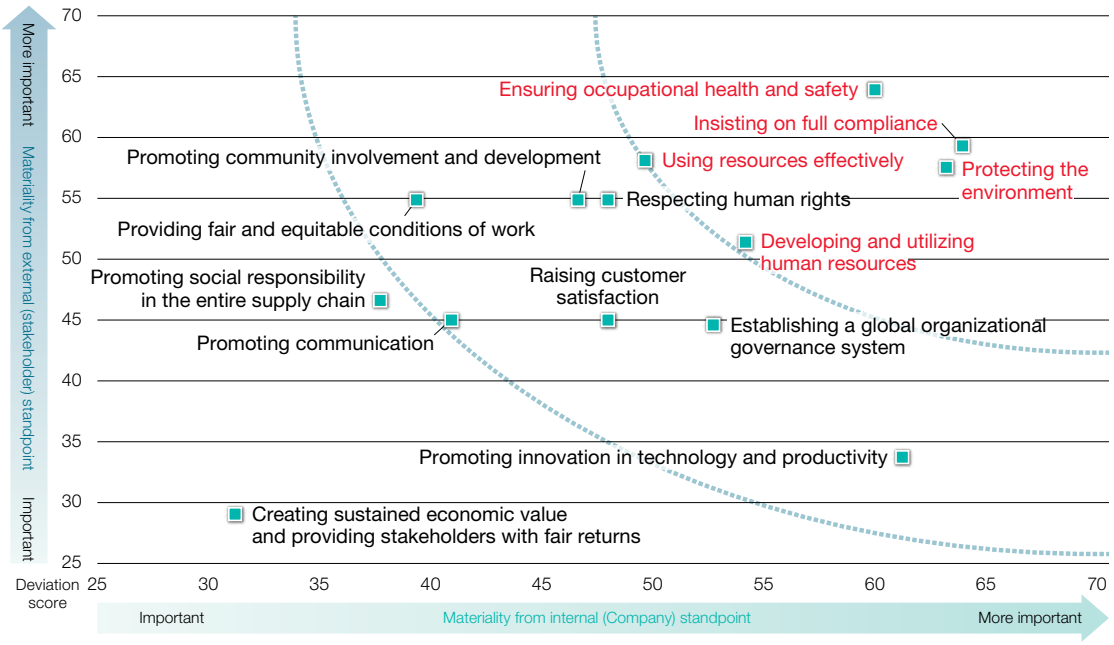
- The JX Group Mission Statement and the JX Nippon Mining & Metals Code of Conduct
- Management policy statements
- Status of CSR initiatives to date
- Employee surveys
- Interviews with CSR promotion managers

External (stakeholder) standpoint:

- Customers (items on supply chain surveys issued by the EICC*)
- Investors (items on socially responsible investment surveys)
- Industry experts (results of mining industry risk analyses)
- Competing companies (each company's behavior guidelines and commitment statements of top management)
- Employees (employee surveys)

* Electronic Industry Citizenship Coalition (trade association of the electronic industry in the United States)

Results of materiality assessment relating to CSR issues



Five issues regarded as material from both internal and external standpoints (shown in red in the chart above) were judged to be of particularly high materiality. To these we added "innovating the productivity of resources and materials," which we regard as an issue to be pursued over the long term, resulting in the identification of six material issues.

In addition, we realize that from the stakeholder standpoint increasing importance is now placed on respecting human rights and promoting community involvement and development. Although these issues were not included in the material issues, we intend to pay attention to them going forward.

3. Obtaining the approval of management

The above selection procedure and the material issues selected were referred to the CSR Committee for discussion at its April 2016 meeting and received the approval of the Executive Meeting members comprising the committee, including the president.

The Roots of CSR in the JX Nippon Mining & Metals Group

Living in Harmony with Local Communities and Protecting Our Greatest Asset—Our Employees

The roots of the JX Nippon Mining & Metals Group's CSR go back to the place where JX Nippon Mining & Metals was founded—the Hitachi Mine (in Ibaraki Prefecture), first developed more than 110 years ago. Throughout the process of working to resolve the problem of smoke pollution at the Hitachi Mine, the Company maintained its stance of promoting community involvement and development as it strove to build up its business. It also created an environment in which mine employees could work with peace of mind and cultivated an ethos of respect for its employees. This approach was ahead of its time, but it lives on in the Group today.

Living in Harmony with Local Communities

How the smoke pollution problem became the occasion for building good relations with the local community

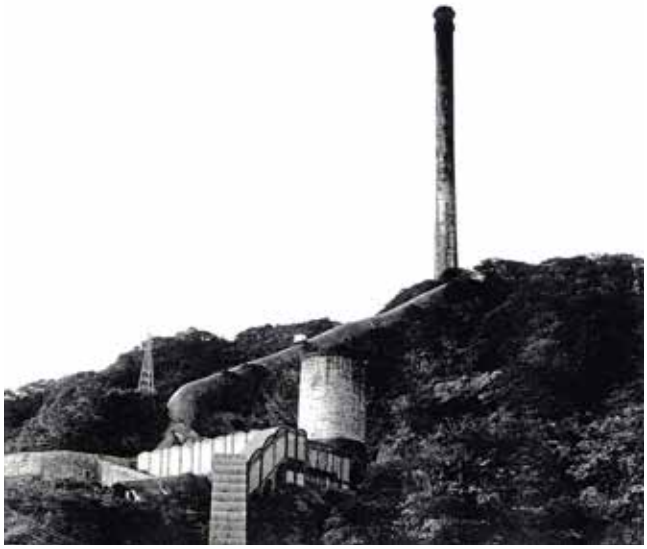
When the Hitachi Mine first went into operation in 1905, there was no established technology for effectively recovering sulfur dioxide generated from the sulfur content of ores in the smelting process. It was not long before the smoke emitted from the Hitachi Mine, which contained sulfur dioxide, began to cause withering of trees in the surrounding forests and widespread crop damage.

Although it was an era in which Japan had not yet established laws concerning compensation for such cases, the management of the Hitachi Mine company, led by Yataro Kado, the first head of general affairs, acted in good faith, paying damage compensation to the residents. As soon as someone reported damage, the Company investigated. It also signed agreements in advance in areas likely to suffer damage as the business expanded, in attempts to reduce the unease of residents. Sincere efforts like these led to the building of relationships of trust between the Company and the community.

Staking the future of the Company on the construction of a 155.7-meter giant stack

Along with paying compensation to residents affected by the smoke pollution, the Company tried various measures to disperse and dilute the exhaust smoke, such as building a flue and a large round chimney. Despite such efforts, the damage continued to spread. The Company's founder Fusanosuke Kuhara then proposed building what at the time was the world's tallest smokestack to disperse the smoke over a wide area. Seen as being too far removed from the accepted methods for dealing with smoke pollution at that time, the proposal was widely opposed within industry, government, and academic circles. Nonetheless, Kuhara decided to go ahead with the project, backed up by weather observations and experimental data.

Construction of the giant stack required a total of nearly 37,000 workers and a massive financial investment. After it was completed in December 1914, what was then the world's tallest stack at 155.7 meters did in fact succeed in dramatically reducing smoke pollution.



The world's tallest smokestack in its day (background) and large round chimney (foreground)

Tree-Planting Programs to Reforest the Devastated Mountains

Planting Oshima cherry trees

The next project the Hitachi Mine undertook was to embark on full-scale tree-planting programs to restore forests in the surrounding mountains that had been devastated by smoke pollution. It set up an agricultural testing station near its smelter and stationed a forestry expert there to test and selectively breed trees and crops including smoke-resistant Oshima cherry.

A total of five million saplings grown by the Hitachi Mine based on this research were planted to reforest an area of approximately 1,200 hectares. An additional five million saplings were distributed to local residents free of charge, for planting in city areas, bringing the total including those planted by the mine to ten million trees.

The Ethos of Community Involvement and Development Continues Today

As a result of these efforts, greenery returned to the mountains, and the city of Hitachi became famous throughout Japan as "the city of cherry trees." In 1993, the stack suddenly collapsed, leaving only the bottom one-third in place. The repaired stack currently stands at a height of 54 meters, but the spirit of community involvement and development that it symbolizes continues to this day.

In the words of the mayor of Hitachi at the time, "The scale of the giant stack represented the scale of our predecessors' aspirations. Even if the stack itself no longer looks the same, the spirit of community building that it stands for remains as strong as ever."

The giant stack today

The Words of Founder Fusanosuke Kuhara

Fusanosuke Kuhara

"Pollution problems are ever present. They are like an eternal cross that the human race must bear. As science advances, pollution becomes more diverse. How many people have devoted strenuous efforts and pains to stopping this problem from growing?"…

…"The same can be said for the Hitachi Mine. Without the pollution problem, the history of the mine could not be told. In December 1914, the Hitachi Mine finished building on its own what is said to be the world's tallest smokestack at the time, marking an end to the problem. This was a valuable experience, through which, over a period of around 10 years, the Company and the local citizens together suffered, anguished, and then came up with a solution on their own."

From the preface to a 1963 book by Umanojo Seki on the story of Hitachi Mine's smoke pollution

Hitachi Mine employee housing

Hospital

Protecting Our Greatest Asset—Our Employees

Creating environments where employees can work with peace of mind

Another CSR legacy instilled in the Group is our belief that employees are a company's assets.

Kuhara realized that to achieve business success at the Hitachi Mine, which was located in an area distant from urban regions, it would be important to provide an environment in which employees could work with peace of mind. He therefore focused his efforts on raising the standard of living at the mine, and set about putting in place the infrastructure to enable employees to live with their families. He accordingly built an entire community, providing not only housing but also schools, hospitals, a railroad, and recreational facilities.

Yataro Kado, as head of general affairs and general manager of the mine, believed in encouraging simplicity and fortitude, as well as simple hard work, while also thinking about the happiness of each individual mine worker. He made it a practice to investigate and resolve employees' dissatisfactions or complaints regarding the mine, and worked to maintain harmony among workers both in the workplace and in employee housing. The culmination of these efforts was the "friendly discussion group" he launched in 1920. The aim was for management and employees to hold talks focusing primarily on employee welfare.

In this environment that combined work and home, the Company organization built a climate of respect for employees, while a sense of togetherness took root among the employees themselves and the creed of "the Mine as One Big Family" was born.

This philosophy lives on in the Group even today. Guided by these principles, we maintain an open, supportive working environment in which employees feel free to exchange opinions regardless of position, age, or gender.

Learning about the Roots of CSR in the JX Nippon Mining & Metals Group

The story of a company and community battling pollution, told in novel form

Naoki Prize-winning author Jiro Nitta wrote the novel *Aru machi no takai entotsu* (A tall stack in a town), telling the story of a community and company aiming for coexistence and mutual prosperity. The novel is based on the actual story of the Hitachi Mine and surrounding residents together confronting the smoke pollution problem. Woven into this story is the determined spirit of the mining company owner. It is a work that paints a vision of company-community relations, and brings the reader in touch with the roots of CSR in the Group.

Nippon Mining Museum

The Nippon Mining Museum conveys the history and philosophy of the JX Nippon Mining & Metals Group

The Nippon Mining Museum, built in 1986 on the site of the Hitachi Mine, celebrated its 30th year in 2016. Located in the place where the Group was born, it features exhibits telling the story of the business from the time of its founding to the present day. It plays a vital role in helping the public understand the history and philosophy of the Group. Since its opening, a total of 400,000 people have visited the museum from the local region and various other places. Many are from educational institutions, coming for education and research, or on school field trips.

Relationship between the JX Nippon Mining & Metals Group and Society

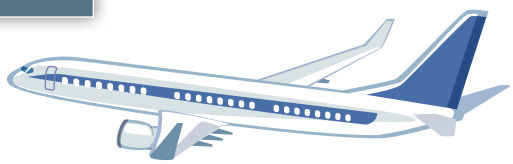
Nonferrous metals play an indispensable role as materials in contemporary life, and of all such metals, copper is particularly notable for its good electrical conductivity and ease of processing. Copper is therefore used in a whole variety of applications, from electrical wires, buildings, and consumer electronics such as air conditioners and refrigerators, to state-of-the-art electronic devices such as LCD televisions, PCs, and smartphones, and even in cars and trains.

The titanium manufactured by the Toho Titanium Group is light, strong, and resistant to corrosion. From industrial to daily necessities, it is likewise used in a wide variety of day to day applications.

➡ See pages 17–27 for details on each of the Group's businesses.

Titanium Business

Aircraft, chemical plants, etc.



Recycling and Environmental Services Business

Urban mines
(end-of-life consumer electronics)

Overview of JX Nippon Mining & Metals Business Segments

We regard the mission of the Group as providing stable supplies of nonferrous metal resources and materials to society and also as promoting zero-emission recycling. To fulfill this mission, seeing CSR activities as "nothing more or less than our business activities," we are pursuing innovation in the productivity of resources and materials in each of our business areas, namely resources development, smelting and refining, electronic materials, and recycling and environmental services.

Resources Development Business

Equity entitled copper mine production

Approx. 200,000 tons per year

(fiscal 2016)

We mine copper ores by developing mines with a view to the mineral deposit potential.

[EXPLORATION TO DEVELOPMENT]

Following exploration to narrow down prospective sites to those with promising mineral deposits, we conduct more detailed studies to consider the feasibility of mine development from technical and economic standpoints. When the decision is made to go ahead with development, construction work starts on the infrastructure and ore processing facilities.

[OPERATION]

Mined ores having a copper grade of around 1% go through processes of crushing and grinding, followed by flotation to select the usable contents, producing copper concentrate with a grade of around 30%.


Exploration


Mining


Grinding


Flotation

Smelting and Refining Business

Refined copper sales volume of Pan Pacific Copper (PPC)

Approx. 600,000 tons per year

(fiscal 2016)

Copper concentrate with a grade of around 30%, imported from overseas, is used as the raw material. From this, we produce refined copper by upgrading it to a purity of 99.99% in flash smelting furnace, converter, anode furnace, and electrorefining processes.

Copper concentrate is poured successively into a flash smelting furnace, converter, and anode furnace, removing iron and sulfur content to create blister copper having a purity of around 99%. Electrolysis is then applied to the blister copper to produce refined copper of 99.99% purity for shipment.


Copper concentrate


Converter


Electrorefining


Blister copper casting


Refined copper

Electronic Materials Business

Products with the top global market share

Treated rolled copper foil: 80%

Sputtering targets for semi-conductors: 60%

(fiscal 2016)

Starting with refined nonferrous metals manufactured in the smelting and refining processes, we perform the necessary processing, such as alloying, high purification, surface treatment, and rolling. We provide electronic materials with a wide range of properties for use in electronic equipment, automotive, medical device, and other industries.

EXAMPLES OF ELECTRONIC MATERIALS PRODUCT MANUFACTURING PROCESSES

Each of the products is manufactured based on advanced metal processing technologies developed over many years.

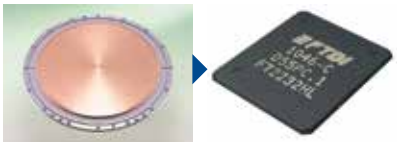
[TREATED ROLLED COPPER FOIL]

Refined copper is melted and cast, followed by repeated rolling until its thickness is only about 6 to 150 microns. Being more bendable than electro-deposited copper foil, treated rolled copper foil is used in flexible printed circuit boards inside smartphones, for example.

Treated rolled copper foil
Applications: Flexible printed circuit boards

[COPPER SPUTTERING TARGETS FOR SEMICONDUCTORS]

Sputtering targets are made from refined copper by further purifying it and then employing processes that include forging, rolling, and surface treatment. In their final use, they are utilized as a material for the extremely fine interconnects of semiconductor integrated circuits.



Copper sputtering targets for semiconductors
Applications: Integrated circuits

Recycling and Environmental Services Business

Annual volume of gold recovered

Approx. 6 tons

(fiscal 2016)

By recovering and reusing nonferrous metal resources from end-of-life electronic devices and industrial waste, we are contributing to environmental conservation and to the realization of a recycling-oriented society.

Making use of domestic and overseas networks, we collect end-of-life electronic devices and industrial waste, which first undergo preprocessing as necessary, such as crushing, incineration, and melting. The resulting materials are then put through smelting and refining processes to recover refined copper, precious metals, rare metals, and other metals.

End-of-life electronic devices and other items for recycling

Refined metals

Titanium Business

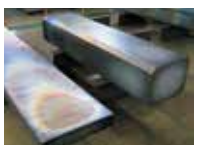
Annual titanium sponge production capacity

25,200 tons

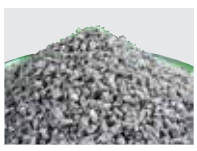
(fiscal 2016)

A variety of titanium materials are manufactured from titanium ore and supplied to society.

Our products include titanium sponge, which is produced through smelting using a magnesium reduction method called the “Kroll process”; titanium ingots, which are made by melting and casting titanium sponge; high-purity titanium; and fabricated titanium products. In addition, we are engaged in the functional chemicals business based on the titanium smelting technology and the raw materials obtained from that process.



Titanium ingots



Titanium sponge

Business Results in Fiscal 2016

(April 1, 2016 to March 31, 2017)

Global demand for refined copper increased, led by 6% year-on-year growth in China, which accounts for around half of worldwide copper demand and where investment in public works and real estate spending were strong. The international copper price (London Metal Exchange (LME) price) began the year at 221 US cents per pound. Against the background of concerns that growth of China's economy may be slowing, and the start of new copper mining operations, prices were weak until October 2016, moving within the range of 200 to 220 cents per pound. The results of the US Presidential election in November prompted a rise in copper prices due to expectations of increased infrastructure investment. Through March 2017, prices moved within the range of 250 to 270 cents per pound. The average price over the fiscal year was 234 cents per pound. On the foreign exchange market, the value of the yen versus the dollar averaged ¥108 over the fiscal year.

In this business climate, consolidated net sales of the JX Nippon Mining & Metals Group declined 4.4% from the previous fiscal year to ¥1,003.1 billion, while ordinary income rose 88.4% to ¥25.0 billion. Net income was positive for the first time since fiscal 2011, at ¥12.6 billion.

Note: The Company discloses financial information through its holding company JXTG Holdings, Inc.

Fiscal 2016 results (consolidated)

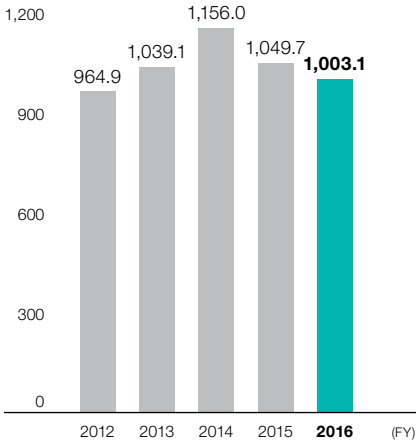
(billions of yen)

	Fiscal 2015	Fiscal 2016	Year-on-year change
Net sales	1,049.7	**1,003.1**	-4.4%
Operating income	14.7	**16.2**	+10.2%
Ordinary income	13.3	**25.0**	+88.4%
Net income (loss)	(47.9)	**12.6**	—
Total assets	1,497.9	**1,496.8**	–0.0%
LME copper price (US cent/pound)	23.7	**23.4**	–1.3%
Exchange rate (JPY/USD)	12.0	**10.8**	–10.0%

Financial Performance (Consolidated)

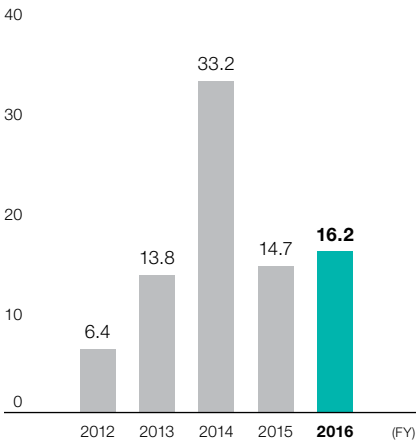
Net sales

(billions of yen)



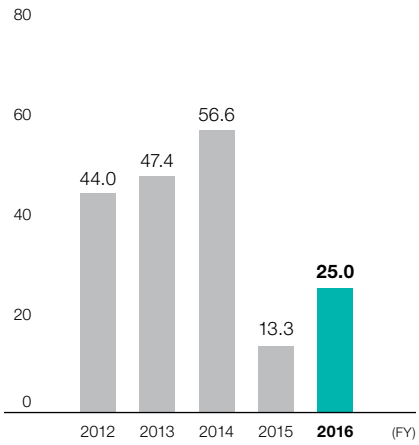
Operating income

(billions of yen)



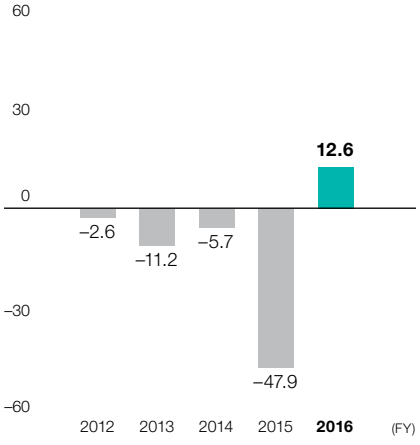
Ordinary income

(billions of yen)



Net income (loss)

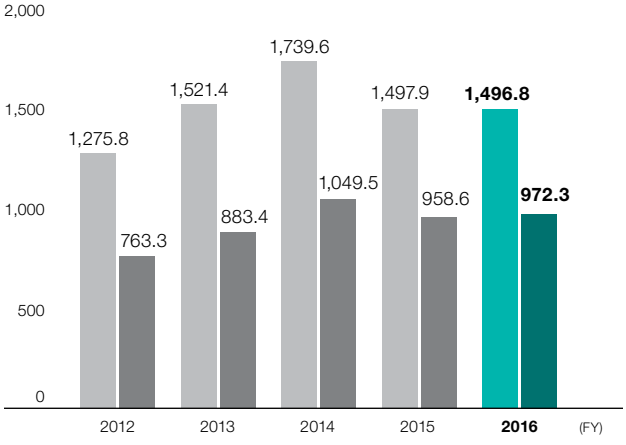
(billions of yen)



Total assets and total liabilities

Total assets Total liabilities

(billions of yen)

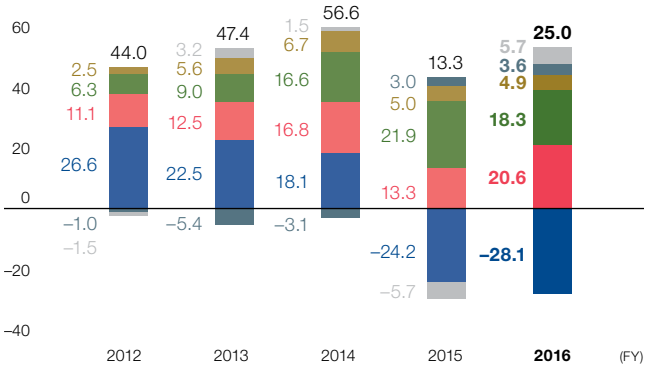


Segment Information

The Group's business consists of five segments: resources development, smelting and refining, electronic materials, recycling and environmental services, and titanium.

Ordinary income trends per segment

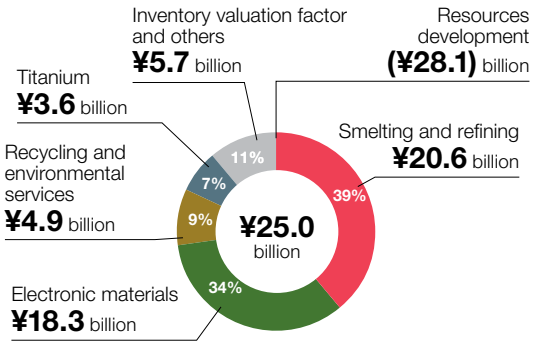
(billions of yen)



Resources development Smelting and refining Electronic materials
Recycling and environmental services Titanium
Inventory valuation factor and others

Ratio of ordinary income by segment* (Fiscal 2016)

(%)



Resources development Smelting and refining Electronic materials
Recycling and environmental services Titanium
Inventory valuation factor and others

* Resources development business is excluded from the ratio calculations.

Year-on-year change in ordinary income (Fiscal 2016)

(billions of yen)

	FY2015	FY2016	Year-on-year change	Main factors in year-on-year change
Resources development business	(24.2)	**(28.1)**	(3.9)	A decline in investment income at mines we have invested in, due mainly to low copper prices, resulted in lower income year on year. Various efforts to achieve stable operation of the Caserones Copper Mine raised the operating rate to more than 90% by the end of the fiscal year.
Smelting and refining business	13.3	**20.6**	+7.3	Despite a decline in profits from the smelting and refining business itself due to low copper prices, foreign exchange rates, and other factors, income rose year on year. A major reason was the lower impact in this fiscal year of the previous fiscal year's recognition of an impairment loss at our South Korean copper smelting company.
Electronic materials business	21.9	**18.3**	(3.6)	Sales volumes of our main products were generally higher year on year, as smartphone demand was solid and demand grew in the IoT field. Income declined year on year, however, affected by the negative aspects of a strong yen.
Recycling and environmental services business	5.0	**4.9**	(0.1)	The generation of recycled materials and volume collected remained steady, in line with the previous fiscal year. Both the generation and collection of industrial waste materials were at similar levels as the previous fiscal year, resulting in the same level of income as the previous year.
Titanium business	3.0	**3.6**	+0.6	Despite the difficult situation for the titanium metal business, as some customers sharply reduced their inventories, income rose year on year thanks to solid performance of the functional chemical products business.

Business Climate Indicators

Trends in key factors affecting Group performance are as indicated below.

Segments affected	Indicators	Units	FY2012	FY2013	FY2014	FY2015	FY2016
All segments	Exchange rate	(JPY/USD)	83	100	110	120	**108**
	LME copper price	(US cent/pound)	356	322	297	237	**234**
Resources development business	Equity entitled copper mine production	(thousand tons/year)	105	127	148	198	**200**
Smelting and refining business	Sales volume of refined copper by PPC	(thousand tons/year)	551	588	623	595	**602**
Electronic materials business	Sales volume of treated rolled copper foil	(thousand kilometers/month)	2.7	3.0	4.1	4.9	**5.0**
	Sales volume of precision rolled materials	(thousand tons/month)	3.3	3.4	3.8	3.7	**4.0**
Recycling and environmental services business	Recovered volume of gold	(tons/year)	5.8	6.1	5.9	6.4	**5.6**

Net Sales by Region

(billions of yen)

	Japan	Rest of world	China	Rest of Asia	North America	Europe	Other	Total
FY2015	562.0	487.7	309.7	138.7	26.9	9.6	2.7	1,049.7
FY2016	584.0	419.1	247.6	133.1	23.2	10.8	4.4	1,003.1

The Medium-Term Management Plan (Fiscal 2017 to 2019)

The JXTG Group drew up the Medium-Term Management Plan (fiscal 2017 to 2019) as the first such plan since the Group was launched. In drawing up this plan, the following basic aims were incorporated toward early realization of the Group Philosophy.

- **In order to contribute to the development of society and economy and the creation of a sustainable and vigorous future, the Group endeavors to enhance its core businesses, promote innovation, and operate business globally.**
- **At the same time, the Group will foster human resources with high ethical standards and willingness to take on new challenges, who are essential in promoting the above, to become one of the most prominent and internationally competitive comprehensive energy, resources, and materials company groups in Asia.**

Fundamental Policy of the JX Nippon Mining & Metals Group for the Medium-Term Management Plan

With the goal of becoming a "Global Resources and Materials Company Centering on Copper," the underlying foundation of the Group will be strengthened and made more stable.

Based on this fundamental policy, three indicators have been set.

1. **Establish and strengthen the profit basis by enhancing the profitability of the resources development segment and developing technology-based businesses**
2. **Improve the financial base by practicing strict financial discipline**
3. **Aggressively implement strategic investment in growth areas for the sake of the future**

In the current business climate, the JX Nippon Mining & Metals Group is moving beyond difficult times as natural resource prices are slowly recovering and moderate growth is continuing in emerging countries. Society is experiencing rapid changes with the emergence of IoT and AI. During the three years of the Medium-Term Management Plan, the Group is called on to establish the kind of profit and financial base that can adapt readily to changes in the business climate.

The first means to this end will be to ensure that the profitability of core businesses is strengthened. While paying attention to investment efficiency, the Group will strengthen the competitiveness from upstream to downstream businesses and obtain stable revenue sources. The second means will be to develop and strengthen businesses that will be the mainstays of the future, thereby increasing the presence of the JX Nippon Mining & Metals Group and contributing to realization of a sustainable society.

Operating income targets (excluding inventory valuation factor)

	FY2016	FY2017	FY2018	FY2019
Upstream (resources development) (billions of yen)	(23.0)	**9.0**	**15.0**	**30.0**
Midstream and downstream (smelting and refining, electronic materials, recycling and environmental services, titanium) (billions of yen)	45.0	**35.0**	**50.0**	**60.0**
Total (billions of yen)	22.0	**44.0**	**65.0**	**90.0**
Key factors				
LME copper price (US cent/pound)	234	**250**	**260**	**270**
Equity entitled copper mine production (thousand tons/year)	200	**235**	**247**	**255**
Sales volume of refined copper by PPC (thousand tons/year)	602	**576**	**625**	**645**
Sales volume of treated rolled copper foil (thousand kilometers/month)	5.0	**5.4**	**5.6**	**5.8**
Sales volume of precision rolled materials (thousand tons/year)	4.0	**4.0**	**4.1**	**4.2**
Volume of gold recovered by recycling and environmental services (tons/year)	5.6	**6.3**	**6.7**	**7.3**

Note: Forecasts for fiscal 2017 to 2019 are values announced in May 2017. The Company has applied IFRS from fiscal 2017.

Strengthening Profitability of the Caserones Copper Mine and Expanding the Scope of Electronic Materials Business

Resources Development Business

Key Strategies
- **Maintain high operating rate**
- **Become more competitive by achieving thoroughgoing cost reductions**

Business Overview

At the Caserones Copper Mine, which the Group has taken the lead in developing since acquiring mining interests in 2006, copper concentrate production began in May 2014. In the second half of fiscal 2016, both mill throughput and copper production in concentrate reached levels exceeding 90% of the plan, as operations have steadily advanced.

We have also invested in some of the world's largest copper mines, such as Los Pelambres, Escondida, and Collahuasi. Our equity entitled copper mine production totaled around 200,000 tons in fiscal 2016.

Initiatives

A top priority is to boost the profitability of the Caserones Copper Mine.

Besides improving operations, reforms will be carried out under a new management team, endeavoring for stable and sustainable operation. Measures will be taken to raise employee motivation, improve efficiency such as by revising the supply chain, and curtail costs, making the mine more competitive.

Caserones Project

Acquisition of mining interests	May 2006
Acquisition price	US$137 million
Initial investment amount	US$4.2 billion (initial investment in production equipment, etc.)
Equity shares (as of March 31, 2017)	JX Nippon Mining & Metals: 51.50% Mitsui Mining & Smelting: 25.87% Mitsui & Co.: 22.63%
Mine life	28 years (2013 to 2040)
Total production volume (28-year lifetime)	Copper: 3,550,000 t (copper concentrate 3,140,000 t, SX-EW refined copper 410,000 t) Molybdenum: 87,000 t
Production plans	March 2013: Start of SX-EW refined copper production May 2014: Start of copper concentrates production

		First 10 years	28-year average	28-year total
Copper	Concentrate (copper content)	150,000 t/year	110,000 t/year	3,140,000 t
	SX-EW refined copper	30,000 t/year	10,000 t/year	410,000 t
	Total	180,000 t/year	120,000 t/year	3,550,000 t
Molybdenum		3,000 t/year	3,000 t/year	87,000 t

Note: The Caserones Copper Mine commenced commercial operation in May 2014. It is to be closed in 2040 when its mineral resources are depleted.

Caserones Copper Mine


SAG (semi-autogenous grinding) mill
After being crushed to 200 mm or smaller in crushing equipment, the ore is reduced to around 0.2 mm in the grinding process.


Flotation
A process in which ore that has been ground in the SAG mill is separated into copper concentrate and tailings

The Medium-Term Management Plan (Fiscal 2017 to 2019)

Smelting and Refining Business

Key Strategy • **Achieving safe and stable operation of facilities and becoming more cost-competitive**

Business Overview

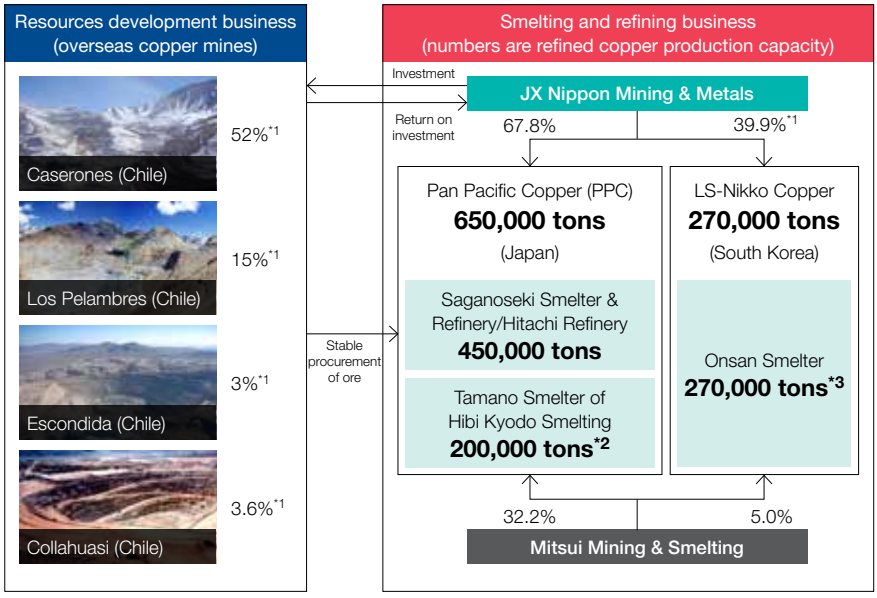
Our refined copper production capacity is among the largest in the world, at approximately 920,000 tons a year combined for Pan Pacific Copper's sites in Japan and LS-Nikko Copper in South Korea. We efficiently produce high-quality refined metal products, including copper and precious metals, and provide stable supplies to Asian markets where demand is expanding.

Initiatives

In smelting and refining, priority is on ensuring stable operation of facilities at the Saganoseki Smelter & Refinery and at the Tamano Smelter of Hibi Kyodo Smelting, and on boosting competitiveness.

We will also endeavor to reduce costs by actively employing IoT and AI technologies in operations management and in equipment maintenance. While leveraging the strengths of the respective plants, we will boost collaboration between the plants and the Head Office, aiming for stable and efficient operations.

Outline of Resources Development and Smelting and Refining Businesses



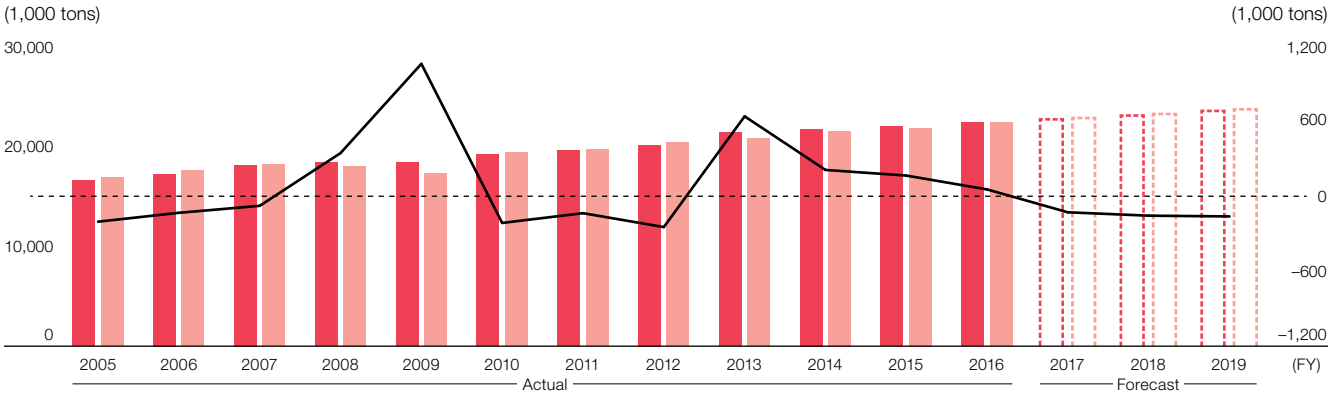
*1 Indirect ownership portion of JX Nippon Mining & Metals (as of March 31, 2017)
*2 PPC's offtake of the total production capacity of 290,000 tons
*3 The amount corresponding to JX Nippon Mining & Metals' equity share of the total production capacity of 680,000 tons


Saganoseki Smelter & Refinery


Tamano Smelter of Hibi Kyodo Smelting


Onsan Smelter

Global Supply and Demand of Refined Copper



Electronic Materials Business

Key Strategies
- **Improve profitability in existing fields**
- **Boost competitiveness by making use of IoT and AI**

Business Overview

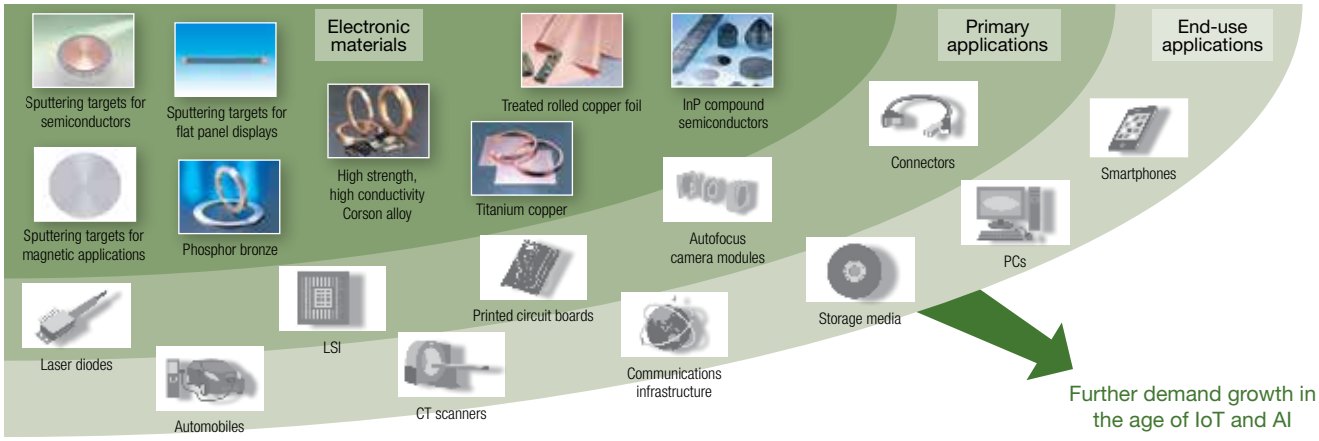
We develop and provide high-quality, high-performance electronic materials in a timely manner, drawing on our technological advantages related to nonferrous metals in areas including high-purity refining, high-density sintering, surface treatment, and precision rolling and fabrication. Our materials are matched to rapidly advancing needs in the electronic equipment and automotive markets, where we maintain high global shares.

Initiatives

Demand for sputtering targets for semiconductors, treated rolled copper foils, compound semiconductors, and other value-added products is increasing steadily, against the background of rapid growth in smartphones and in servers and other IT equipment, and the development of communication services and infrastructure. We plan to increase sales volume and expand earnings while closely watching demand trends.

Ahead of the arrival of the full-fledged IoT society, the period of the current Medium-Term Management Plan is seen as a preparation time, during which we will be strengthening our business foundation. An aim of the JX Nippon Mining & Metals Group is to raise the proportion of unique products, expanding our lineup of products that are at the top of their niche globally. To this end, we will carry out development anticipating technology trends, build up a sales organization able to respond effectively to changes in the social environment, and strengthen business by making use of IoT and AI technologies.

Outline of Electronic Materials Business (Main Products and Applications)



Global Market Share of Our Principal Electronic Materials Products

Product	Global market share (in 2016)	Primary applications	End-use applications				
			PCs	Mobile phones, smartphones	Digital appliances, AV	Communications infrastructure and data centers	Automobiles
Sputtering targets for semiconductors	60% **No. 1**	CPUs, memory chips, etc.	◎	◎	◎	◎	○
ITO targets for flat panel displays	30% **No. 1**	Transparent conductive films	◎	◎	◎		○
Sputtering targets for magnetic applications	60% **No. 1**	Hard disks, etc.	◎		○	◎	○
InP compound semiconductors	50% **No. 1**	Optical communication devices, ultra fast ICs			○	◎	○
Treated rolled copper foil	80% **No. 1**	Flexible printed circuit boards	○	◎	◎	○	○
Phosphor bronze foil (thickness less than 0.1 mm)	65% **No. 1**	Connectors, springs for electronic parts	○	◎	○	○	○
High strength, high conductivity Corson alloy	60% **No. 1**	Lead frames, connectors	○	◎	○	○	○
Titanium copper	70% **No. 1**	High-end connectors, etc.	○	◎	○	○	○

The Medium-Term Management Plan (Fiscal 2017 to 2019)

Recycling and Environmental Services Business

Key Strategies

- **Promote differentiation from competitors**
- **Enhance the global resource collection network**

Business Overview

In the recycling business, the Group efficiently recovers copper, precious metals, rare metals, and other resources from recycled materials, harnessing the processes that utilize technologies from our smelting and refining business. In the environmental services business, we provide zero-emissions treatment of industrial waste materials to render them harmless without producing any secondary waste. In Japan, we established the Hitachi Metal-recycling Complex (HMC) Department of the Hitachi Works, engaging in the recovery of a wide variety of valuable metals. At the same time, we have been taking steps to strengthen our nationwide network with recyclers and hydrometallurgical refiners for collection and processing of recycled materials. By establishing bases outside Japan in the US and Taiwan, and building stronger ties with major recyclers, we are seeking to increase the volume of collected materials.

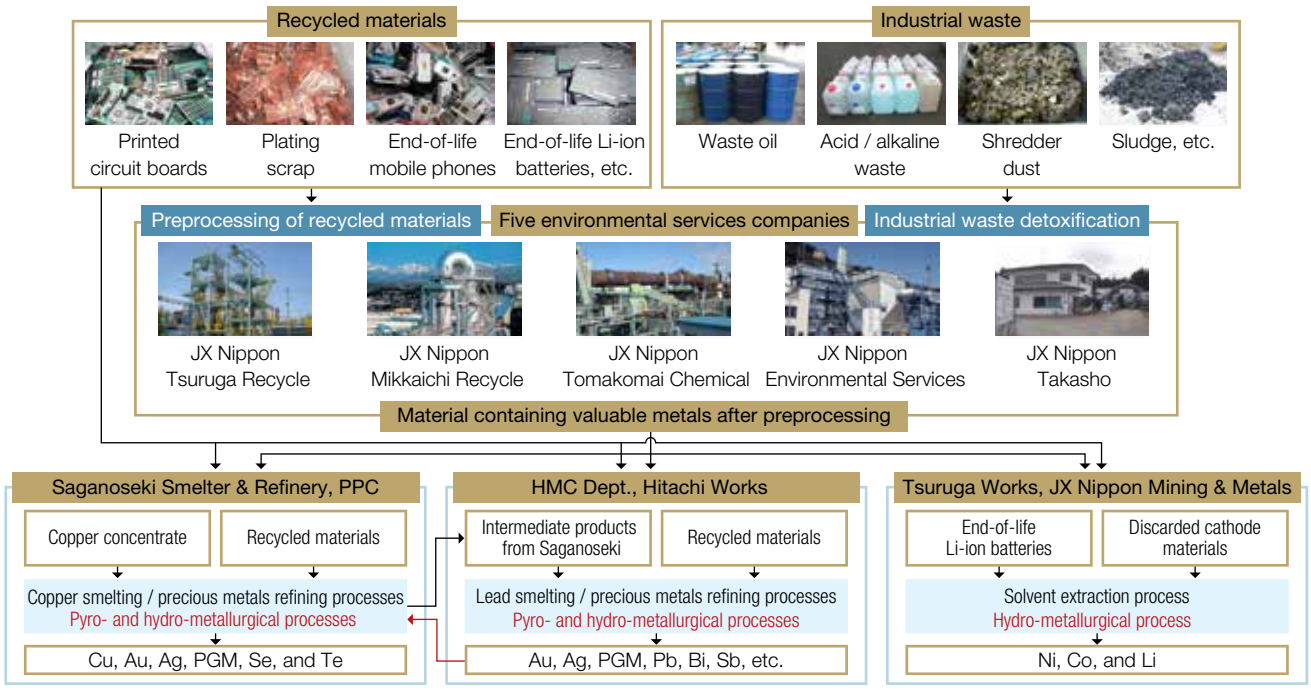
Initiatives

The recycling and environmental services business is marked by constant demands to reduce costs and boost competitiveness, as rivals vie for resources to recycle. In this business climate, we have been seeking to differentiate our services from competitors by improving recycling technologies for separating impurities and for analysis. Based on superior technology, we aim to increase collection from major recyclers in Japan and overseas, building up a strong global network for resource recovery.

Analysis facility: Recycled Materials Analysis Center, HMC Department, Hitachi Works

Overseas collection base: Zhangbin Recycling Center, Nikko Metals Taiwan

Outline of Recycling and Environmental Services Business



Titanium Business

Key Strategies

- **Strengthen the titanium metal business by bringing the Saudi Arabia project to early commercial operation and establishing an optimal production system for titanium sponge**
- **Advance differentiation strategies in the catalysts and chemicals business and expand production capability**

Business Overview

Titanium, a light, strong metal resistant to corrosion, has wide-ranging uses, from aircraft to desalination plants, electric power plants, and other applications. Group company Toho Titanium is engaged in the manufacture of titanium metals, as well as catalysts and electronic materials using materials and technologies related to titanium production such as catalysts for manufacturing polypropylene, and materials for electrodes and dielectrics in multilayer ceramic capacitors.

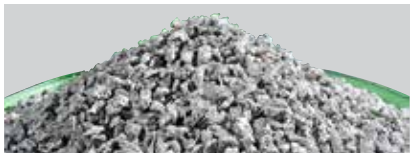
Initiatives

Besides continuing with the thoroughgoing pursuit of efficiency and cost reduction in the titanium metal business, we are working through ATTM (see below) toward the early completion and commercialization of the titanium sponge joint venture project in Saudi Arabia, and toward establishment of an optimal titanium sponge production system that is responsive to changes in the business climate (demand, raw materials, exchange rates, etc.). In the catalysts and chemicals business, we are seeing growing demand for polypropylene and multilayer ceramic capacitors; in response, we are aiming for growth of our businesses of propylene polymerization catalysts, and nickel powder and other materials for multilayer ceramic capacitors, at a rate outpacing the market by leveraging our strengths to carry out differentiation strategies and expanding our production capacity. We are also strengthening development of related technologies, in efforts to create original technologies and new businesses, while advancing our capabilities in fundamental and core technologies as the fountainhead of next-generation technology development.

In preparation for the titanium sponge joint venture in Saudi Arabia, a total of 65 trainees from Saudi Arabia who will be responsible for operations at the new plant took part in practical training at the Toho Titanium Wakamatsu Plant, where titanium sponge is manufactured, between April 2015 and February 2017. Construction of the new plant was completed at the end of May 2017. It is expected to start commercial production in early 2018.

Overview of Saudi Arabia Project

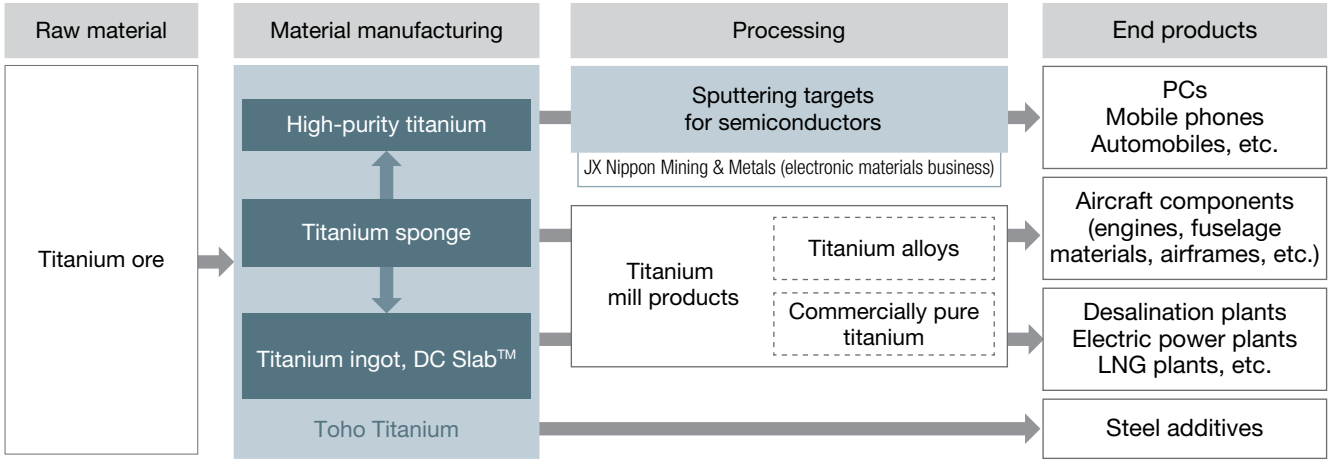
Name	Advanced Metal Industries Cluster and Toho Titanium Metal Company Limited (ATTM)	
Head office	Yanbu, Kingdom of Saudi Arabia	
Operations	Manufacture and sale of titanium sponge at a new plant constructed in Saudi Arabia	
Established	February 29, 2016	
Fiscal year end	December 31	
Equity shares	Toho Titanium 35.0% Advanced Metal Industries Cluster Company Limited* 65.0% ⟶ (Cristal: 32.5%, Tasnee: 32.5%) * A company equally owned by Cristal and Tasnee, Cristal's parent company.	
Other	Production capacity 15,600 t/year	Investment amount approx. US$480 million
	Plant construction started May 2015	Completed May 2017



Titanium sponge

Saudi Arabia plant

Outline of Titanium Metal Business



Scope of the Group's business

The Medium-Term Management Plan (Fiscal 2017 to 2019)

Developing technology-based businesses (Developing and strengthening businesses that will be the mainstays of the future)

Key Strategies

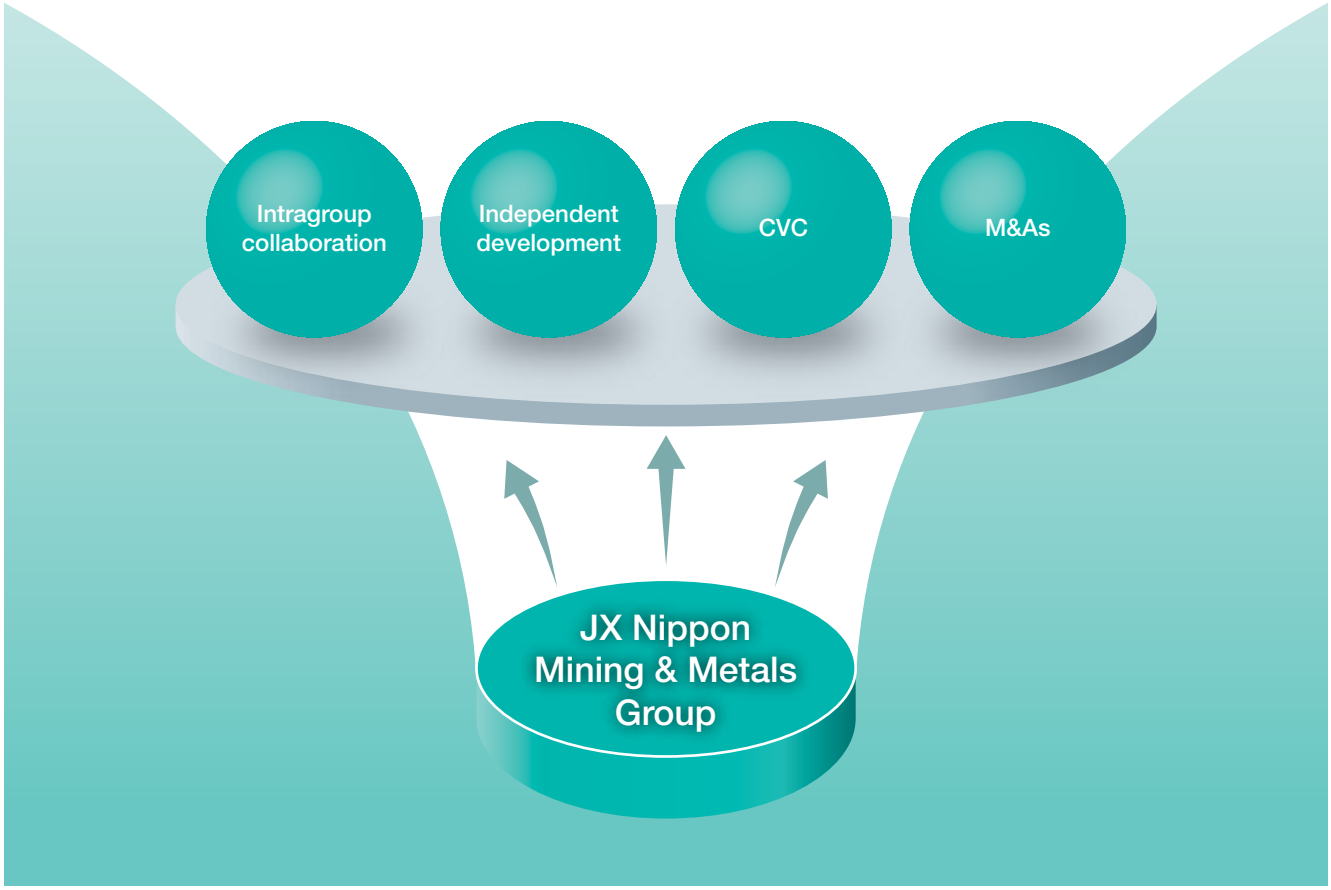
- **Develop markets, strengthen sales, and develop technologies in anticipation of the arrival of the IoT society**
- **Proactively devote management resources to prospective areas**

Of special note

The JX Nippon Mining & Metals Group is spending a total of ¥200 billion on implementing the Medium-Term Management Plan. This will consist mainly of strategic investment in growth fields in midstream and downstream operations, where demand is expected to expand greatly with the advance of IoT and other new technologies. Directions of business size expansion include intragroup collaboration (harnessing Group-held technologies), independent development, CVC (Corporate Venture Capital), and M&As.

By means of ongoing strategic investment in these directions, we plan to create new businesses, mainly in electronic materials, and obtain stable earnings.

Directions of Business Size Expansion



Amount of Capital Investment in Medium-Term Management Plan

(billions of yen)

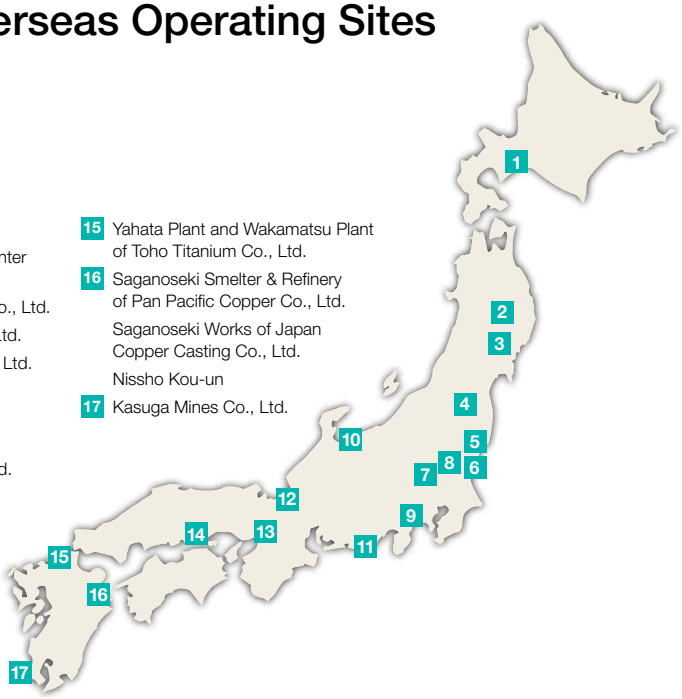
Strategic investment	**70.0**
Maintenance and others	**130.0**
Total	**200.0**

Production Sites in Japan and Overseas Operating Sites

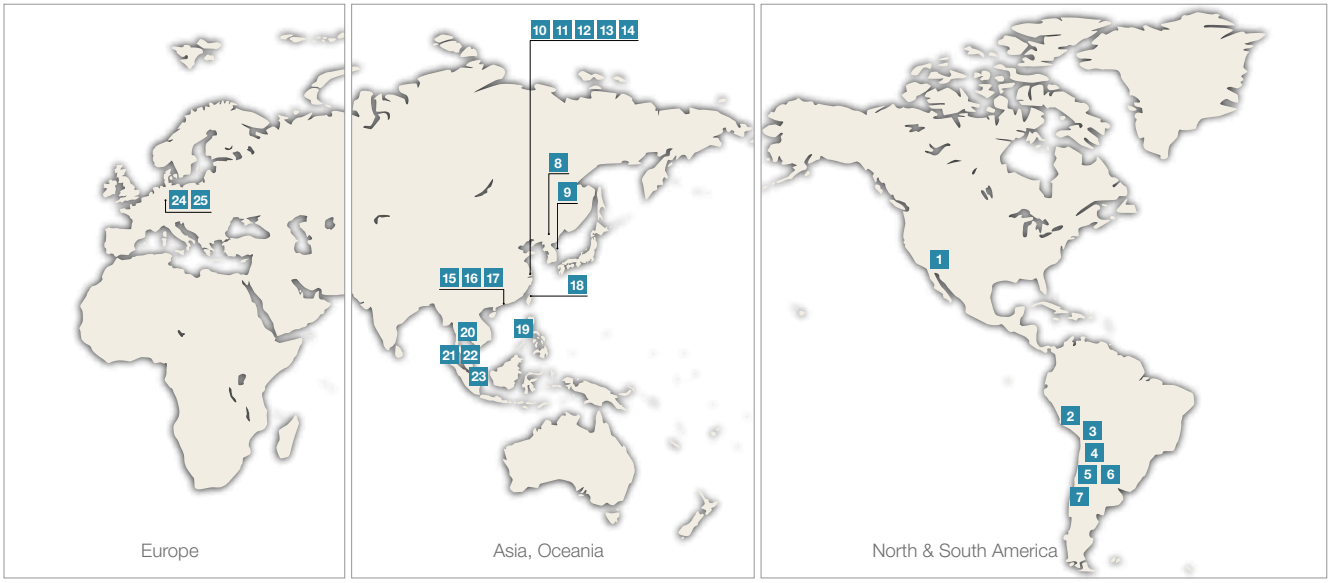
As of July 1, 2017

Domestic

1 JX Nippon Tomakomai Chemical Co., Ltd.
2 Esashi Works of JX Metals Precision Technology Co., Ltd.
3 Ichinoseki Foil Manufacturing Co., Ltd.
4 Shirakawa Plant of JX Nippon Takasho Co., Ltd.
5 Isohara Works, JX Nippon Foundry Co., Ltd.
6 Hitachi Works,
Hitachi Refinery of Pan Pacific Copper Co., Ltd.
JX Nippon Environmental Services Co., Ltd.
Kamine Clean Service Co., Ltd.
Hitachi Plant of Toho Titanium Co., Ltd.
7 Tatebayashi Works of JX Metals Precision Technology Co., Ltd.
8 Nasu Works and Metal Mold Production & Development Center of JX Metals Precision Technology Co., Ltd.
9 Kurami Works,
Kurami Office of JX Nippon Coil Center Co., Ltd.
Chigasaki Plant of Toho Titanium Co., Ltd.
10 JX Nippon Mikkaichi Recycle Co., Ltd.
Kurobe Plant of Toho Titanium Co., Ltd.
11 Kakegawa Works of JX Metals Precision Technology Co., Ltd.
12 Tsuruga Plant,
JX Nippon Tsuruga Recycle Co., Ltd.
13 Takatsuki Plant of JX Metals Trading Co., Ltd.
14 Hibi Smelter of Pan Pacific Copper Co., Ltd.
Tamano Smelter of Hibi Kyodo Smelting Co., Ltd.
Hibi Smelting Logistics Co., Ltd.
15 Yahata Plant and Wakamatsu Plant of Toho Titanium Co., Ltd.
16 Saganoseki Smelter & Refinery of Pan Pacific Copper Co., Ltd.
Saganoseki Works of Japan Copper Casting Co., Ltd.
Nissho Kou-un
17 Kasuga Mines Co., Ltd.



Overseas



1 JX Nippon Mining & Metals USA, Inc.
2 Pan Pacific Copper Exploration Peru, S.A.C.
Compania Minera Quechua S.A.
3 Collahuasi Mine
4 Escondida Mine
5 Caserones Mine
6 Los Pelambres Mine
7 Chile Office
Chile Office of Pan Pacific Copper Co., Ltd.
Pan Pacific Copper Chile SpA
Pan Pacific Copper Exploration Chile Limitada
SCM Minera Lumina Copper Chile
8 JX Nippon Mining & Metals Korea Co., Ltd.
9 LS-Nikko Copper Inc.
Poongsan-Nikko Tin Plating Corporation
10 JX Nippon Mining & Metals Shanghai Co., Ltd.
11 Pan Pacific Copper (Shanghai) Co., Ltd.
12 Nikko Metals Shanghai Co., Ltd.
13 Nippon Mining & Metals (Suzhou) Co., Ltd.
14 Nikko Fuji Precision (Wuxi) Co., Ltd.
15 JX Nippon Mining & Metals Dongguan Co., Ltd.
16 Hong Kong Nikko Shoji Co., Ltd.
18 Shenzhen Nikko Shoji Co., Ltd.
18 Nikko Metals Taiwan Co., Ltd.
Taiwan Office of Pan Pacific Copper Co., Ltd.
19 JX Nippon Mining & Metals Philippines, Inc.
20 Thai Office of Pan Pacific Copper
21 Materials Service Complex (Thailand) Co., Ltd.
22 Materials Service Complex Malaysia Sdn. Bhd.
23 JX Nippon Mining & Metals Singapore Pte. Ltd.
24 JX Nippon Mining & Metals Europe GmbH
25 Frankfurt Office

Corporate Data

Company Name:
JX Nippon Mining & Metals Corporation
Paid-in Capital:
¥20.0 billion (wholly owned by JXTG Holdings, Inc.)
Representative:
Shigeru Oi, President and Chief Executive Officer
Net Sales:
¥1,003.1 billion (fiscal 2016, consolidated)
Ordinary Income:
¥25.0 billion (fiscal 2016, consolidated)
Head Office:
1-2, Otemachi 1-chome, Chiyoda-ku, Tokyo 100-8164, Japan

Business Lines:
- Resources development
- Smelting and refining
- Electronic materials
- Recycling and environmental services

Employees (Nonconsolidated):
1,413 (as of March 31, 2017)
Employees (Consolidated):
8,260 (as of March 31, 2017)

Domestic Operating Sites:
- Hitachi Works (Ibaraki Prefecture)
- Isohara Works (Ibaraki Prefecture)
- Technology Development Center (Ibaraki Prefecture)
- Kurami Works (Kanagawa Prefecture)
- Tsuruga Plant (Fukui Prefecture)

Overseas Operating Sites:*
Chile Office, Frankfurt Office

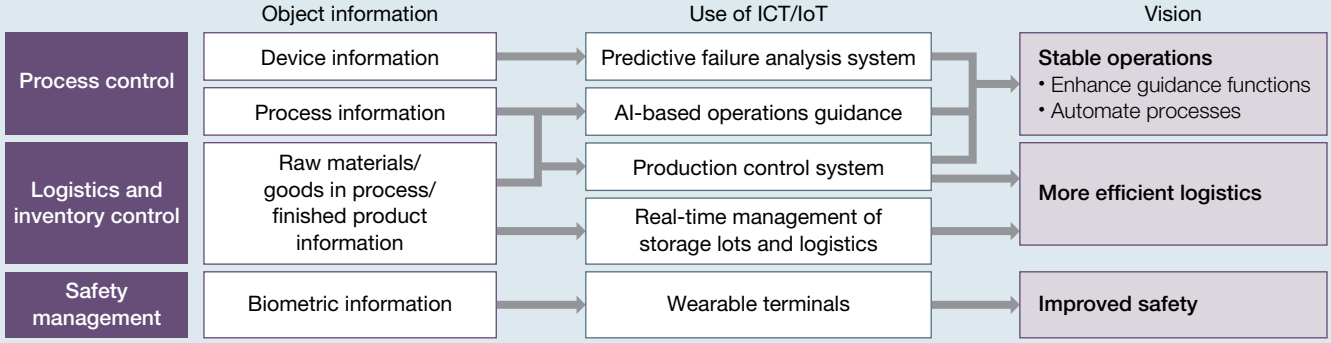
* The JX Nippon Mining & Metals Group conducts business in 11 countries worldwide.

SPECIAL FEATURE 1 IoT Initiatives at Saganoseki Smelter & Refinery

The JX Nippon Mining & Metals Group has launched an IoT & AI Promotion Project, as an integral part of the IT Medium-Term Management Plan Project, for actively promoting use of information technology in the Group and use of Internet of Things (IoT) technologies in production processes. The project will contribute to the reform of each of the business groups and operating sites through the use of process technologies, equipment technologies, and information technology.

As part of the project efforts, Pan Pacific Copper is promoting IoT adoption at its Saganoseki Smelter & Refinery in the three areas of process control, logistics and inventory control, and safety management. By efficiently utilizing various information communication technologies (ICT), it has achieved stable operations, more efficient logistics, and improved safety. In this way the company aims to operate a high productivity, low environmental burden refinery leading the world in technology.

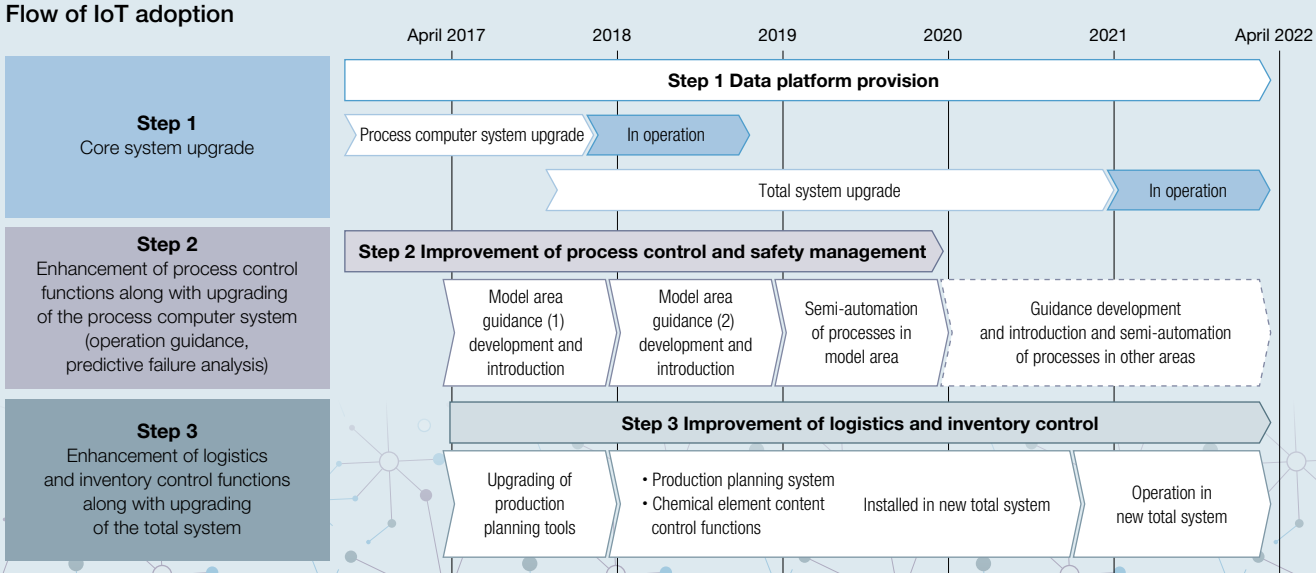
The Vision Aimed for by the Saganoseki Smelter & Refinery



Promoting IoT Use

The Saganoseki Smelter & Refinery employs two core systems, a plant process computer system that collects operations information in real time from equipment control devices and analysis devices, and a total system that manages physical information. This site was already a pioneer in introducing and making use of these core systems in the 1970s. During regular maintenance in 2017, the systems are being upgraded, adopting IoT technologies in the three steps shown here.

Flow of IoT adoption



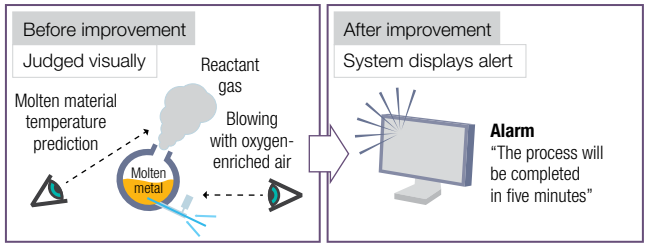
Example of Process Improvement by IoT Technology

Converter furnace operation guidance
Developed and introduced in house

Description Conventionally, the end of the slagging stage[*1] in the converter furnace had to be determined visually by the operator. A system was introduced that displays guidance based on real-time operation information.

*1 Slagging stage: The process of oxidizing molten copper matte and removing iron sulfide.

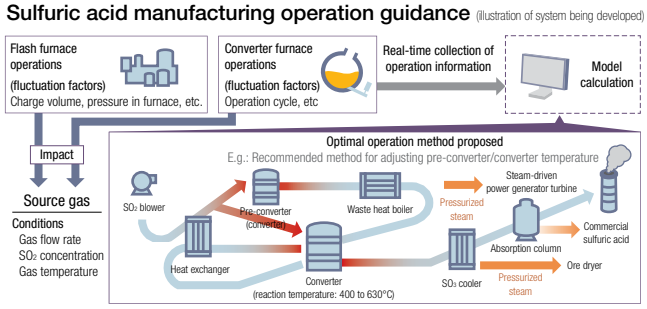
Benefits Enables flexible response to changes in copper matte grade



Sulfuric acid manufacturing operation guidance
Under development in house

Description A system is being developed that collects operation information in real time during the preliminary sulfuric acid manufacturing processes (flash furnace, converter furnace), proposes optimal operations for subsequent processes, and displays the proposal on the screen.

Benefits Enables operations independent of operator skills; lays foundations for automation

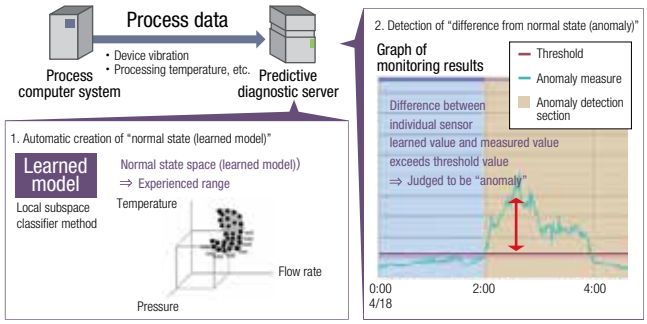


Predictive failure analysis system
Introduction planned

Description A predictive diagnostic server and BD-CUBE[*2] are to be introduced in the sulfuric acid manufacturing processes. Based on equipment data accumulated in the predictive diagnostic server, BD-CUBE automatically learns the normal states of equipment, calculates anomaly prediction threshold values, and detects predicted anomalies.

*2 BD-CUBE: Predictive failure analysis software developed by Hitachi High-Tech Solutions Corporation

Benefits Provides advance prevention of operation stoppage due to equipment malfunction



VOICE Bringing IoT to the Challenge of Process Innovation

Toshihiro Nagato
Chief Engineer,
Production Division,
Saganoseki Smelter & Refinery, Pan Pacific Copper Co., Ltd.

Up to now, smelter and refinery estimates and operations have relied on the instincts of on-site operators, due to the difficulty of directly measuring in real time the temperatures or compositions of the high-temperature molten materials handled in processes. When I joined the company in 1994, my first posting was to Saganoseki. While there, I learned from veteran operators that the temperature of hot molten materials is estimated from their color, and I recall being impressed by the skills of experienced workers. More recently, I have been working on obtaining a number of indicators that are difficult to acquire directly, from indirect information collected in real time, and on attempting to put these to use in process control. These efforts have met with a certain amount of success. Today, dramatic advances in information technology have made possible great increases in the volume and speed of data transmission. I would like to take advantage of this progress to use various kinds of object-related data to estimate data about things that are difficult to know, and to make more effective use of IoT in ways that will be useful for process control.

Lately IoT and AI are being touted as technologies that will revolutionize industry. Since 2016, the Saganoseki Smelter & Refinery has had an IoT promotion organization. As a member of this organization, I will be devoting efforts toward making this wave an even bigger one.

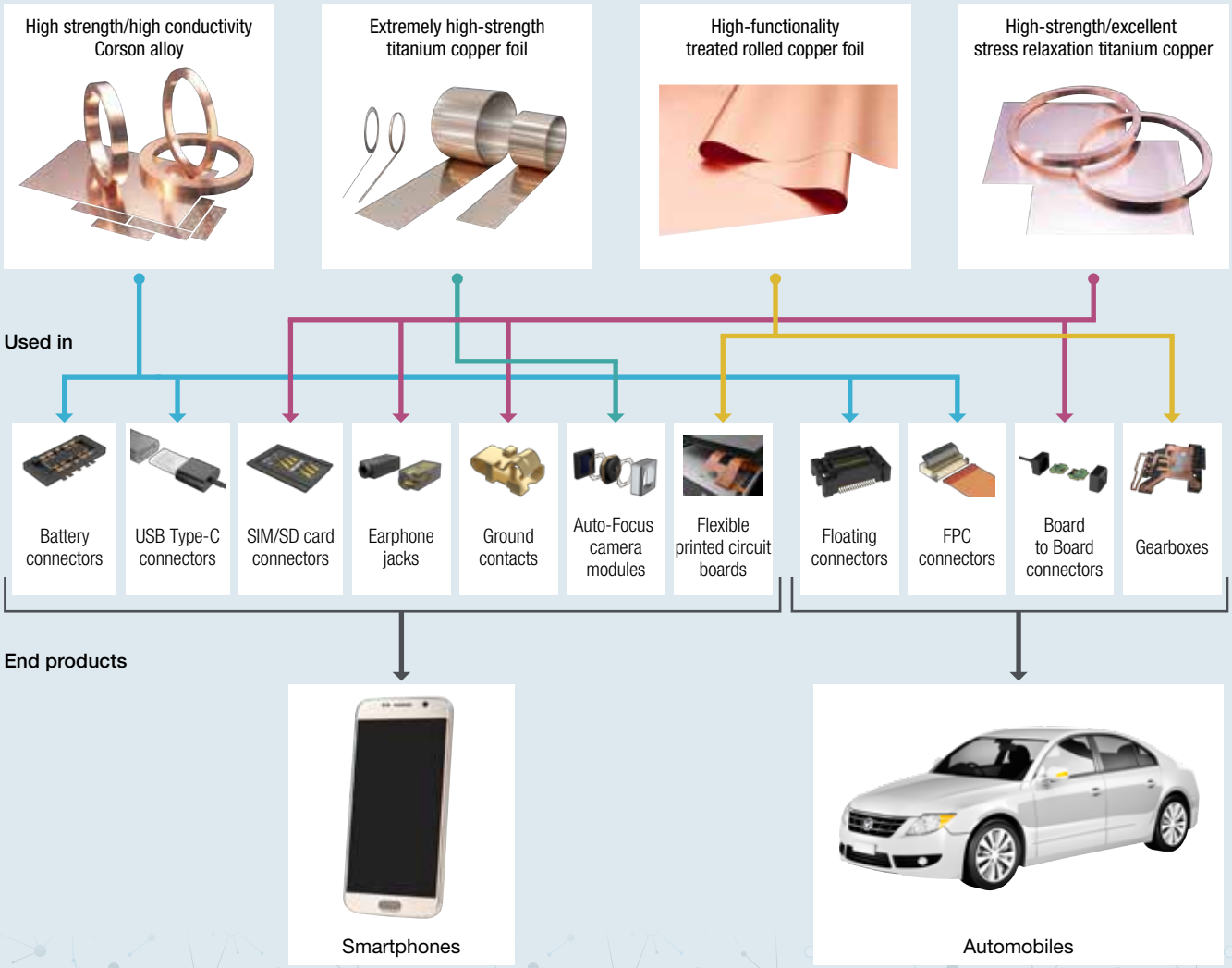
SPECIAL FEATURE 2

Stable Supply by Raising Production Capacity of High Performance Copper Alloys and Foils

The high performance copper alloys and foils manufactured by JX Nippon Mining & Metals are widely used in smartphones and other information and communication devices. Today, as products and components become even smaller, and are adopted in smarter cars and the IoT, the copper alloys used for in-vehicle electrical parts, sensors, and other components are becoming increasingly thin. The number of parts used in end products is also growing. As a result, the fields where our products are used are expected to expand even further.

To meet this situation, we are taking further steps to ensure stable supplies of our products from a number of perspectives, such as BCP (business continuity planning). Measures include drawing up capital investment plans for the relevant products at our main Kurami Works and other plants, and steadily boosting production.

JX Nippon Mining & Metals high performance copper alloys and foils



Details of Capital Investment

Kurami Works

❶ Finishing mill

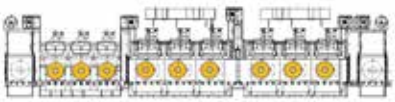
Applicable products:
High performance copper alloys and foils
Attempted preparation: FY2017 1H
Full operation: FY2017 2H

❷ Degreasing line

Applicable products:
Treated rolled copper foils
Attempted preparation: December 2016
Full operation: March 2017

❸ Precipitation hardening furnace

Applicable products:
Corson alloy
Attempted preparation: FY2017 4Q
Full operation: FY2018 1H



Hitachi Works

Surface treatment line

Applicable products:
Treated rolled copper foils
Attempted preparation: January 2017
Full operation: April 2017

VOICE Devoting Our Energies to Facility Design to Ensure Stable Product Supply Well into the Future

Ryota Kishimoto
Engineer,
2nd Production Section,
Production Department,
Kurami Works

Just about everyone carries a smartphone today, but back in 2011 when I joined the company, they were quite rare. Since then their popularity has taken off, and now we can do all kinds of things with smartphones. This situation, along with the advent of the IoT and AI, is causing further demand for the high performance copper alloys and foils produced at the Kurami Works, which is something we are keenly aware of here on the manufacturing front lines.

We have now decided to make the first major investment in 13 years for capacity upgrades to our finishing mill, degreasing line, and precipitation hardening furnace, rallying all our resources as a Division to maximize the benefits. In carrying out facility design, our aim was to create the best possible equipment for the future. To this end, with an eye on future demand trends, we sought to incorporate the technical expertise and experience of the Kurami Works to date, the latest safety and efficiency designs, and suggestions for improvements from people in the workplace. From facility design to product assessment and stable operation, we are devoting our efforts toward early delivery of products to customers.

While there are many obstacles to overcome, I take great satisfaction in working on a project in which so many people are participating. As a team, we all share the same goals, and are working toward them with key milestones in mind and in close communication with all those involved.

Project members
(author is front center)

Ensuring Occupational Health and Safety

From its inception, the Group has always considered the maintenance of occupational health and safety to be an essential condition for the continuation of its business, and it has endeavored to provide an environment where employees can work with peace of mind. The Group drew up the Basic Policy on Health and Safety aimed at the elimination of accidents and illnesses and strives to foster a culture of safety.

TOPIC 1

Experiential Risk Training at Operating Site (Saganoseki Smelter & Refinery)

The JXTG Group opened the JXTG Safety Education Center in the city of Hitachi, Ibaraki Prefecture, for providing education to employees of the Group and subcontractors, aimed at raising their safety awareness. In addition to the comprehensive education provided at the center, the JX Nippon Mining & Metals Group carries out supplementary safety education by providing experiential risk training at individual operating sites geared to the nature of the operations performed at each site and their risks.

Saganoseki Smelter & Refinery Safety Education Center

At the Saganoseki Smelter & Refinery, experiential risk training is offered at an on-site Safety Education Center by six instructors (as of the end of fiscal 2016) who were trained with assistance from the JXTG Group Safety Education Center. Starting in September 2016, training aimed at prevention of industrial accidents by improving risk sensitivity has been provided to more than 350 employees of subcontractors. The training will be enhanced further by engaging site supervisors as instructors, and will be offered also to the Company's employees, in an effort to maintain and improve risk sensitivity.

Training in progress

Experiential Risk Training Curriculum at Saganoseki Smelter & Refinery

1. Experiencing risks of toppling, flying or falling objects, and falls
2. Experiencing hanging from a safety strap
3. Experiencing risk of entanglement in a roller
4. Experiencing risk of entanglement in a conveyor belt
5. Experiencing risk of entanglement in a cooling fan
6. Experiencing risk of getting finger caught in a suspended load
7. Education in basic rules
8. Emergency notification drills

Experiencing risk of entanglement in a cooling fan

VOICE

Training at the Saganoseki Smelter & Refinery Safety Education Center

Shigeru Sato
(left in photo)
Instructor,
Safety Education Center,
Saganoseki Smelter &
Refinery, Pan Pacific
Copper Co., Ltd.

Experiential risk training at the Saganoseki Smelter & Refinery of Pan Pacific Copper began in 2011 using simulations of risk factors. Initially there were two pieces of equipment, one for experiencing entanglement in a roller, and the other for falling and flying objects and toppling risks. Thereafter, other kinds of equipment were gradually added. The training program started without an assigned instructor. Instead, staff in charge of the program in the Environment & Safety Department conveyed the content of the training to senior managers or managers and the training was conducted in their individual sections.

Provision of the training to employees of subcontractors began in 2016. The curriculum has been tailored to subcontracted firms, such as by making use of original equipment manufactured by the refinery for experiencing the risk of entanglement in control panel cooler fans.

In 2017, the training provided to the refinery's employees was enhanced by adding to the curriculum experiential risk training involving heavy machinery, steam explosions, oxygen deficiency, and chemical splattering.

TOPIC ❷

Initiatives Aimed at Eliminating Serious Accidents

The latest report on industrial accident occurrences (see page 37 for details) makes clear the urgent need to eliminate serious accidents.* Essential to achieving this goal will be to raise the level of risk assessment, focusing also on "identification of risk sources" and "imagining accident scenarios," which have received insufficient attention up to now. Inviting outside instructors (representatives of The Japan Industrial Safety and Health Association and occupational safety consultants), the JX Nippon Mining & Metals Group moved to address this need by holding level-raising training and guidance sessions for the leader class responsible for promoting actual risk assessment. During fiscal 2017, training and guidance sessions continue to be held, as well as follow-up sessions. Participants in these sessions conduct practical risk assessment and devise effective countermeasures for the major risks found, raising expectations for a safer working environment.

* Accidents with lost workdays or more severe accidents

Training by The Japan Industrial Safety and Health Association

This training was provided multiple times for approximately 140 persons at the Isohara Works, Hibi Smelter and Saganoseki Smelter & Refinery, including affiliates of each site. In advance of the training, detailed discussions were carried out between The Japan Industrial Safety and Health Association and the Head Office Environment & Safety Department, so that an original training program could be drawn up for the JX Nippon Mining & Metals Group. The practice sessions, in particular, were geared to the actual situation at each operating site, making use of workplace photos and going to the site to identify risk sources.

Group discussion at Hibi Smelter

Guidance Sessions by Occupational Safety Consultants

Occupational safety consultants who had already been providing education and guidance at the Hitachi Works for raising risk assessment levels and training supervisors have more recently conducted risk assessment improvement training for management at the Head Office, Kurami Works, Isohara Works, Hibi Smelter, and Saganoseki Smelter & Refinery. In addition, risk assessment guidance sessions are conducted regularly by consultants at the Hitachi Works and Kurami Works, providing on-site instruction in identifying risk sources, assessing risks, and proposing countermeasures.

Guidance session (Kurami Works)

VOICE Participation in Risk Assessment Improvement Training

Michihiro Okada
Senior Staff Manager
Technology Unit,
Engineering Section,
Engineering Department,
Hibi Smelter, Pan Pacific
Copper Co., Ltd.

Recently I took part in risk assessment improvement training for the first time.

The training took place in two sessions. I was reminded of the importance of regular risk assessment, and felt the training was good as a review of methods, and in giving me guidance on important points.

Our workplace is a smelting and refining plant, where our work is carrying out maintenance of facilities and installation of new equipment. Since the installation work is performed irregularly, it is accompanied by various risks. The training reinforced the importance of identifying risk sources, and provided useful material for skill improvement.

In small groups that included factory floor workers, we received especially careful guidance on identifying risk sources and imagining scenarios that could lead to accidents. This training was effective in that it expanded the viewpoint of participants, enabling us to exchange ideas with each other that opened our eyes and made us think.

In these sessions, I reconfirmed the effectiveness of conducting risk assessments. Upon returning to the workplace, I will share with my section colleagues the mindset I gained in the training, of developing an eye for risks and nipping them in the bud. I would like to carry out activities that lead to risk reduction in my section and spread from there to the entire site.

Manager's Comment
Masahiro Wakayama, Manager,
Engineering Section, Engineering Department, Hibi Smelter, Pan Pacific Copper Co., Ltd.
As one of those who also received this training, I felt it was effective from the standpoint of the work front. Identifying risk sources must be done from a broad perspective, and I believe discussing with people from various workplaces can lead to changing awareness. I hope Mr. Okada will share what he learned in this training with the people in our section, and I look forward to his guiding the section and the entire site toward greater awareness of safety.

Health and Safety Activities

From its inception, the JX Nippon Mining & Metals Group has endeavored to provide an environment where employees can work with peace of mind. On the theme of "Safety First," the Group drew up the Basic Policy on Health and Safety aimed at the elimination of accidents and illnesses, and strives to foster a culture of safety.

JX Nippon Mining & Metals Basic Policy on Health and Safety

We place the highest priority on ensuring the health and safety of all members working at the JX Nippon Mining & Metals Group and thereby strive to create a safe and secure workplace.

1. We will continuously improve health and safety management levels through the establishment and efficient operation of the health and safety management system.
2. We will work to identify, eliminate, and reduce hazards and harmful factors in all areas of business operations and to ensure no accidents occur.
3. We will work to maintain and improve employees' mental and physical health by ensuring good communication and a comfortable working environment.
4. We will actively provide information and education in order to develop human resources that can act spontaneously and have strong safety competencies.
5. We will not only comply with health and safety laws and regulations but also establish and observe necessary voluntary standards.

Management Policy on Health and Safety

The Group formulates the Management Policy on Health and Safety each fiscal year. The goals and key policy measures are set based on analysis of health and safety performance in the previous year. The policy is discussed and approved by the Central Health and Safety Committee and then promulgated across the Group.

Management Policy on Health and Safety for 2016

Goals	Examples of key policy measures
1 Fatal accidents: zero	1 Creating a culture of safety
2 Accident occurrences: a reduction by 10% or more from the smallest number of accidents in the past three years	2 Accident-prevention activities for each issue
3 Explosions and fires: zero	
4 Occupational diseases: zero	
5 Rate of lost work days due to ordinary illnesses: a reduction by 10% or more from the average in the past three years	

Organization for Occupational Health and Safety Management

Meetings Related to Health and Safety

In compliance with the Industrial Safety and Health Act, the Group has formed health and safety committees at each operating site and in each Group company. At the Head Office, the Central Health and Safety Committee holds an annual meeting, attended by representatives of each business segment, in addition to the regular meetings held five times a year. Members go over various measures for health and safety, discuss the Management Policy on Health and Safety, and deliberate measures to prevent the recurrence of accidents. The meetings are chaired by the General Manager of the Environment & Safety Department. Health and safety patrols are conducted once a year, and Group safety staff meetings are held twice a year to discuss health and safety management status and measures and to exchange related information. Workshops are also held twice a year for employees performing actual operations. In cases where unique safety measures are found to be in place at a specific operating site or Group company, steps are taken to share these measures across the entire Group, such as by presenting implementation examples at Group safety staff meetings and conducting factory tours.

Environment and Safety Audits

Environment and safety audits are conducted by a team under the supervision of the president to examine operating sites directly run by the Company and major domestic Group companies. Issues discovered in the audits are reported to the president. The team also notifies the operating site of the issues, requesting improvements and following up by monitoring progress. Audits were conducted at 11 operating sites and companies in fiscal 2016.

Measures for Legal Compliance

To ensure full compliance with the latest revisions to laws and regulations concerning health, safety, and the environment, regular compliance inspections are performed by an outside organization, and a legal compliance monitoring system has been introduced to obtain the latest information on legal revisions on a weekly basis. When information on important legal revisions is obtained under this system, instructional handbooks and manuals are created and issued, facilitating a prompt response by each operating site. In addition, we have compiled instructional handbooks outlining laws, guidelines, notices, and other rules related to particular items in order to enhance understanding of legal requirements by those involved.

Conducting an environment and safety audit at the Kurami Works

Health and Safety Activities

Health and Safety Performance in 2016

Occupational Accidents, Etc.[*1] ☑

Our health and safety record for 2016 is shown in the table below. While the number of domestic occupational accidents was below the 2015 level, there was one fatal accident.

Category		2014	2015	2016
Safety performance at domestic operating sites[*2]	Instances of fatal accidents (persons)[*2]	1	0	**1**
	Instances of accidents with lost working days (persons)[*2]	8	12	**14**
	Instances of accidents without lost working days (persons)[*2]	17	25	**11**
	Total (persons)	26	37	**26**
	Frequency rate of industrial accidents[*3]	0.28	0.55	**0.26**
	Accident severity rate[*3]	0.00	0.05	**0.00**
	Explosions and fires (occurrences)[*2]	4[*4]	4[*4]	**2[*4]**
(For reference) Safety performance at overseas operating sites	Instances of accidents with lost working days (persons)	11	9	**8**
	Instances of accidents without lost working days (persons)	5	8	**9**
	Total (persons)	16	17	**17**

*1 Data on health and safety performance is compiled on a calendar-year basis (Jan. to Dec.).
*2 The figures include the performance of Group companies and subcontractors (but exclude Toho Titanium).
*3 Both the frequency rate of occupational accidents (the number of casualties caused by occupational accidents per million hours of total actual work) and the accident severity rate (the number of work days lost per thousand hours of total actual work) are rates for the Company's employees.
(For reference) In 2016, the frequency rate of occupational accidents and the accident severity rate of all businesses in Japan were 1.63 and 0.10, respectively.
(Source: Ministry of Health, Labour and Welfare, "Survey on Industrial Accidents")
*4 There were no physical injuries due to fire or explosion.

Fatal Accident Occurrence

On August 10, 2016, a fatal accident occurred at the Saganoseki Smelter & Refinery of Pan Pacific Copper, in which a Group employee died after becoming caught in the hatch of a vacuum truck. The victim was an employee of Nissho Kou-un, a Group company responsible for handling ore cargo. After dropped ore was discharged from the vacuum truck tank, a worker operated the lever to close the hatch. The victim, who was standing close to the hatch, became wedged between the tank and the lower part of the hatch. We are responding to this accident by taking countermeasures that include clearly delineating the no-entry zone during tank hatch operations, installing rear view cameras and monitors, and installing a voice alarm urging caution during tank hatch operations. This industrial accident was also the occasion for conducting safety inspections of all subcontracted work on Saganoseki Smelter & Refinery premises, from both equipment and operations standpoints. To ensure such an accident never happens again, the above countermeasures were proposed, and disseminated throughout the Group with the aim of preventing a recurrence.

Achievements of Health and Safety Activities in 2016 and Remaining Issues

As key policy measures in our Management Policy on Health and Safety for 2016 we chose "Creating a culture of safety" and "Accident-prevention activities for each issue." The aim was not for these initiatives to be directed by the Head Office, but to have each operating site (workplace) take the lead in creating a culture of safety in their own workplace and eliminating accidents there.

Activities to Build a Safety Culture

Definition of a Safety Culture
Safety culture is the assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance.
(Adapted from the definition by the International Atomic Energy Agency (IAEA))

The Group has undertaken various activities toward creating a culture of safety, having made "Safety First" part of the Basic Policy on Health and Safety, and having adopted the above definition of safety culture. Individual operating sites continue to hold discussions to obtain a clear picture of their issues, and to address them thoroughly with effective actions. Since 2015, activities have been focused on eliminating risks as they emerge and on raising safety awareness and risk sensitivity. Specifically, the key policy measures guiding our safety activities are (1) identifying major risks and thoroughly enforcing safety measures (preventing serious accidents), (2) preventing the recurrence of similar accidents, and (3) improving safety awareness and risk sensitivity.

Senior Supervisor for Safety lecturing on safety practices
(JX Nippon Tomakomai Chemical)

Issue-Based Accident-Prevention Activities

For every major accident, there are many more minor accidents and incidents. Without thoroughgoing efforts to prevent these minor accidents and incidents, it will not be possible to reduce the overall accident rate, making it difficult to prevent fatal or otherwise serious accidents. In 2015, we analyzed trends relating to all the occupational accidents that had occurred in the prior three years and identified five new issues based on those trends. Each operating site was then asked to assign an order of priority for the five issues based on their individual situation (according to risk level and the number of occurrences to date), and to carry out activities aimed at eradicating accidents in a three-year program from 2015 to 2017. As a result of these and earlier such efforts, in 2016 there was a decline in the number of accidents relating to handling of heavy objects by human effort, and cutting or severing accidents. The number of accidents for all five new issues also dropped. There was, however, a sharp increase in entanglement accidents during equipment repairs or inspections, raising the need for further accident-prevention activities.

Collection of accident cases

For each of these five issues, a record of actual accidents is being compiled and other steps are being taken to further our understanding of accident trends and preventive measures.

1. Preventing accidents relating to handling of heavy objects by human effort
2. Preventing accidents relating to cranes or slinging work
3. Preventing accidents relating to forklifts, front-end loaders, backhoes, and other vehicle-type heavy machinery
4. Preventing entanglement accidents during equipment repairs or inspections, etc.
5. Preventing cutting or severing accidents

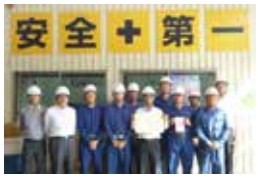
Promoting Physical and Mental Health

The Group realizes how important it is that all employees are able to maintain good physical and mental health as they work. We also recognize the significance of good mental health in ensuring an enjoyable life for employees and their families as well as heightening productivity and making the work experience more fulfilling. The Group set up counseling services for providing face-to-face, telephone, and online counseling to support employees and their families in maintaining good mental health. Also, employee stress checks are provided annually; in fiscal 2016, they were provided for 2,487 JX Nippon Mining & Metals employees and 3,011 employees of Group companies. Workshops on improving the working environment and other such events are held as necessary, as we take various measures to reduce stress and provide a better place to work.

Other Activities

Introduction of a Safety Commendation System

In September 2011, we introduced a safety commendation system at operating sites directly run by the Company and domestic affiliated companies. Through this system, the president officially commends operating sites that have continuously operated without an accident for a designated period, the length of the period being determined according to the number of personnel. In fiscal 2016, commendations were given to the following ten sites: the Amagasaki Office, the Tokyo Recycling & Technical Services Center, and the Takatsuki Plant (all operated by JX Metals Trading); the closed mine sites operated by Kamikita Mines, Namariyama Mining, Hanawa Mines, Yoshino Mine, Hitachi Mine, and Hokuriku Mines; and the Esashi Works (operated by JX Metals Precision Technology).



Amagasaki Office, JX Metals Trading

Hanawa Mines

Esashi Works JX Metals Precision Technology

Operating Sites That Have Obtained OHSAS 18001

Fiscal year certification was acquired	Operating sites
Fiscal 2006	Hibi Smelter, Pan Pacific Copper Co., Ltd. (including Hibi Kyodo Smelting Co., Ltd., Tamano Smelter)
Fiscal 2008	Hitachi Works (including Technology Development Center, Hitachi Refinery of Pan Pacific Copper Co., Ltd., JX Nippon Environmental Services Co., Ltd., Hitachi Office of JX Nippon Foundry Co., Ltd.), Kurami Works (including JX Nippon Coil Center Co., Ltd., Kurami Office of JX Metals Trading Co., Ltd.), Saganoseki Smelter & Refinery of Pan Pacific Copper Co., Ltd. (including Japan Copper Casting Co., Ltd., Nissho Kou-un Co., Ltd., PPC Plant Saganoseki Co., Ltd.)
Fiscal 2009	Isohara Works (including Isohara Administration Office of JX Nippon Foundry Co., Ltd.), JX Nippon Tomakomai Chemical Co., Ltd., JX Nippon Mikkaichi Recycle Co., Ltd., JX Nippon Tsuruga Recycle Co., Ltd.
Fiscal 2010	Tatebayashi Works of JX Metals Precision Technology Co., Ltd.
Fiscal 2011	Esashi Works of Metals Precision Technology Co., Ltd.
Fiscal 2013	Nasu Works and Kakegawa Works of JX Metals Precision Technology Co., Ltd.
Fiscal 2014	Longtan Works of Nikko Metals Taiwan Co., Ltd.

Health and Safety Activities

JXTG Group Safety Education Center

Role as an Educational Facility of the JXTG Group

To eliminate accidents, enhancing the risk sensitivity and safety awareness of individual employees is essential. Risk sensitivity means the ability to correctly recognize risks as dangerous. Sharpening this ability leads employees to follow rules and keep away from dangers. The Safety Education Center attempts to raise risk sensitivity by providing trainees with simulated experiences of accidents that have actually occurred in the past so that they can come to recognize the dangers instinctively. Around half of all accidents are recurrences of past accidents. For this reason, undergoing training at the center is an effective way to reduce the number of accidents that occur.

Further efforts are being made to raise the quality of the education, by building a more effective curriculum while improving the teaching skills of instructors.

Examples of Experiential Risk Training at the Safety Education Center

1. Introduction of Virtual Reality (VR) Technology for Risk Simulation

The effectiveness of safety education by means of simulated risk experiences depends on (1) making trainees feel what it is like to be involved personally in an accident, and (2) making them think about the psychological state of victims, causes, and accident-prevention measures. VR technology has been introduced to enhance this effectiveness. By creating a vivid impression that an accident is occurring right in front of the trainees (see photo), this technology enables more realistic and practical experiential training. The introduction of VR in safety education is a new initiative, by which trainees will learn necessary knowledge, such as typical circumstances following an accident, psychological analysis of victims, and methods for avoiding accidents.

VR for experiencing risk of steam explosion

2. Experiencing the Risks of Working in High Places

This training teaches the advantages of wearing a safety harness (see photo) while working at elevated heights, which in case of a fall imposes less of a burden on the wearer than a safety waist belt. By having trainees compare use of a waist belt and harness, the aim is to increase the use rate of safety harnesses. In March 2017, the number of safety harnesses was increased, enabling all trainees to take part in this comparative experience.

Experiencing the risks of working in high places (superiority of safety harness over waist belt)

Benefits of Training at the Safety Education Center and Strengthening of Supplementary Education at Operating Sites

During the period from January 2013 when the center was established to March 31, 2017, the total number of trainees from the JX Nippon Mining & Metals Group had reached 6,404 (in the former JX Group as a whole, there were 6,964 trainees). The annual accident rate per 1,000 employees for those who have undergone the training is around half that of those who have not; moreover, the types of accidents covered by the curriculum have been declining in frequency. Such results show the clear benefits of this education. Due to the center's limited capacity to accommodate trainees, however, it currently takes three to four years to provide training to all employees and others working in the Group, including subcontractors. To prevent a drop in risk sensitivity during this time among those who have undergone training, similar safety education programs have been started at individual operating sites. The aims of this supplementary education are twofold: (1) to provide experiential training tailored to the situation at each operating site, such as its accident history and rules, and (2) to advance the skills of the instructors themselves as promoters of safety in the process of training employees to become safety education instructors at each site.

Training of these safety education instructors is the responsibility of the Safety Education Center. Through lectures and on-hands training, they learn guidance principles and classroom skills from the three viewpoints of leadership, motivation, and communication.

Training of safety education instructors (lectures and hands-on training)

Developing and Utilizing Human Resources

It is essential for the JX Nippon Mining & Metals Group to develop and utilize the employees involved in day-to-day operations if it is to maximize its corporate value through business activities. By creating personnel systems that value the diversity of employees working in various domestic and overseas locations and by enhancing education programs, we are providing a foundation empowering employees to make the most of their abilities.

TOPIC 1

Strengthening Initiatives for Developing the Next Generation

The JX Nippon Mining & Metals Group believes it is essential to develop human resources who can ensure the future stable acquisition and supply of indispensable nonferrous metal resources and materials. We have therefore begun directing strong efforts at engaging the young, of high school age and below, who will be responsible for carrying on with this mission. A few examples of these efforts are introduced here.

Science, Technology, Engineering, and Mathematics (STEM) Challenge

During the summer break, the Isohara Works and the Hitachi Works held plant tours and experimentation sessions for female students from middle school. Through presentations, lunch meetings, plant tours, and workplace experiences, female engineers found enjoyable ways to convey to the students the importance of nonferrous metals as essential materials in daily life and the appeal of technology-related work.

Hitachi Works (experimenting with nickel plating on copper)

Isohara Works (presentation by female employee)

理工チャレンジ

These events are part of the STEM Challenge, a Japanese Cabinet Office program to raise the interest of female middle and high school students in STEM subjects and help them choose a career path.

Nikkei Education Challenge

Sponsor: Nikkei Inc.

The Company participated in this event, in which businesspeople from various industries provided real-world lessons for high school students so that they could learn about the current state of Japan's economy and technology, and experience the dynamism of society. In our lecture titled "Nonferrous metal recycling for a recycling-oriented society," we informed students about the involvement of the JX Nippon Mining & Metals Group in technology and society, and our history of continuing to take on various challenges.

Students experience the weight of real gold

Lecture session

Power of Innovation

Sponsor: Educa & Quest Inc.

For three days, from March 20 to 22, 2017, students from middle and high schools and colleges of technology heard about initiatives in corporations to tackle society's problems, and made presentations about their own proposed solutions. We participated in this event, giving a lecture on the Company's efforts centering on the recycling and environmental services business; we then challenged the students to present ideas on nonferrous metals recycling at a workshop, urging them to think freely, unfettered by conventional thinking. It was a good occasion to ask many students to think about the future of nonferrous metal resources.

Lecture session

Phase 2 Initiatives of the Endowed Unit for Non-ferrous Metal Resource Recovery Engineering (JX Metals Endowed Unit)

Phase 2 of the JX Metals Endowed Unit began in January 2017. In addition to the activities of Phase 1, public relations efforts touting the appeal of the nonferrous metals field are being directed at the general public, especially young people of high school age and below. (See page 69 for details.)

JX Nippon Mining & Metals Next-Generation Educational Content: Mascot Character "Coppy the Kappa" Created

Even though nonferrous metals are essential materials in daily life, they tend to go unnoticed because they are in places that are not normally seen. In an attempt to make nonferrous metals, especially copper, a little more familiar to the younger generation, we created the mascot character Coppy the Kappa, along with its own pamphlets and website. The pamphlets are made available at the Nippon Mining Museum and at the Science Museum in Tokyo's Kitanomaru Park, as well as being distributed at various events. The mascot design aims to further understanding of the features and importance of copper, through the mascot's appearance and actions.

Website for young people: "Learn about Copper with Coppy the Kappa"

http://www.nmm.jx-group.co.jp/copper/ (in Japanese only)

Coppy the Kappa

"Introduction to Copper" pamphlet and accompanying ruler

TOPIC ❷

Strategy to Energize Individuals and Organizations

At JX Nippon Mining & Metals, we are working to transform ourselves by energizing individuals and organizations, with the aim of strengthening business while adapting to changes in the business climate and making major strides toward the future. Starting in fiscal 2016, we revised various personnel systems and took measures to change awareness from the two standpoints of strengthening personnel management and development, and creating environments in which a diverse range of personnel can do fulfilling work. We will continue monitoring and studying these systems, making further changes as necessary, and rolling them out flexibly.

Strengthening Personnel Management and Development

(1) Revising personnel and evaluation systems for managerial staff

We are revising our personnel and evaluation systems so they can be administered with more clarity. In doing so, we seek to make it clear that the most important roles of managerial staff are personnel development and workplace supervision, while also ensuring that all managers are rewarded fairly according to the capabilities they demonstrate.

(2) Defining job categories more broadly and pursuing personnel development that transcends job categories

To proactively develop personnel with an overview of the big picture, we are defining job categories more broadly and making greater efforts to rotate staff among different job categories.

Creating Environments in Which a Diverse Range of Personnel Can Do Fulfilling Work

(1) Changing mind-sets

To improve work-life balance, we ask managerial staff to keep workplace management uppermost in their minds, while we ask general employees to complete tasks in order of priority within the time constraints they are under.

(2) Allowing the time necessary for healthy, fulfilling lives

To allow time for employees to live healthy, fulfilling lives, we ensure appropriate staffing levels and implement a range of measures. For instance, we insist on rigorous compliance with laws and regulations relating to working hours, and we set targets for improving work hours, checking the extent to which they are achieved.

In fiscal 2016, we changed our core flextime hours (from 10 a.m.–3 p.m. to 1 p.m.–3 p.m.) to give workers more flexibility, and trialed the introduction of a telecommuting system as a first step toward full adoption.

(3) Creating systems to support diverse work styles

Japan's working population is being eroded by a declining birthrate and growing proportion of senior citizens, presenting a challenge that is now critical. If companies are to secure and retain talented personnel, they must consider the needs of employees who become unable to work due to the demands of childcare, family care, or other commitments. The measures below are examples of ways in which the Company has been addressing these issues since fiscal 2016 (some measures take effect in fiscal 2017).

- **Revising the childcare and family care systems**
  To enable more flexible work styles, we eased the conditions for use of various systems including shorter workdays and eligibility for flextime. We also introduced a new support system to alleviate the revenue reduction and economic burden of childcare and family care leave.
- **Encouraging effective use of childcare and family care leave systems**
  We regularly inform employees about these systems, letting them know that we have measures available enabling them to work with peace of mind. We also encourage male employees to take childcare leave.
- **Return-to-work system**
  Sometimes employees become unable to work and must leave their job due to childcare or family care commitments, a spouse's job transfer, relocation following marriage, or other life events. We provide a system enabling such employees to return to work within five years provided they register beforehand.

VOICE Thoughts on Energizing Individuals and Organizations

Nozomu Kubo
General Manager, Human Resources Department
JX Nippon Mining & Metals Corporation

We have to reflect to make sure that as individuals and as organizations statements such as these do not apply to us: "I have no interest in what other departments or sections are doing"; "I do my job the way it's always been done before, without thinking too deeply"; "I only point out minor, inconsequential inconsistencies in numbers or problems with wording"; "I just do what I think my boss wants me to do, without having my own opinion"; or "I don't offer help to colleagues when they are struggling with their work."

Unless we ourselves change, the Company will not be able to survive in the globally competitive environment, or hire the excellent employees we need from the declining pool in an aging society.

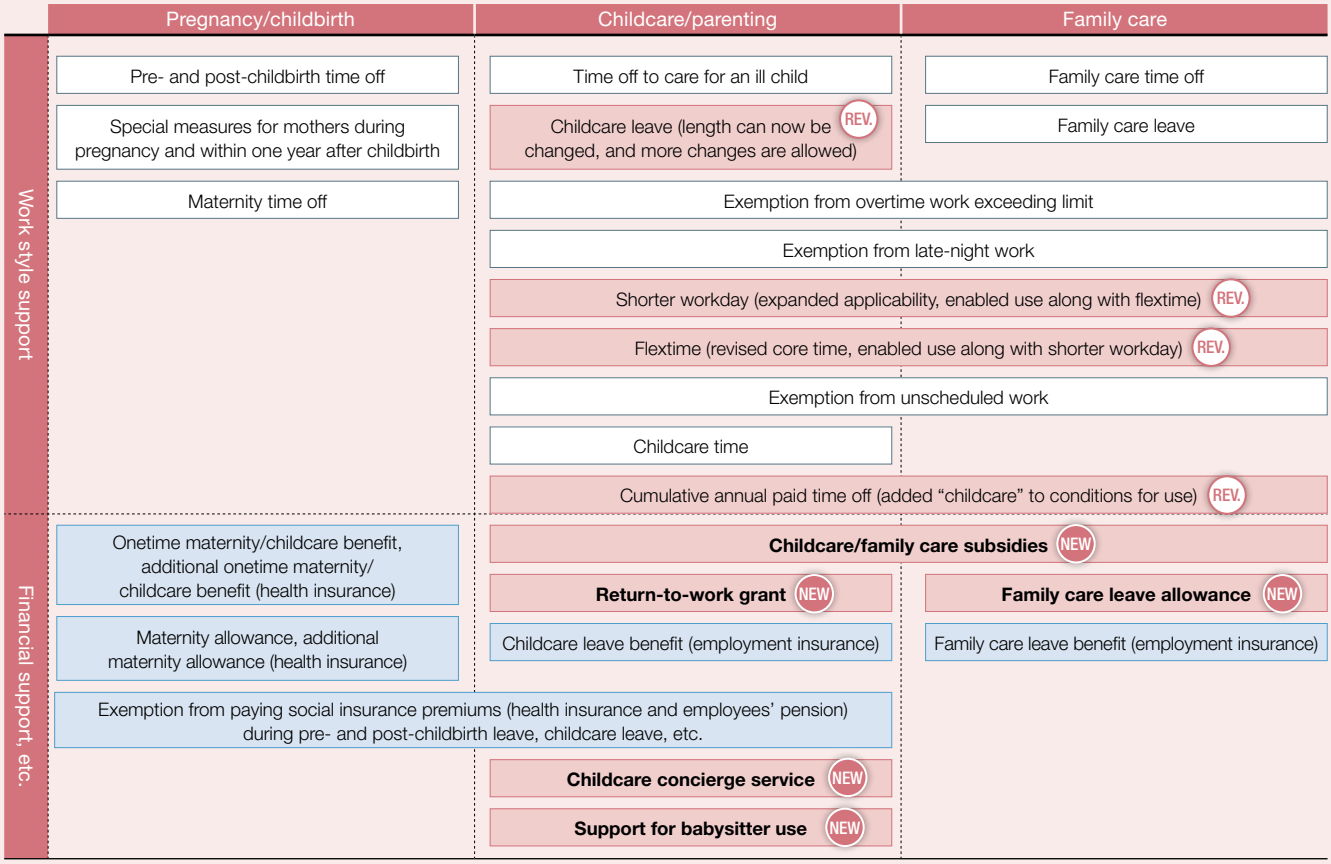
By carrying out the initiatives for energizing individuals and organizations started in fiscal 2016, we are striving to change the mind-set of each employee, so that they will perform their work without fear of change, applying an unbending spirit to creative ingenuity that will lead to the further growth and advancement of the Company.

TOPIC ❸

Initiatives for Energizing Individuals and Organizations: Enhancement of Childcare and Family Care Systems

One aspect of initiatives for energizing individuals and organizations is making the working environment one where even employees with commitments such as childcare or family care can make the most of their abilities. To this end, we introduced new or revised systems as described here.

Overview of Childcare and Family Care Systems



Main New Systems (From Fiscal 2017)

- **Return-to-work grant**
  A onetime grant is paid to an employee returning to work after childcare leave to ease the economic burden of preparing to combine childcare and work, and to smooth the return to work.
- **Family care leave allowance**
  During family care leave, along with a drop in income, the burden on the individual for paying social insurance premiums and the like continues. This monthly allowance, paid during family care leave, is intended to provide partial assistance to ease this economic burden, and to make the environment more conducive to taking advantage of the family care leave system.
- **Childcare/family care subsidies**
  To enable employees to combine work and childcare or family care, monthly subsidies are paid to help cover the costs of childcare-related services (to the extent these costs exceed ordinary daycare) or family care services (as stipulated in the Long-Term Care Insurance Act, excluding services received during continued residence in a facility) used for the sake of work.
- **Childcare concierge service**
  With the aim of helping employees return to work early or balance work and childcare, outside advisers have been appointed to provide employees with information and advice on such matters as finding a daycare center or childcare in general.
- **Support for babysitter use**
  In another measure to support employees in balancing work and childcare, a corporate contract has been made with a babysitter company enabling its services to be used for less than the usual rates. This support makes it easier to use these services in emergencies, such as when a child is ill or sudden overtime work arises, and also for everyday childcare.

VOICE Comments by an Employee Using the Childcare System

Aki Tsukahara
IFRS Disclosure Group,
Contract Department 2
JX Nippon Business
Services Corporation
(seconded)

Obtained pre- and post-childbirth time off and childcare leave from January 2016 to April 2017

Continuing to look for a daycare center while taking advantage of the childcare concierge service

The daycare center where our child currently goes is a small one that only takes children up to two years old, so now I have to look for one that will accept older children. With many people on waiting lists for openings, I was frankly concerned about how I could gather information while working and taking care of our child, and whether I could get our child into another licensed daycare center. When I consulted the childcare concierge, I was assured that I would be able to receive detailed information not only about licensed daycare centers, but also about other options as well, such as a nearby licensed center for early childhood education and care, and a kindergarten with its own daycare service. This helped ease the burden of looking for a daycare facility. I plan to continue making use of the childcare concierge service while I search for the optimal daycare.

The various kinds of financial support make it an option to use childcare-related services

When our child started daycare, there were onetime costs such as purchasing multiple changes of clothes, but this was amply covered by the return-to-work grant I received after I went back to my job. Also, babysitter and other childcare-related services have the image of being expensive, but thanks to systems like childcare subsidies, there may well be times when I will use them, such as when our child gets sick and there are no openings in the sick child daycare service of our local municipality.

Looking ahead

In the future, I imagine myself making use of telecommuting. While managing my time well so I can do my job, I want to show my child what it's like to be a working mother who enjoys her work and gains a sense of satisfaction from it. I am also encouraged by those who have preceded me in combining work with childcare, and would like to set a similarly encouraging example for those who come after.

What I look for in the Company in future is a structure that removes unease when returning to work. I myself had been on secondment before leaving work, and after returning I felt uncertainty about where I would be assigned, the kind of work, and the work style. I hope the Company will provide more systematic return-to-work interviews and other such services so that employees returning to work can eliminate their anxiety and switch to work mode as early as possible.

Lecture Report

Topic: Work Style Reform—Achieving Work-Life Balance by Improving Labor Productivity

Lecture provider: Work Life Balance Co., Ltd.

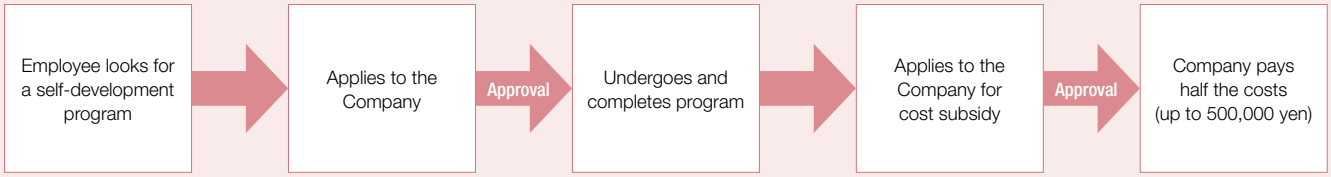
As one initiative toward changing mind-sets, which is a key aspect of energizing individuals and organizations, a series of lectures was presented from October to November 2016 at the Head Office and individual operating sites, on the topic of changing how we think about work style. The lectures were intended to help develop the mind-set necessary for achieving work-life balance. More than time management, this involves changing the way we work and furthering understanding of the necessity and significance of such changes. The lectures contributed to review of work style at each workplace, and therefore to further measures to reduce overtime work.

TOPIC 4

Self-Innovation Support

At JX Nippon Mining & Metals, we thought about devising a good way of responding to the desire of employees for further self-growth. Out of this came the Self-Innovation Support scheme.

Application Process for Self-Innovation Support



Employees themselves look for a suitable self-development program, and take it with Company approval. Provided the employee has completed the program, the Company subsidizes half the costs, up to a limit of 500,000 yen per program. Unlike the other self-development support systems, this one offers broad latitude, enabling effective use of the private time employees create by improving their work-life balance. Before, employees had to choose from programs prepared by the Company in advance. Under this new scheme, so long as minimum conditions are met, employees can choose programs freely; for example, language study, qualifications, degrees, or development of various skills. In this way the Company should be able to meet the desire of employees for self-growth more effectively than before.

Applications made		Examples of programs applied for
1st round (Oct.–Dec. 2016)	14	English conversation, US certified public accountant, patent attorney, small and medium enterprise management consultant, university leadership program, and courses at business school
2nd round (Mar.–May 2017)	8	

VOICE Comments by an Employee Who Received Self-Innovation Support

Yumi Morishima
Projects Promotion Department
Pan Pacific Copper Co., Ltd.

Courses at business school

Logical thinking: To improve problem-solving ability as well as communication, by learning the steps for solving problems through logical thinking

Accounting basics: To acquire fundamental knowledge for decision-making, learning how to read and understand financial data and discover problems for business administration

I took these two courses, each lasting three months, with classes held biweekly on Saturdays.

What prompted me to think about taking advantage of the system was being transferred from the operating site to the Head Office and tasked with project management, a job completely different from what I had been doing in terms of both nature and quality. In this situation, I thought it would be useful to raise my skill level by acquiring thinking power and the basic knowledge for solving problems.

A good thing about this system is that it lets you choose freely the area of study and what you want to learn. Another is that, whereas the other educational programs were mostly short-term ones, this system covers long-term programs where you attend classes, making it possible to study a topic thoroughly. One more advantage is that, to set aside the time for self-development, you come to think of how to carry out your company duties more efficiently, so you can learn efficient ways to work.

The system is easy to use, since you can decide what and when to learn yourself. Other points making it easy to use are that applications are invited several times a year, and the application process is a simple one.

I feel that after taking the courses, the speed and quality of my problem-solving have improved, since I've learned how to list all matters needing consideration before taking on a work problem, and to come up with a hypothesis and then consider it. As a result, I can think more deeply when writing up a report, and the reports are of better quality and easier to understand.

Developing and Utilizing Human Resources

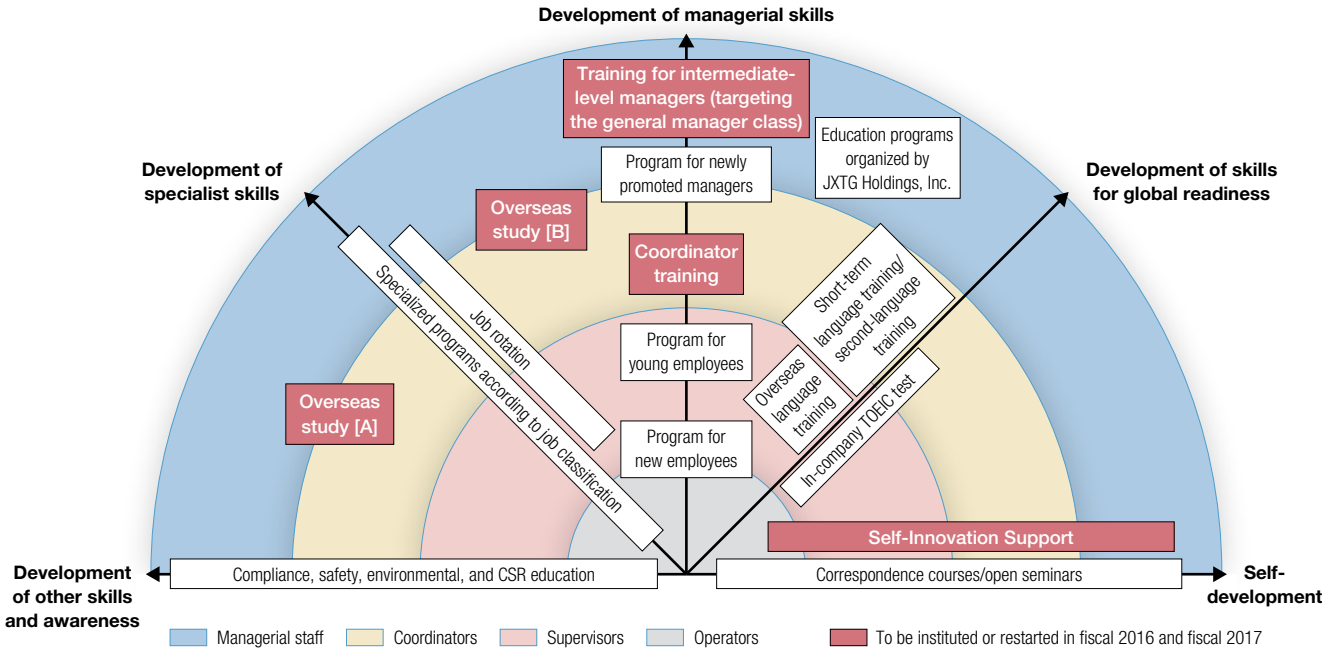
The JX Nippon Mining & Metals Education System

The Company takes a proactive approach to developing its employees, who are important stakeholders. We endeavor to provide a wide-ranging education to our personnel, offering a variety of educational programs addressing five key areas of development: managerial skills, specialist skills, skills for global readiness, self-development, and other skills and awareness.

Strengthening the Education System to Support the Energizing of Individuals and Organizations

In fiscal 2016, we launched a new education system and new training programs to transform the mind-set and improve the skills of each of our employees. These include (1) boosting managerial skills by providing new training for intermediate-level managers (targeting the general manager class); (2) facilitating overseas study to boost specialist skills and managerial skills (either to earn a master's or doctoral degree at an overseas graduate school [A], or to obtain an MBA [B]); and (3) launching Self-Innovation Support, a new scheme for the Company to assist with self-development. In fiscal 2017, coordinator training is being newly added to expand opportunities for boosting managerial skills.

Our Education System



Training Programs Implemented in Fiscal 2016

(hours)

	Managerial staff			General employees			All staff and employees		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Total hours of programs (annual)	8,780	159	8,939	66,077	9,117	75,194	74,857	9,276	84,133
Per employee	18	53	18	34	41	35	31	41	32

Survey scope: Employees of the Company and employees being seconded from the Company to JX Nippon Environmental Services and Pan Pacific Copper (Saganoseki Smelter & Refinery, Hitachi Refinery)

Examples of Education Programs Implemented in Fiscal 2016 (Training for Young Employees Who Completed University or Graduate School)

Program for new employees	1 Understanding the Company's organization, current business conditions, and management issues. 2 Acquiring basic skills requisite to a businessperson, including business manners and financial accounting. 3 Fostering a sense of cooperation and camaraderie among employees who entered the Company at the same time.
First-year follow-up program	1 Looking back at personal progress since entering the Company and confirming one's current situation and expected role. 2 Determining issues with one's own way of working (using the goal-plan-do-check-act cycle) and defining future challenges to growth. 3 Comprehending one's own thinking style, and understanding and using stress to cultivate strength in adversity, making it possible to rise to a challenge even in difficult circumstances.
Third-year program	1 Deepening understanding of the current business conditions and management issues of the Company. 2 Acquiring leadership and mentoring skills necessary in the workplace. 3 Acquiring communication skills necessary to gain the cooperation of coworkers while performing one's work (logical thinking and presentation skills). 4 Understanding role expectations and enhancing motivation.
Fourth-year program (Corporate DNA training)	1 Deepening understanding of the Company's social responsibility in relation to operational management, and of its CSR initiatives through activities including a study tour of the Toyoha Mine, a closed mine that represents one example of such initiatives. 2 Deepening understanding of the Company's corporate philosophy (its management approach), and at the same time encouraging trainees to think like employees of the Company by considering how their own work and the work of their business relates to the corporate philosophy.
Fifth-year program	1 Deepening understanding of the current conditions and issues facing the Company. 2 Developing a vision for one's own career to shed new light on one's approach to work. 3 Cultivating problem-solving skills by learning the problem-solving process and taking action to deal with issues in one's own work. 4 Using the program to identify current deficiencies in one's skills or approach, and acknowledging those deficiencies to facilitate future personal growth.

Visit to the Toyoha Mine as part of the fourth-year program (Corporate DNA training)

Program for new employees

Enhancing Education Programs for Global Readiness

The JX Nippon Mining & Metals Group has prepared various educational programs for global readiness aimed at developing human resources who can advance its global operations and making the Group as a whole more globally minded.

Overview of the Educational Programs for Global Readiness at JX Nippon Mining & Metals

Program	Target employee group	Details
First-year language training	All graduates of university or graduate school in their first year with the Company	About five months of study through language correspondence courses matched to foreign-language level (TOEIC score). A language other than English may be chosen as needed.
Second-year overseas training	All graduates of university or graduate school in their second year with the Company	Twelve weeks of study at overseas language schools, etc., matched to foreign-language level (TOEIC score): university-level classes in Europe or the US, or training in Chinese, Korean, or Spanish at overseas language schools.
Short-term study-abroad language program	Persons requiring a certain level of language competence for their work	Four to twelve weeks of study in English, Chinese, Korean, or Spanish at overseas language schools, etc.
Second-language training	Persons requiring a certain level of language competence for their work	Language training outside work hours for persons desiring to study Chinese, Korean, Spanish, or another language for self-development who have received approval from their manager (two-hour weekly classes, tuition paid by the Company).
In-company TOEIC testing	Those interested (mandatory for graduates of university or graduate school up to their 10th year of employment)	TOEIC tests administered annually.
Study abroad (resumed in fiscal 2017)	Those recommended by supervisors for each job category and selected by the Council for Utilization of Human Resources	Study at a university or graduate school, in principle outside Japan, for enhancing work-related knowledge, learning technology and skills, and fostering insight. The courses are divided broadly into the following two types. A courses: Aim for a master's or doctoral degree to strengthen expertise B courses: Aim for an MBA degree to strengthen managerial skills

Developing and Utilizing Human Resources

Personnel Systems

The Company has designed personnel evaluation systems, consisting mainly of Competency Evaluation, Performance Evaluation, and Self-Statement systems.

Creating Appropriate Personnel Evaluation Systems

The Company has introduced a Competency Evaluation System based on competency models and a Performance Evaluation System centered on management of missions and goals.

In Competency Evaluation, employees are interviewed by their supervisors based on competency items determined by the nature of their work and job position. The resulting assessment of whether they have the necessary competency is used in deciding promotions.

For Performance Evaluation, employees meet with their supervisors to discuss the extent to which they attained missions and goals agreed on with the supervisor at the beginning of the fiscal year, and the degree of challenge presented by the goals. Their performance is then evaluated, and the results of these evaluations are reflected in employee bonuses. In fiscal 2016, we restructured the competency model and performance evaluation items for managerial staff so that 50% of the elements evaluated relate to personnel management.

By implementing these personnel evaluation systems properly, we seek to improve fairness in the treatment of employees and in the development of their abilities.

Self-Statement System

A Self-Statement System was introduced to help the Company understand the aspirations of individual employees and reflect them in personnel development and elsewhere. Employees submit this statement on the specified form once a year, looking back on their work and indicating their ambitions, as well as other matters of relevance, such as any reason why they cannot accept job transfers that would involve moving residence and how long that will remain the case.

Initiatives Promoting Diversity

The Group values diversity in both human resources and work style. In compliance with relevant laws and regulations in Japan and overseas, the Group is pursuing initiatives including the reemployment of workers aged 60 and older, and promotion of active participation in the workplace by women. By creating programs enabling childcare and family care leave, and time off for international volunteering, we provide an environment that supports various work styles.

Compliance with the Act on Promotion of Women's Participation

In accordance with Japan's Act on Promotion of Women's Participation and Advancement in the Workplace, JX Nippon Mining & Metals drew up a plan in fiscal 2016 for the five-year period to fiscal 2020, to develop environments in which even more female employees can take on significant roles and to provide all employees with the motivation to perform to the best of their abilities.

Targets

1. Steadily increase the number of female employees and ensure that at least 30% of newly hired university graduates are women to cultivate female managers early on.
2. Improve working environments to create workplaces in which all employees including women can do fulfilling work.

Specific Initiatives

(1) We are seeking to increase the number of women applying for employment at the Company by making use of the corporate website and other means to actively offer information about work opportunities for women. In addition, by offering workplace tours and similar opportunities for female students, we are seeking to secure personnel to work in technical positions, where the rate of female participation is particularly low. In this way, the Company is helping to nurture female specialists in science and technology, whose numbers are currently insufficient throughout Japan.

(2) We have introduced new and revised systems aimed at creating workplace environments in which a diverse range of personnel can do fulfilling work, so that all employees including women have the opportunity to perform to the best of their abilities. These include a new system for returning to work following life-event leave, revision of childcare and family care leave systems, and trial introduction of telecommuting with an eye to full adoption later on. We are also working to change employees' mindsets by offering a variety of educational programs.

Workplaces Where Women Play Significant Roles☑

As of March 31, 2017, a total of 1,148 female employees were working in the Group worldwide. Of these, approximately 23% occupy managerial positions (supervisor class and above). JX Nippon Mining & Metals employs 225 female employees (including part-time employees), of whom approximately 27% are in managerial roles. We ensure that all employees are treated equally, with no gender differences in base pay.

VOICE Comments by an Employee Who Took Childcare Leave

Kan Hashimoto
Rolled & Fabricated Products Department, Functional Materials Division, Electronic Materials Group

What I experienced through taking childcare leave

I took a month of childcare leave starting two weeks after my wife gave birth to our son. Even before the leave period, upon returning home from work I was in charge of diaper-changing and bathing duties, and had considered those to be the extent of childcare. After childcare leave began, however, I discovered I had underestimated what was really involved.

After seeing what it was like to go through the cycle of breast-feeding, burping, diaper changing, and trying to deal with crying for no clear reason, every few hours for 24 hours a day, with no letup day or night, I came to realize the concentrated burden my wife had been under up to then.

Besides this realization, most important of all was being able to watch our child growing noticeably day by day. Such experiences made taking childcare leave very much worthwhile.

How my attitude changed after childcare leave

Being able to spend only a few hours a day with my wife and child on weekdays, and with the baby going to sleep by 8:00 p.m. at the latest, I have become more conscious of the need to finish my work as soon as possible and obtain valuable time with family.

I now well understand the importance of business basics—such as keeping to a schedule and making proper reports, contacts, and consultations—to deal with work efficiently.

Data Relating to Diversity (JX Nippon Mining & Metals)☑

Use of childcare leave program in fiscal 2016

	No. of employees using program in fiscal 2016	No. of employees eligible to use program*	Usage rate (%)
Male	2	87	2
Female	10	10	100
Total	12	97	12

* Male: Employees with a child born within the fiscal year
Female: Employees whose post-childbirth time off ended during the fiscal year and who can take childcare leave

Rate of return from childcare leave (Percentage of employees who took leave and then returned to their jobs)

	No. of employees returning to work in fiscal 2016	No. of employees planning to return	Return rate (%)
Male	1	1	100
Female	2	2	100
Total	3	3	100

Retention rate after return from childcare leave (Percentage of those still employed 12 months after return from leave)

	No. of employees returning to work in fiscal 2016	No. of employees still employed 12 months later	Retention rate (%)
Male	1	1	100
Female	5	5	100
Total	6	6	100

Status of rehiring efforts in fiscal 2016

No. of age-limit retirees	No. of reemployed	Reemployment rate (%)
30	24	80

Persons with disabilities as a percentage of the workforce in fiscal 2016

Percentage of employees with disabilities
2.12% (the legal requirement is 2.0%)

Maintaining Good Labor-Management Relations

Labor unions have been formed at nearly all Group companies in Japan.

At each Group company, good relations built on mutual trust are maintained between management and employees. At regular meetings between representatives of management and the labor union, management discloses details of the company's business; while at the Health and Safety Committee meetings, causes of accidents and incidents are analyzed thoroughly. In such ways, labor unions play an important role as a partner with management, including by conveying information and gathering views within the organization. Recognizing health and safety as a particularly important theme to be confirmed between management and labor, 96% of Group companies with labor unions include matters relating to health and safety in their labor agreements.

When changes are made in the company organization or business activities, adequate time is given to preliminary explanations and discussions before conducting the necessary procedures, in accordance with the labor agreement.

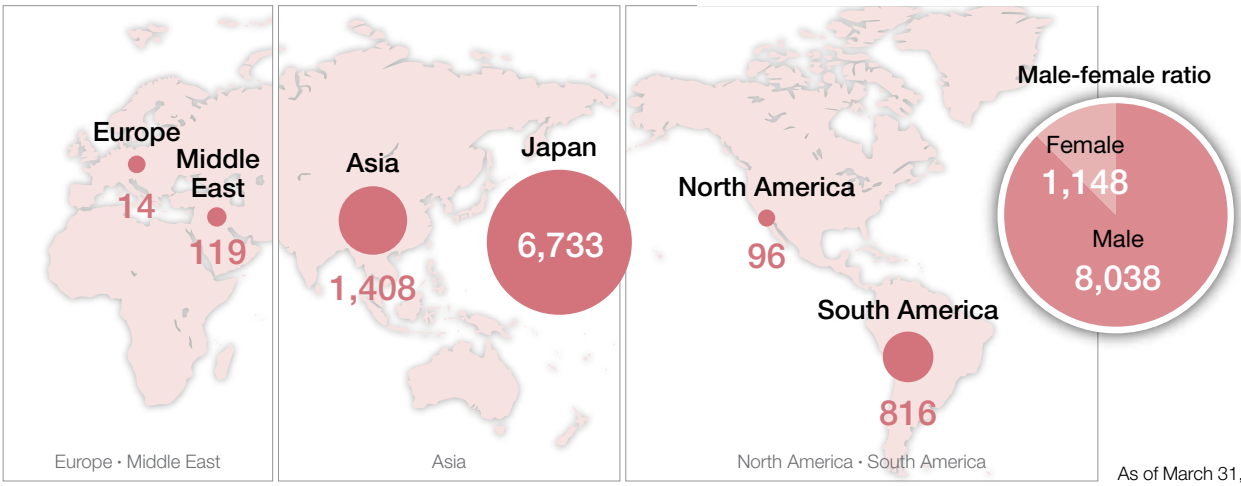
In fiscal 2016, there were no strikes or lockouts in the Group.

Membership in labor unions (as of March 31, 2017)☑

	Male	Female	Total	Age 29 or younger	Age 30 to 49	Age 50 or older	Total
No. of union members	4,863	624	5,487	1,220	3,447	820	5,487
Membership rate	61%	54%	60%	72%	64%	39%	60%

Employees Active in Japan and Overseas

Survey scope: Companies in which JX Nippon Mining & Metals has 50% or greater voting rights directly or indirectly
Counting of seconded employees: Includes employees being seconded to and from the companies subject to this survey



As of March 31, 2017

No. of employees (by employment status and employment contract type; as of March 31, 2017)

	Full-time			Part-time			Total	Temporary staff	Total workforce
	Open-ended contract	Fixed-term contract	Subtotal	Open-ended contract	Fixed-term contract	Subtotal			
Male	7,103	881	7,984	12	42	54	8,038	145	8,183
Female	941	173	1,114	5	29	34	1,148	107	1,255
Total	8,044	1,054	9,098	17	71	88	9,186	252	9,438

No. of employees (by region; as of March 31, 2017)

	Japan	North America	South America	Asia	Europe	Middle East	Total
Male	6,075	78	743	1,015	8	119	8,038
Female	658	18	73	393	6	0	1,148
Subtotal	6,733	96	816	1,408	14	119	9,186
Temporary staff	222	8	0	22	0	0	252
Total workforce	6,955	104	816	1,430	14	119	9,438

No. of employees (by employment category; as of March 31, 2017)

	Male	Female	Total
Managerial*	2,873	259	3,132
Non-managerial	5,165	889	6,054
Subtotal	8,038	1,148	9,186

	Age 29 or younger	Age 30 to 49	Age 50 or older	Total
Managerial*	215	1,877	1,040	3,132
Non-managerial	1,489	3,493	1,072	6,054
Subtotal	1,704	5,370	2,112	9,186

	Japan	North America	South America	Asia	Europe	Middle East	Total
Managerial*	2,326	34	361	379	7	25	3,132
Non-managerial	4,407	62	455	1,029	7	94	6,054
Subtotal	6,733	96	816	1,408	14	119	9,186

* Managerial positions (coordinator/supervisor class and above)

No. of locally hired managers at overseas operating sites (as of March 31, 2017)

Employees at overseas operating sites who are local citizens	2,290
Of whom are in managerial positions	198

No. of newly hired employees (April 1, 2016, to March 31, 2017)

	Male	Female	Total
New hires	818	138	956
Percentage of total number employed as of March 31, 2017	10%	12%	10%

	Age 29 or younger	Age 30 to 49	Age 50 or older	Total
New hires	382	430	144	956
Percentage of total number employed as of March 31, 2017	22%	8%	7%	10%

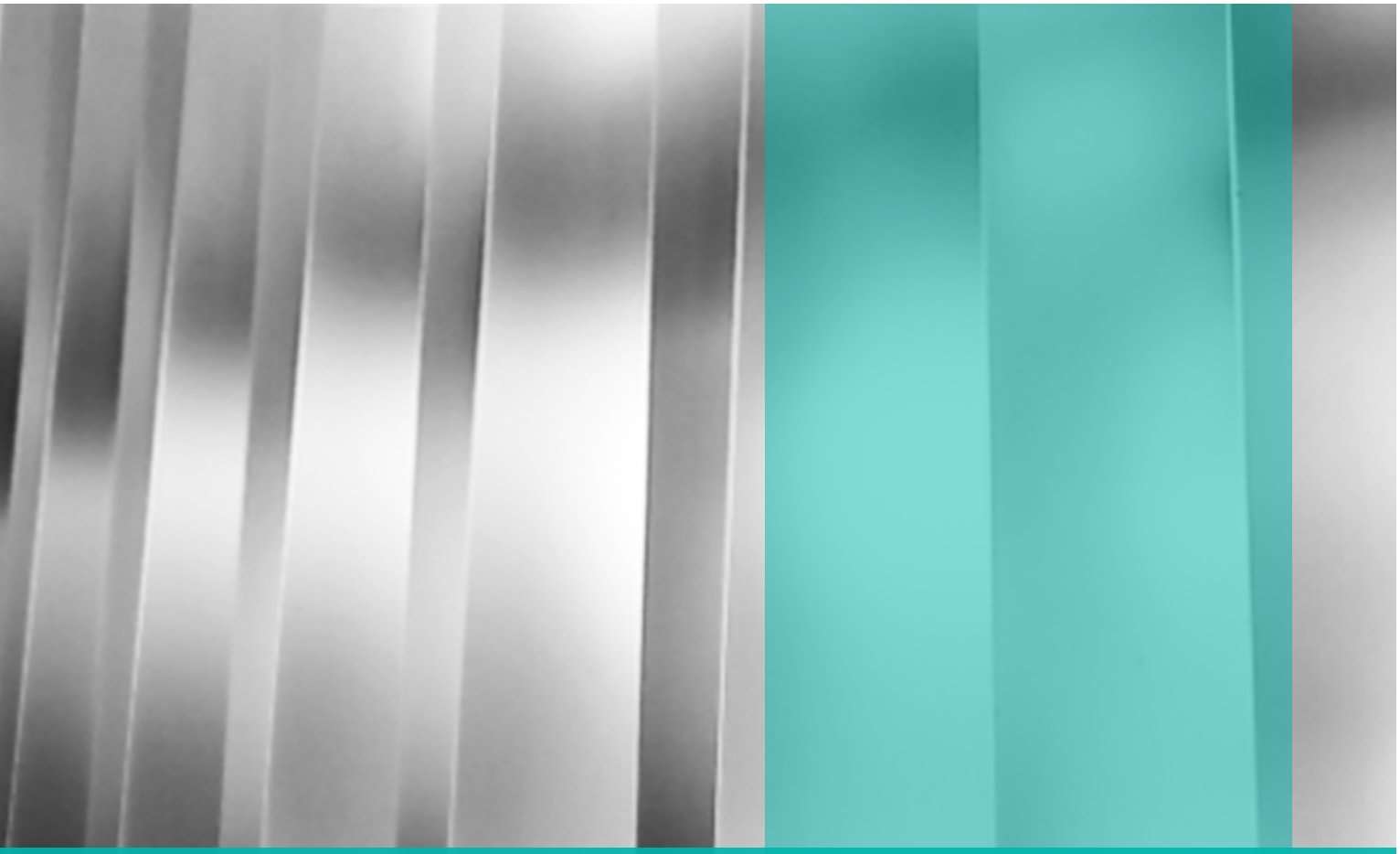
	Japan	North America	South America	Asia	Europe	Middle East	Total
New hires	487	11	208	247	0	3	956
Percentage of total number employed as of March 31, 2017	7%	11%	25%	18%	0%	3%	10%

No. of employees ending employment (April 1, 2016, to March 31, 2017)

	Male	Female	Total
Departing employees	597	113	710
Percentage of total number employed as of March 31, 2017	7%	10%	8%

	Age 29 or younger	Age 30 to 49	Age 50 or older	Total
Departing employees	175	307	228	710
Percentage of total number employed as of March 31, 2017	10%	6%	11%	8%

	Japan	North America	South America	Asia	Europe	Middle East	Total
Departing employees	344	11	135	215	5	0	710
Percentage of total number employed as of March 31, 2017	5%	11%	17%	15%	36%	0%	8%



Protecting the Environment

The preservation of the earth's environment is a common challenge for all human beings, not just corporations. The JX Nippon Mining & Metals Group seeks to reduce the environmental burden of its business pursuits as much as possible. Our Basic Environmental Policy goes beyond compliance with environmental regulations, calling for technology development in such areas as energy saving, resource conservation, and environmental protection toward the prevention of global warming and reduction of waste materials. Our efforts in these areas are managed by setting environmental targets in our Medium-Term Action Plan and other strategies.

TOPIC 1

Progress Report on Low-Concentration PCB Waste Treatment Service

Since March 2014, when JX Nippon Tomakomai Chemical received certification from the Minister of the Environment as the first low-concentration PCB waste treatment facility in Hokkaido, the company has been working to improve its treatment capacity.

JX Nippon Tomakomai Chemical rotary kiln furnace

What Are Polychlorinated Biphenyls (PCBs)?

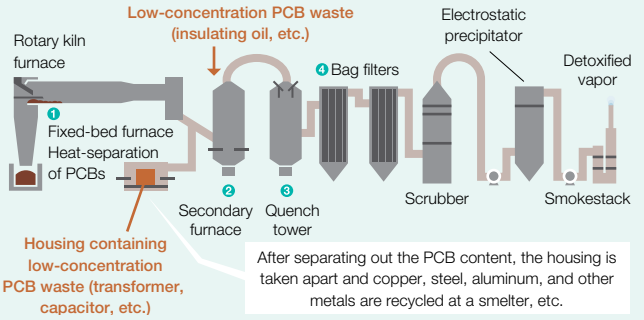
Due to their excellent electrical insulating properties, PCBs were used extensively as insulating oils mainly in transformers and capacitors, as heat transfer media in various industries, and in pressure-sensitive copiers and other equipment; but today their use in new manufacturing or import is prohibited.

Transformer

Pole transformer

Capacitor bank

Process for complete detoxification of low-concentration PCB waste



Disposal of PCB Waste

A deadline of March 31, 2027, has been prescribed by law for disposal of waste materials containing PCBs. By that date, the owner must either dispose of them or have their disposal handled by an agent.

High-concentration waste (PCB content exceeding 0.5%)	These can be disposed of only at one of the five regional treatment facilities operated by Japan Environmental Storage & Safety Corporation.
Low-concentration waste (PCB content of 0.5% or less)	Certification of treatment facilities throughout Japan is currently being carried out.

As of March 2017, there are 24 incineration facilities in Japan, including JX Nippon Tomakomai Chemical, capable of detoxifying not only low-concentration PCB waste materials but also the transformers, drums, and other housings that contain them. There are also 10 treatment facilities that perform decontamination by means of cleaning processes. These are still inadequate to meet the demand for low-concentration PCB waste disposal.

Changes since Initial Certification

	Treated items	Treatment capacity
March 2014 (certification by environment minister)	Transformers Metal scrap (drums, etc.) Waste oil containing low concentrations of PCBs	Solids: 6 tons/day (3 batches of 2 tons each) Waste oil: 8.4 kiloliters
March 2015	Waste materials from outside Hokkaido can be accepted without the need for advance consultation with local governments	
September 2015 (additional certification by environment minister)	Increased size of objects that can be treated Width: 2.5 meters / depth: 1.5 meters / height: 2.3 meters	
	Additional treated items: Capacitors Metal-coating scrap containing low concentrations of PCBs	Increase in treatment capacity Solids: 12 tons/day (3 batches of 4 tons each)
April 2016	Additional treated item: Ballasts contaminated with low concentrations of PCBs	
March 2017	Additional treated item: Inorganic sludge (concrete scrap)	

VOICE Protecting the Environment of Local Communities

Takayuki Nagasu
Manager,
Production Section,
Production Department
JX Nippon Tomakomai Chemical Co., Ltd.

One way we have contributed to local communities is through industrial waste disposal. Since receiving certification for disposal of low-concentration PCB waste, we have expanded the types of items treated, giving priority to detoxification of waste materials received from power companies and other private companies and municipalities in Hokkaido to help protect the environment of the local region. We are also devoting efforts to detoxifying the low-concentration PCB waste of JXTG Group companies throughout Japan.

Our section carries out a wide range of operations to ensure stable industrial waste disposal. These include management of waste material storage places, incinerated material inventory management, operation scheduling, health and safety management, and education and training of new employees.

All our staff are working together on measures for safety and for the maintenance of stable operations, not only for the sake of local communities, but also for global environmental conservation. Through these efforts we aim to help accomplish the Stockholm Convention goal of detoxifying all low-concentration PCB waste by the end of fiscal 2027.

TOPIC ❷

Upgrading of Oxygen Production Equipment at Tamano Smelter, Hibi Kyodo Smelting

In December 2016, upgrades were completed to the oxygen production equipment at the Tamano Smelter of Hibi Kyodo Smelting (Tamano City, Okayama). The upgrade consisted of replacing five small oxygen production systems that were showing deterioration with a new large-scale system, the latest of its kind. The electricity consumption intensity (the amount of electricity consumed in producing one ton of refined copper) was improved by approximately 15% as a result.

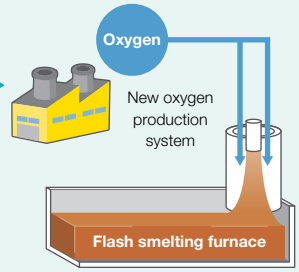
Oxygen Use in Copper Smelting

In the flash smelting furnace where the copper smelting process begins, copper concentrate is melted by making use of heat from the reaction between oxygen and the sulfur content of the copper concentrate. The upgraded oxygen production system produces the oxygen used for this purpose.

New oxygen production system

Equipment for compressing air used as raw material

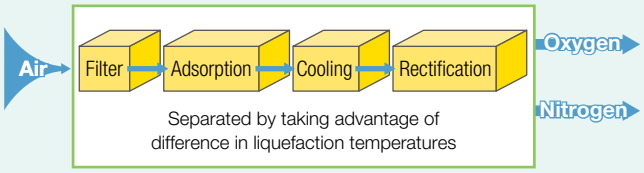
Operating panel



How the Oxygen Production System Works

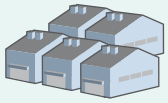
Air is taken into the system, where nitrogen is removed in a series of processes, and highly enriched oxygen is extracted. Use of this highly enriched oxygen greatly increases the amount of copper produced.

Oxygen production process of the new system (cryogenic air separation)



Energy Saving from Introduction of the New System

When the amount of ore processed in a copper smelter increases, so does the amount of oxygen needed. For this reason, the Tamano Smelter continued to add oxygen production equipment as copper production grew, resulting in a total of five small systems. As these five systems had deteriorated and were in need of an upgrade, we replaced them with one large-scale system. By adopting the latest process (cryogenic air separation), which requires less power, the electricity consumption intensity (the amount of electricity consumed in producing one ton of refined copper) was significantly reduced, by approximately 15%.



Previous oxygen production systems (5 units)

New oxygen production system (1 unit)

VOICE Working for Stable Supply of Copper While Saving Energy

Eiichi Tachibana
Coordinator
(responsible for oxygen production system),
Smelting Section,
Tamano Smelter
Hibi Kyodo Smelting Co., Ltd.

Being responsible for planning this project from the system operations side, I was involved from the conceptual phase, mainly in improving the operability compared with the existing systems. There was something emotional about replacing an oxygen plant that had been in operation from the time I joined the company. But since I also felt a personal responsibility to devote to the project the knowledge and expertise I had accumulated up to that time, I got to grips with the task while consulting with people from the manufacturer. The start of the project coincided with regular maintenance at the plant in 2016. Despite this and other difficulties, however, we saw it to completion, leaving me with a sense of accomplishment.

Copper is a vital material sustaining Japan's industry. At the same time, it is also true that a smelter has a large environmental impact, consuming considerable amounts of electricity. We must therefore not forget to pursue efforts to save energy. This upgrade, as a project contributing notably to energy efficiency, was adopted under the Energy Use Rationalization Business Support Program, a subsidy program administered by the Ministry of Economy, Trade and Industry and the Sustainable Open Innovation Initiative. I intend to continue working for energy conservation, to fulfill the challenging mission of supplying copper stably while coexisting harmoniously with society.

Basic Environmental Policy

As a comprehensive manufacturer of nonferrous metal resources and materials, the JX Nippon Mining & Metals Group is carrying out the following initiatives aimed at contributing to environmental conservation on a global scale through innovation in the productivity of resources and materials.

Note on numerical data in this section

Due to rounding, numbers presented here may not add up precisely to the totals provided.

Action Plan for Environmental Protection

We have drawn up an Action Plan for Environmental Protection as outlined below, to implement the Basic Environmental Policy.

Approach to environmental protection

1. Environmental management organization
The general manager of the Company's Environment & Safety Department is in charge of coordinating and promoting environmental protection efforts in the Group. Recognizing that on-site personnel should be responsible for ensuring environmental protection, the top managers at each operating site serve as supervisory environmental managers. At the same time, we are aiming to enhance the effectiveness of the Environment Measures Committee and to advance mutual understanding between labor and management regarding environmental protection.

2. Environmental management systems
Through Group-wide commitment, from top management to frontline employees, and through appropriate implementation of ISO 14001-compliant environmental management systems, we are continuously strengthening environmental conservation measures and working to reduce environmental risks.

3. Environmental auditing
Supervisory environmental managers at each operating site review the results of internal audits to verify their site's environmental management and compliance with environmental regulations. Additionally, the Head Office Environment & Safety Department's environment and safety audit team conducts periodic environmental audits of each operating site, detects and identifies problems as well as areas requiring remediation from an environmental management perspective, and continually strives to improve accident prevention and environmental conservation measures.

Measures to be taken

We are committed to undertaking the measures indicated below to minimize the environmental impact of the Group's business activities.
■ Help prevent global warming ■ Promote resource efficiency and recycling ■ Reduce waste materials ■ Manage chemical substances ■ Maintain biodiversity
■ Provide recycling services ■ Develop environmentally friendly technologies and products, and introduce new technologies ■ Promote green purchasing ■ Conduct training, public relations initiatives, and social activities to communicate our Action Plan for Environmental Protection and raise awareness of our environmental protection measures

Environmental conservation at our overseas businesses

1. Environmentally friendly operations in our overseas business activities
To ensure an effective approach to environmental conservation at overseas operating sites, we promote a thorough understanding of the need to be aware of our environmental impact and to observe environmental regulations.

2. Environmentally friendly importing and exporting
In addition to adhering to the Basel Convention, we take steps to ensure that our exporting and importing partners do not harm the environment.

Emergency response measures

1. Emergency response manuals and drills
Reporting procedures are in place at the Group-wide level, along with those at the business-group and operating-site levels. Emergency response manuals are reviewed and updated to minimize the environmental impact of accidents, and regular emergency drills are carried out.

2. Response to environmental accidents
Should an environmental accident occur in business activities or due to a product defect, we will take steps to minimize the environmental impact of such an accident by acting in accordance with emergency response manuals and procedures.

Environmental Targets

Along with the new 4th Medium-Term Action Plan that went into effect from fiscal 2016, we are working to meet new environmental targets including long-term targets for fiscal 2030.

Long-term targets

❶ **CO_2 Reduction and Energy Conservation:** By fiscal 2030, reduction in CO_2 emissions by 18% from fiscal 1990 levels
(A target set after the Japanese government's new targets were incorporated in the Paris Agreement at COP21 in 2015)

❷ **Ratio of Non-Value-Bearing Waste Volume:** By fiscal 2030, ratio of non-value-bearing waste volume of less than 0.5%

Results for the 4th Medium-Term Action Plan (fiscal 2016 to 2018)

Target area	Environmental targets	Performance in fiscal 2016	Summary
Energy and CO_2	Cumulative allowable CO_2 emissions in Japan of less than 3.06 million tons for fiscal 2016 to 2018*1	853 thousand tons (Target achieved)	Due to energy-saving measures and other efforts, domestic CO_2 emissions in fiscal 2016 were 853 thousand tons, 167 thousand tons less than the annual target of 1.02 million tons, achieving the target. In fiscal 2017 and thereafter, we will aim to continue meeting the target. The premise for meeting the long-term target is reducing the energy consumption intensity by 1% annually at each domestic operating site as stipulated in the Act on the Rational Use of Energy.
Waste	Ratio of non-value-bearing waste volume*2 of less than 0.7%	0.5% (Target achieved)	Due to thoroughgoing separation of waste materials for reuse and recycling, the ratio of non-value-bearing waste volume in fiscal 2016 was 0.5%, achieving the target.
Environmental management	Compliance with revisions to ISO 14001 (Environmental Management Systems), and scheduled implementation of compliance inspections and environmental auditing	Comprehensive compliance inspections performed at nine operating sites, along with environmental and safety audits at 11 sites, all as planned (Target achieved)	Preparations were made to enable the 16 operating sites*3 that acquired ISO 14001 certification to complete transition to the 2015 version by August 2018. In addition, comprehensive compliance inspections and environmental audits were implemented as planned.

In the 4th Medium-Term Action Plan, data on energy, CO_2, and waste is collected for the below-listed operating sites, where energy consumption is at or above the level of Type 2 Designated Energy Management Factories under the Act on Rationalizing Energy Use.

Domestic: Hitachi Works (HMC Dept., Copper Foil Dept.); Isohara Works; Kurami Works; Pan Pacific Copper Co., Ltd. (Saganoseki Smelter & Refinery, Hitachi Refinery); Hibi Kyodo Smelting Co., Ltd. (Tamano Smelter); Japan Copper Casting Co., Ltd.; JX Nippon Environmental Services Co., Ltd.; JX Nippon Tomakomai Chemical Co., Ltd.; JX Nippon Mikkaichi Recycle Co., Ltd.; JX Nippon Tsuruga Recycle Co., Ltd.; JX Metals Precision Technology Co., Ltd. (Esashi Works, Tatebayashi Works, Kakegawa Works); and Toho Titanium Co., Ltd. (Headquarters & Chigasaki Plant, Yahata Plant, Wakamatsu Plant, Kurobe Plant)

Overseas: Changzhou Jinyuan Copper Co., Ltd.; JX Nippon Mining & Metals Philippines, Inc.; and Nippon Mining & Metals (Suzhou) Co., Ltd.

*1 We are aiming to reduce annual allowable emissions from the above-listed domestic operating sites in stages year-by-year, starting with the 13.1% reduction from the fiscal 1990 level in fiscal 2015 that was targeted in the 3rd Medium-Term Action Plan, and aiming for an 18% reduction from the fiscal 1990 level by fiscal 2030. Emission reduction targets were accordingly set for a three-year period. Emissions from fuel usage are calculated using the coefficients stipulated by the Act on Promotion of Global Warming Countermeasures. Emissions from electricity usage are calculated using the coefficient of 0.417 tons of CO_2 per megawatt-hour (the actual figure for fiscal 1990 as given in the Environmental Action Plan of the Federation of Electric Power Companies of Japan) to reflect the efforts made by individual operating sites.
*2 Ratio of non-value-bearing waste volume = (Volume incinerated + Volume of final disposal) / Total volume of waste and sellable materials generated
*3 The operating sites covered are the 16 domestic sites listed on page 58.

Our Business Activities and the Environment

The JX Nippon Mining & Metals Group monitors and analyzes the impacts of its business activities on the environment and endeavors to reduce these impacts. An overview of our efforts in this area is given here.

Mass Balance Table for the Group (Fiscal 2016)

INPUT

Raw materials
(1,000 tons)

Primary raw materials

Domestic operating sites	2,025
Overseas operating sites	293
Total	**2,318**

Recycled raw materials

Domestic operating sites	209
Overseas operating sites	1
Total	**210**

Energy
(terajoules)

Fuel

Domestic operating sites	3,864
Overseas operating sites	2,487
Total	**6,351**

Electricity

Domestic operating sites	13,832
Overseas operating sites	8,595
Total	**22,427**

Water resources
(million cubic meters)

Freshwater

Domestic operating sites	20.4
Overseas operating sites	10.1
Total	**30.4**

Seawater

Domestic operating sites	113.2
Overseas operating sites	—
Total	**113.2**

JX Nippon Mining & Metals Group

OUTPUT

Principal products

Copper concentrate*	**85** thousand tons
Refined copper	**679** thousand tons
Gold	**44** tons
Silver	**369** tons
Platinum	**598** kilograms
Palladium	**3,280** kilograms
Other metals (selenium, tellurium)	**259** tons
Electro-deposited and treated rolled copper foil	**7** thousand tons
Copper alloy, special steel strips, etc.	**38** thousand tons
Titanium sponge	**19** thousand tons
Sulfuric acid (by-product)	**1,731** thousand tons

Emissions

CO_2
(1,000 tons)

Total of domestic operating sites	
Scope 1	260
Scope 2	791
Total of overseas operating sites	
Scope 1	163
Scope 2	372
Total	**1,586**

SOx
(1,000 tons)

Domestic operating sites	7.0
Overseas operating sites	0.3
Total	**7.2**

NOx
(1,000 tons)

Domestic operating sites	0.7
Overseas operating sites	0.2
Total	**0.9**

Chemical substances (release and transfer)
(1,000 tons)

Total of domestic operating sites (domestic only)	**0.24**

Final landfill disposal
(1,000 tons)

Domestic operating sites	1.8
Overseas operating sites	3.0
Total	**4.9**

Wastewater
(million cubic meters)

Domestic operating sites	159.0
Overseas operating sites	0.9
Total	**159.9**

* Not including the Group's equity share

Environmental Management System

The JX Nippon Mining & Metals Group has established an environmental management system in line with ISO 14001 standards for ensuring achievement of the Action Plan for Environmental Protection, which was drawn up reflecting the Basic Environmental Policy. A multi-level organizational structure has been created, including various committees and subcommittees, in which everyone, from senior management headed by the president to employees at operating sites and affiliated companies, is working together to promote environmental conservation and avoid environmental risk.

Operating Sites That Have Obtained ISO 14001 Certification

Domestic	Hitachi Works (including Hitachi Refinery of Pan Pacific Copper Co., Ltd. and JX Nippon Environmental Services Co., Ltd.); Copper Foil Dept. of Hitachi Works (including Ichinoseki Foil Manufacturing Co., Ltd.); Isohara Works; Kurami Works (including the Kurami Office of JX Nippon Coil Center Co., Ltd.); Saganoseki Smelter & Refinery of Pan Pacific Copper Co., Ltd. (including Japan Copper Casting Co., Ltd. and Nissho Kou-un Co., Ltd.); Hibi Smelter of Pan Pacific Copper Co., Ltd. (including Hibi Kyodo Smelting Co., Ltd. and Hibi Smelting Logistics Co., Ltd.); JX Nippon Tomakomai Chemical Co., Ltd.; JX Nippon Tsuruga Recycle Co., Ltd.; JX Nippon Mikkaichi Recycle Co., Ltd.; Headquarters & Chigasaki Plant of Toho Titanium Co., Ltd. (including its Kurobe Plant and Wakamatsu Plant); JX Metals Precision Technology Co., Ltd. (each of Esashi Works, Tatebayashi Works, Nasu Works, and Kakegawa Works); JX Metals Trading Co., Ltd.; and Shirakawa Plant of JX Nippon Takasho Co., Ltd.
Overseas	JX Nippon Mining & Metals Philippines, Inc.; JX Nippon Mining & Metals USA, Inc.; Materials Service Complex Malaysia Sdn. Bhd.; JX Nippon Mining & Metals Korea Co., Ltd.; Nikko Fuji Precision (Wuxi) Co., Ltd.; and Longtan Works of Nikko Metals Taiwan Co., Ltd.

Compliance with Environmental Laws and Regulations

Through the effective operation of environmental management systems at operating sites and affiliated companies, the Group is ensuring compliance with environmental laws and regulations. The Environment & Safety Department in the Head Office monitors and supervises the state of compliance and reports to the CSR Committee through the Safety and Environment Committee. The Group seeks to strengthen its compliance systems by such means as environmental manager meetings, held each year to share information on legal and regulatory trends and to hear compliance status reports from operating sites.

Once again in fiscal 2016, there were no adverse dispositions from regulatory authorities (license revocation, order to cease operations, order to cease use of facilities, order for improvement, fines, etc.) for violations of environmental laws and regulations.

Environmental and Safety Auditing

Individual operating sites implement internal environmental audits at least once a year. In addition, they periodically undergo environmental and safety audits by the Head Office Environment & Safety Department, which were conducted at 11 sites in fiscal 2016.

Environmental Education

Periodic education, training, and drills are conducted for each employee level at individual operating sites, to spread awareness regarding the Basic Environmental Policy, the Action Plan for Environmental Protection, and applicable laws and regulations.

Transition to ISO 14001:2015

Preparations are being made so that all 16 domestic operating sites that acquired ISO 14001 certification can complete the transition to the 2015 version by August 2018. Nine operating sites are expected to complete the transition during fiscal 2017.

Environmental Accidents

In fiscal 2016, the environmental accidents listed below occurred. In each case, necessary measures have been taken to address these accidents and make sure they do not recur.

Date	Place	Description
August 2016	Hibi Kyodo Smelting	The soot and dust concentration at the outlet of flue gas desulfurization equipment exceeded limits set in the Air Pollution Control Act.
November 2016	Hitachi Works	A drainage pipe in the Daioin area suffered damage from corrosion. Wastewater containing lead and other contaminants exceeding the effluent standards leaked into the river.

Environmental Assessment of Suppliers

The Group promotes environmental conservation in the entire supply chain including suppliers. Based on the Group's Green Purchasing Guidelines, suppliers are asked to create an environmental management system to reduce their environmental impact.

Additionally, green purchasing surveys are conducted periodically to confirm implementation by major suppliers. (See page 88 for details.)

Energy Conservation

Fundamental Policy

Global warming is causing changes in many aspects of the climate, from frequent abnormal weather to rising sea levels. Furthermore, it is feared that the significant impact on ecosystems may undermine the sustainable development of society as a whole. The JX Nippon Mining & Metals Group has defined long-term targets for reducing emissions of CO_2 and other greenhouse gases, which we are pursuing by promoting energy conservation and expanding the use of renewable energy. (See page 56 for details.)

Activity Results in Fiscal 2016

Energy Consumption and Energy Consumption Intensity in Manufacturing Activities

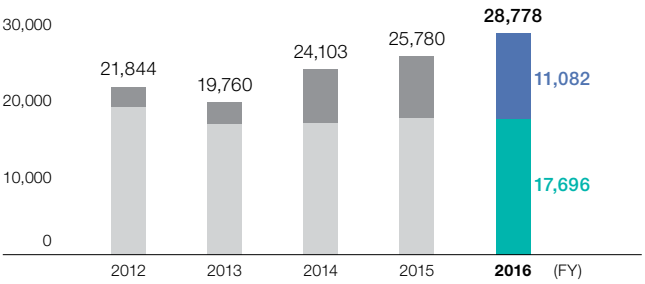
In fiscal 2016, the Group's overall energy consumption in terms of its calorific value was 28,778 terajoules,* compared with 25,780 terajoules in fiscal 2015. The further rise in the Caserones Copper Mine operating rate was one of the major factors resulting in an increase of 2,998 terajoules. Around 49% of the Group's total energy consumption at operating sites in Japan is accounted for by energy consumed at smelters and refineries, where energy consumption intensity in fiscal 2016 decreased by 0.2 points year on year. The Group will continue to take active measures for reducing energy use and improving efficiency. As an example of such measures, at the Tamano Smelter of Hibi Kyodo Smelting, the oxygen production systems were upgraded to a single system adopting the latest technology. The resulting improved power efficiency reduced electricity usage by a total annual calorific value of 46 terajoules. At the Saganoseki Smelter & Refinery of Pan Pacific Copper, changing the receiving voltage reduced transformer loss, lowering electricity usage by a total annual calorific value of 16 terajoules.

At our overseas operating sites as well, we are taking steps to reduce energy consumption, such as optimizing the number of cooling towers in operation, installing pump-inverter control equipment, and carrying out phased replacement of conventional lighting with LED lamps. We will continue to pursue additional reductions in energy use and to recover waste heat by installing energy-efficient equipment.

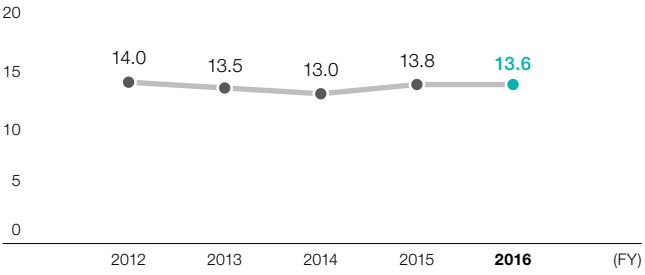
* Energy consumption is calculated using coefficients in accordance with the Act on Rationalizing Energy Use, for both domestic and overseas operating sites.
A breakdown of energy consumption in fiscal 2016 is shown below (terajoules).
Electricity (indirect): Domestic 13,832 Overseas 8,595
Fuel (direct): Domestic 3,864 Overseas 2,487
Note: A terajoule is one trillion joules, a unit of energy.

New power-receiving equipment
(Saganoseki Smelter & Refinery of Pan Pacific Copper)

Energy Consumption (Fuel and Electricity)



Energy Consumption Intensity at Smelters and Refineries (Fuel and Electricity)



Breakdown by Fuel Type

	Domestic	Overseas
Kerosene (kl)	2,621	—
Light oil (kl)	2,875	41,405
Class A heavy oil (kl)	7,080	645
Class B and C heavy oil (kl)	43,662	9,462
Reclaimed oil (kl)	1,970	—
LPG/butane (t)	5,429	6
LNG (t)	4,663	—
Coke (t)	7,076	—
Petroleum coke (t)	1,928	—
City gas (1,000 m^3)	14,959	11,580

CO_2 Emissions from Energy Consumption for Manufacturing Activities*

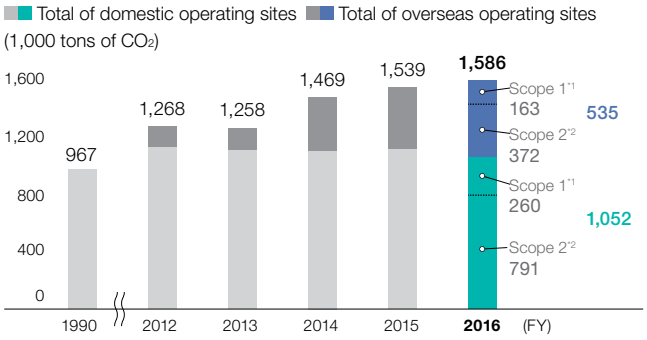
In fiscal 2016, the Group's total CO_2 emissions from energy consumption in Japan and overseas were 1,586 thousand tons of CO_2.

There was a slight rise in CO_2 emissions from energy consumption over fiscal 2015, which was the result of a higher operating rate at the Caserones Copper Mine.

Approximately 49% of the Group's total energy consumption in Japan is accounted for by energy consumed at smelters and refineries. Through the consolidation of facilities, improved production efficiency, and other measures, the Group reduced CO_2 emission intensity at these sites to 0.86 in fiscal 2016, down approximately 40% from 1.34 in fiscal 1990.

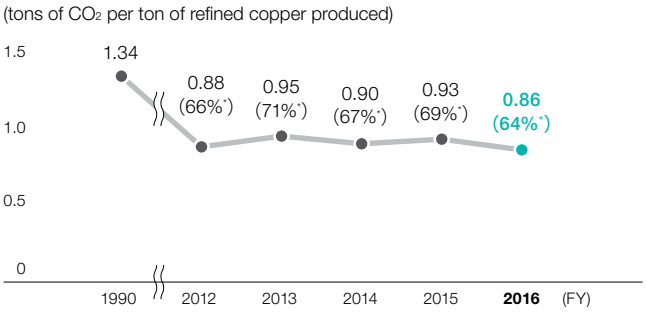
* Emissions are calculated using emission coefficients in accordance with the Act on Promotion of Global Warming Countermeasures. Actual coefficients that individual power companies made public and statistical data released by the International Energy Agency are used to calculate amounts of emissions from electricity consumption at domestic and overseas operating sites, respectively. In addition to the CO_2 emissions from energy consumption regulated under the above Act, the Company includes in its calculations CO_2 emissions from burning fuel that was used as a reducing agent (with the exception of those emissions from titanium operations), which are outside the scope of the Act.

CO_2 Emissions from Energy Consumption



*1 Emissions from fuel consumption are converted to equivalent CO_2.
*2 Emissions from electricity consumption are converted to equivalent CO_2.

CO_2 Emission Intensity at Smelters and Refineries



* In relation to fiscal 1990 level.

Expansion of Renewable Energy Usage

Hydroelectric power generation in the Group traces back to 1907, when its predecessor Kuhara Mining operated. Today, we carry out power generation operations at the Kakinosawa Hydroelectric Power Plant and sell the electricity generated to specified-scale electricity utilities. From October 2014 to June 2015, the facilities of the Kakinosawa Hydroelectric Power Plant were upgraded to enable more effective use of valuable water resources. The plant is now operating stably with increased power generation capacity thanks to upgraded facilities such as turbines, generators, and power receiving and transforming equipment. A photovoltaic power generation facility with capacity of 240 kilowatts went into operation in April 2013 at the Kakegawa Works of JX Metals Precision Technology. Photovoltaic power generation is also carried out at the Hibi Smelter of Pan Pacific Copper.

Results in Fiscal 2016 (megawatt-hours)

	Total generated electricity	Generated electricity sold
Hydroelectric power (Kakinosawa Power Plant)	26,424	26,355
Photovoltaic power (Kakegawa Works)	673	664

CO_2 Emissions Other than from Energy Consumption, and Other Greenhouse Gas Emissions from Manufacturing Activities*

Three operating sites in the recycling and environmental services business submit reports on the emissions of CO_2 from sources other than energy consumption as well as the emissions of other greenhouse gases. In fiscal 2015, such emissions totaled approximately 54 thousand tons of CO_2. In fiscal 2016, this amount grew by 3 thousand tons to around 57 thousand tons of CO_2 (consisting entirely of CO_2 emissions from sources other than energy consumption).

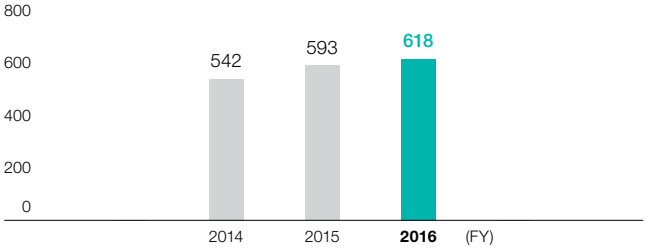
* Emissions are calculated using emission coefficients in accordance with the Act on Promotion of Global Warming Countermeasures. CO_2 emissions other than from energy consumption result from treatment of waste oil, waste plastic, sludge, and wood waste. In fiscal 2016, the emissions of greenhouse gases excluding CO_2 from sources other than energy consumption were below the reporting threshold or there were no such emissions.

Energy Consumption and CO_2 Emissions in the Logistics Stage

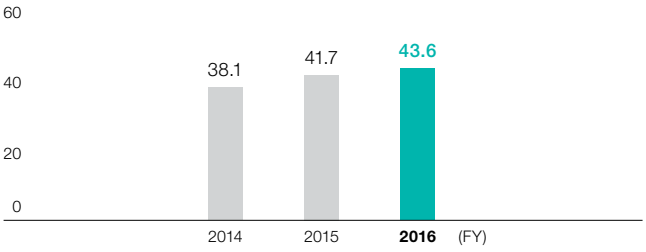
In fiscal 2016, energy consumption in the logistics stage of applicable Group companies in Japan*1 was 618 terajoules and CO_2 emissions in that stage were 43.6 thousand tons of CO_2, compared with 593 terajoules and 41.7 thousand tons, respectively, in fiscal 2015.

*1 Specified consigners as defined by the Act on Rationalizing Energy Use. This applies to the following three companies in the Group: JX Nippon Mining & Metals, Kasuga Mines, and Pan Pacific Copper.
*2 With the transfer of shares in Nippon Marine, the data for overseas transport by copper concentrate/sulfuric acid combination carrier ships reported up to fiscal 2015 is no longer included.

Energy Consumption: Domestic



CO_2 Emissions: Domestic



Initiatives for Effective Resource and By-Product Use and Waste Reduction

Fundamental Policy

The JX Nippon Mining & Metals Group is committed to helping prevent the depletion of natural resources and reducing the discharge of waste materials. We therefore strive to make effective use of water resources, use recycled resources as raw materials, utilize by-products, and reduce the volume of final disposal by recycling waste materials.

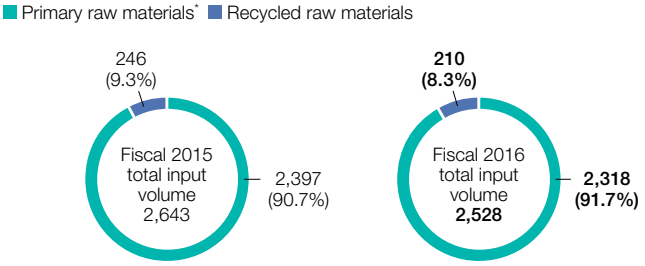
Activity Results in Fiscal 2016

Usage of Recycled Resources as Raw Materials ☑

The ores and other natural resources extracted from nature are finite, and must be preserved for future generations. The Group is expanding usage of recycled resources as raw materials.

Material Input

(1,000 tons)



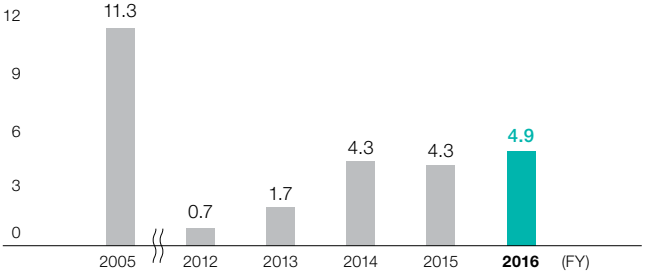
* The Group's equity share of the copper concentrate produced at the Caserones Copper Mine is not included.

Reuse and Reduction of Waste Materials ☑

Of the total volume of waste and sellable materials the Group generated in fiscal 2016, 84% was reused internally. Of the final volume of waste materials discharged, the volume of final disposal, excluding the volume recycled externally or otherwise used, was 4.9 thousand tons, an increase of 600 tons from the previous fiscal year. The main cause of this increase was the spot release of incineration ash in our recycling operations. To achieve future reductions in waste discharge volume, we will continue to repeatedly reuse all neutralized sludge generated at smelters and refineries. We are also continuing to expand uses for waste materials at all operating sites, including those manufacturing electronic materials, through proper waste separation.

Volume of Final Disposal of Waste Materials*1, *2, *3

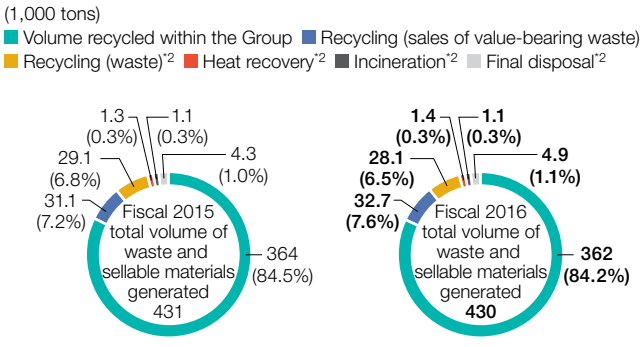
(1,000 tons)



*1 These figures do not include the approximately 6.6 thousand tons disposed of in offshore landfills by Toho Titanium.
*2 These figures do not include the approximately 21.6 million tons of slag from the Caserones Copper Mine.
*3 Totals reflect retroactive revisions to data from past years.

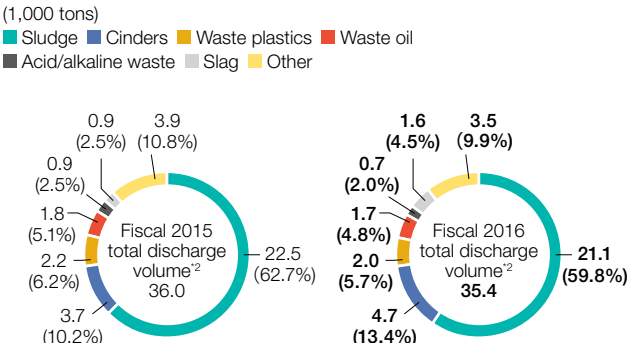
Total Volume of Waste and Sellable Materials Generated*1

(1,000 tons)



Discharge Volume by Type of Waste Materials*1

(1,000 tons)

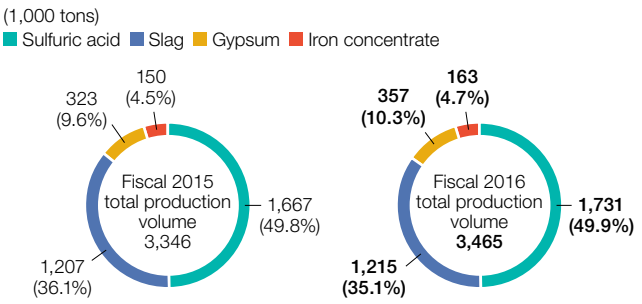


*1 Totals reflect retroactive revisions to data from past years.
*2 Total discharge volume for each fiscal year shows the total of items marked with "*2" in the key for "Total Volume of Waste and Sellable Materials Generated" above.

Use of By-Products

In fiscal 2016, the Group produced 3,465 thousand tons of by-products. Slag is utilized as a sandblasting material, a cement material, a caisson filler, or as an aggregate for wave-dissipating blocks. Iron concentrate and gypsum are used in cement.

By-Product Production



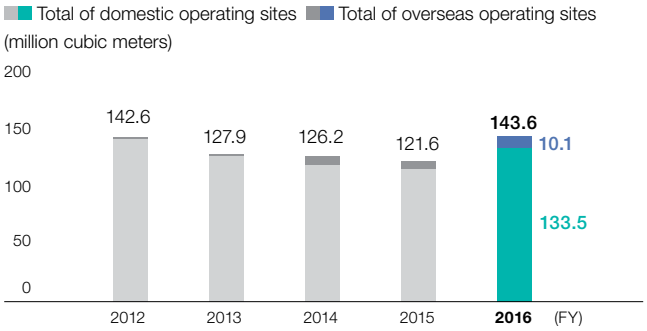
Effective Use of Water Resources

Of the Group's water usage in fiscal 2016, seawater accounted for 79% of the total. Of the volume of water discharged, 90% was discharged into the sea. Water usage at domestic operating sites in fiscal 2016 increased 16% year on year, mainly due to increased production in our smelting and refining business.

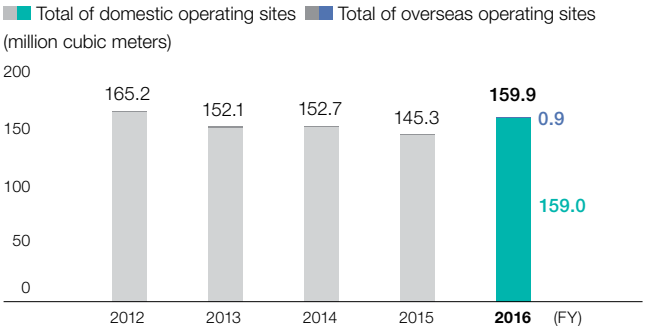
Overseas, water usage increased 49% year on year, with the higher operating rate at the Caserones Copper Mine being the chief factor.

The increase in water usage and discharge intensity at smelters and refineries was mainly caused by coolant use during regular maintenance.

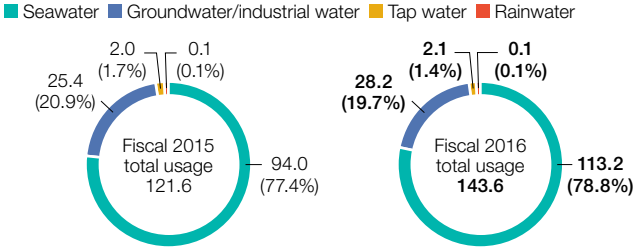
Water Usage*1



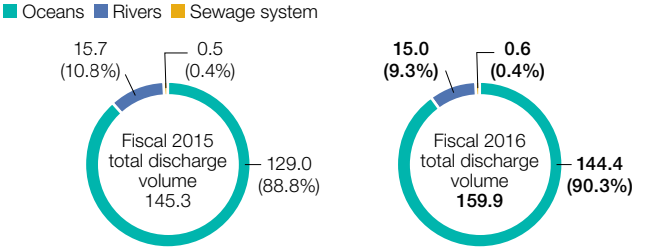
Water Discharge Volume*2



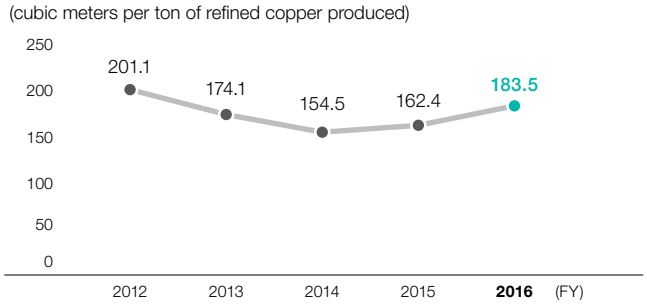
Water Usage*1



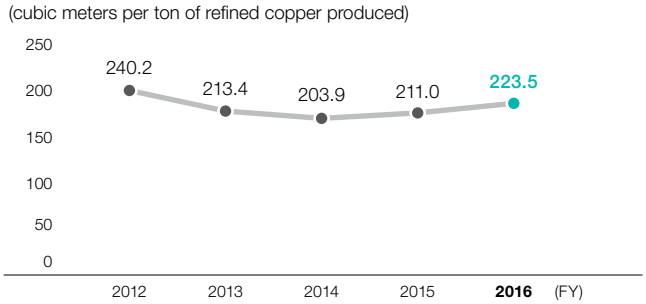
Water Discharge Volume*2



Water Usage Intensity at Smelters and Refineries



Water Discharge Intensity at Smelters and Refineries



*1 Seawater usage at the Saganoseki Smelter & Refinery of Pan Pacific Copper is calculated based on pumping capacity. Groundwater usage at JX Nippon Mikkaichi Recycle is calculated by multiplying water discharge volume by a fixed rate. Freshwater usage at the Saganoseki Smelter & Refinery of Pan Pacific Copper, and water usage at the other operating sites, are based on flowmeter readings or on invoices from the water company.

*2 The volume of water discharged into public waters (oceans and rivers) at each operating site represents the following: an amount calculated based on drainage weirs (Hitachi Works, Isohara Works, Saganoseki Smelter & Refinery of Pan Pacific Copper, JX Nippon Tomakomai Chemical, JX Nippon Mikkaichi Recycle); an amount obtained by multiplying groundwater usage by a fixed rate (Kurami Works, Headquarters & Chigasaki Plant of Toho Titanium); an amount otherwise calculated (Yahata Plant of Toho Titanium); or an amount based on flowmeter readings (the other operating sites). The volume of water discharged into the sewage system is as measured by a water treatment company in the case of Changzhou Jinyuan Copper, and is based on flowmeter readings or on invoices from the sewage company for the other operating sites.

Environmental Risk Management

Fundamental Policy

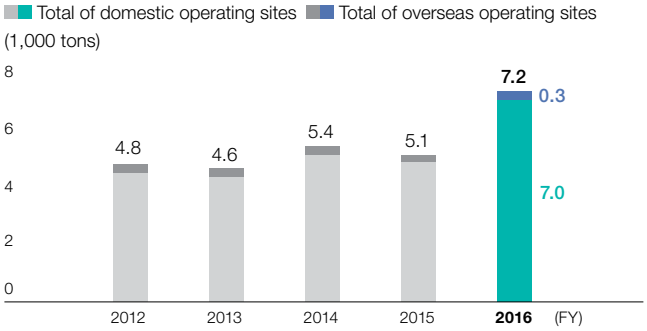
Air and water systems are key influencers of human health and living environments. In carrying out its business operations, the JX Nippon Mining & Metals Group gives top priority to protecting the environment relating to these two systems. In addition to abiding by all relevant laws, regulations, ordinances, and agreements, we have set and monitor our own voluntary standards to reduce environmental impact. At the same time, we implement the plan-do-check-act cycle to reduce environmental risks.

Activity Results in Fiscal 2016

Preventing Air Pollution

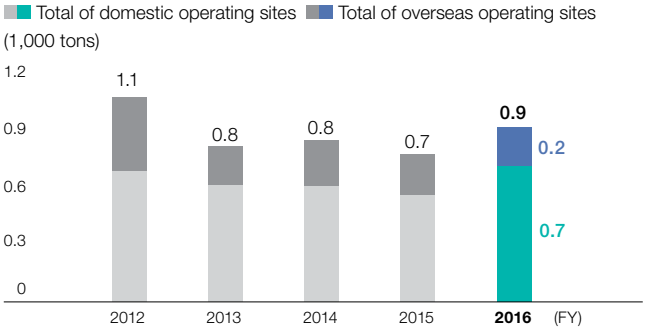
The Group monitors waste gas emissions at all operating sites in compliance with laws, regulations, ordinances, agreements, and voluntary standards. In fiscal 2016, emissions of both sulfur oxides (SOx) and nitrogen oxides (NOx) in the Group increased from fiscal 2015 levels. Principal reasons for the rise in SOx emissions were increased production at smelting and refining facilities and a leakage problem in the sulfuric acid process at the Saganoseki Smelter & Refinery of Pan Pacific Copper. The NOx rise was due mainly to a higher operating rate of standby generators in the Copper Foil Department of Hitachi Works.

SOx Emissions*

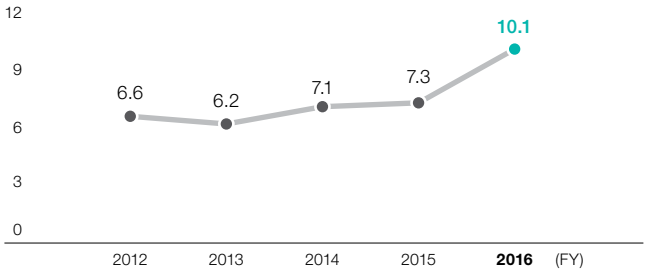


* Totals are for operating sites subject to emissions regulations.

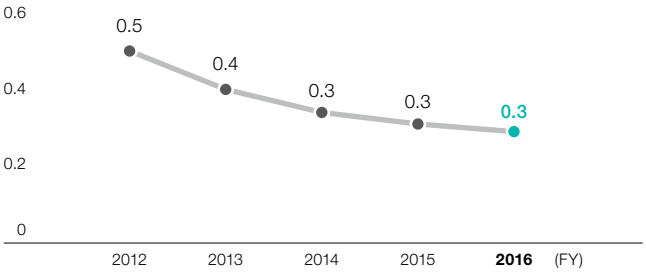
NOx Emissions*



SOx Emission Intensity at Smelters and Refineries (kilograms of SOx per ton of refined copper produced)



NOx Emission Intensity at Smelters and Refineries (kilograms of NOx per ton of refined copper produced)



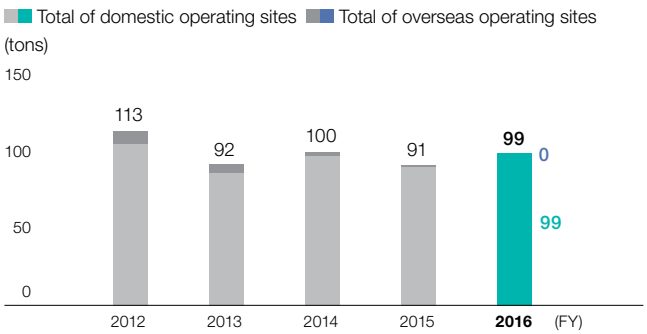
Preventing Water Pollution

The Group monitors water discharge at all operating sites in compliance with laws, regulations, ordinances, agreements, and voluntary standards. The COD*1 and BOD*2 levels are shown below.

*1 Chemical oxygen demand: An index of water quality indicating the amount of oxygen needed to oxidize substances in water. This is a representative indicator for measuring contamination by organic substances in oceans and lakes.

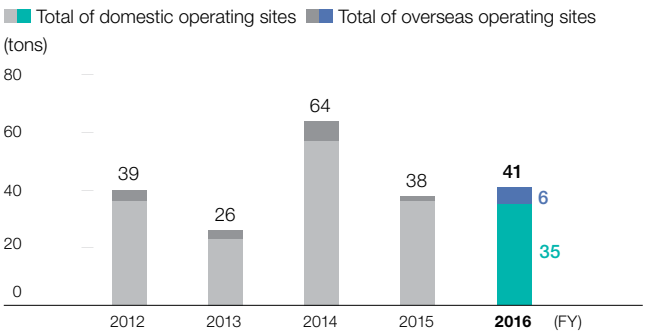
*2 Biochemical oxygen demand: An index indicating the amount of oxygen needed for organic matter in water to be broken down by microorganisms. This is a representative indicator for measuring contamination by organic substances in rivers and streams.

COD*3



*3 Totals are for operating sites subject to legal requirements (sites that discharge water into the ocean or lakes).

BOD*4



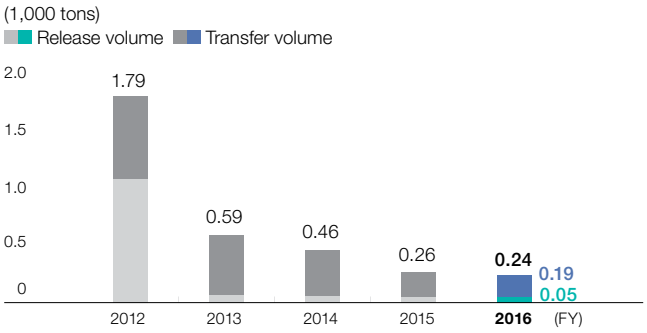
*4 Totals are for operating sites subject to legal requirements (sites that discharge water into the ocean or lakes).

Chemical Management ☑

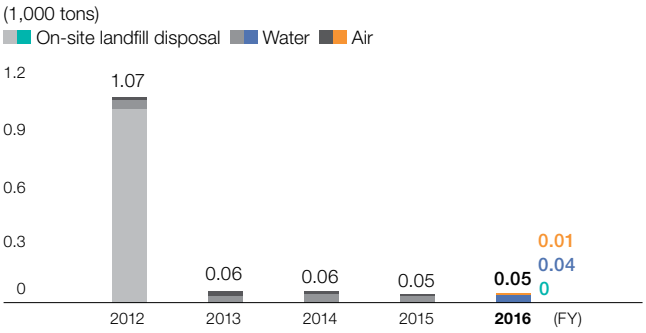
At operating sites with significant release and transfer of chemicals, the Group strictly adheres to the Act on Confirmation, Etc., of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof (PRTR Act). Also, as part of our environmental management activities, we are working to reduce our environmental impact by setting targets for decreasing the release and transfer volumes of applicable chemical substances.

Regarding the Group's total release and transfer volumes of chemical substances to be reported in compliance with the PRTR Act, the release volume in fiscal 2016 increased by 1 ton from the previous fiscal year, but the transfer volume decreased by approximately 23 tons due primarily to recycling waste solvent into resources.

Volumes of Release and Transfer of PRTR Substances



Breakdown of Release Volumes of PRTR Substances



* The on-site landfill disposal in fiscal 2012 relates to neutralized sludge generated owing to the Motoyama drainage treatment facility going into full operation at the Toyoha Mine. As the smooth operation of the facility has reduced the labor requirements, the mine has been exempted from reporting requirements under the PRTR Act since fiscal 2013.

Volumes of Release and Transfer of Major PRTR Substances in Fiscal 2016

(tons)

No.	Cabinet order no.	Chemical substances	Release volume			Transfer volume	
			Air	Water	On-site landfill disposal	Sewage system	Waste
1	1	Zinc compounds (water soluble)	0.1	6.1	0.0	0.0	0.0
2	75	Cadmium and its compounds	0.1	0.2	0.0	0.0	36
3	132	Cobalt and its compounds	0.0	0.3	0.0	0.0	10
4	272	Copper salts (water soluble)	1.2	6.1	0.0	0.0	6.4
5	300	Toluene	2.7	0.0	0.0	0.5	100
6	309	Nickel compounds	0.1	0.8	0.0	0.0	6.1
7	374	Hydrogen fluoride and its water-soluble salts	0.4	8.5	0.0	0.0	1.3
8	405	Boron compounds	0.0	5.9	0.0	0.0	3.0
9	412	Manganese and its compounds	0.0	2.0	0.0	0.0	16
							(grams of toxic equivalents)
10	243	Dioxins	0.04	0.01	0.0	0.0	4.4

* The values given are totals for companies with operating sites subject to reporting requirements under the PRTR Act (JX Metals Trading, Kasuga Mines, and the domestic companies defined on page 1 as companies subject to reporting with regard to the Boundary of the Report (Environment)).
* Of the 56 chemical substances subject to reporting, those totaling at least 5.0 tons in any category, and dioxins, are listed here.
* There were no cases of chemical substances released into the soil.

Detoxification of PCB-Containing Equipment

The Group carries out systematic disposal of equipment containing high concentrations of PCBs, using the services of Japan Environmental Storage & Safety Corporation. Disposal is expected to be completed during fiscal 2017, with the exception of operating sites in Tokyo and Kanagawa where treatment is behind schedule.

We have also been detoxifying equipment containing low concentrations of PCBs by entrusting a private-sector facility starting in fiscal 2012. In March 2014, JX Nippon Tomakomai Chemical received certification from the Minister of the Environment to provide a low-concentration PCB waste treatment service, and carries out disposal of Group equipment containing low concentrations of PCBs. (See page 53 for details.)

Compliance with the REACH Regulation

The European Union's Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH Regulation) came into effect in June 2007. Based on precautionary principles, the purpose of this regulation is to standardize the management and identification of chemicals that are distributed within the EU, and to monitor their risks and clarify their environmental impact. The Group respects the intent of the REACH Regulation, has completed preliminary registration of products that are subject to the regulation, and plans to complete official registration by 2018.

Initiatives for Biodiversity Conservation

Fundamental Policy

The Hitachi Mine, to which the JX Nippon Mining & Metals Group traces its history, worked to ensure that the rich greenery of the surrounding mountains would be preserved for future generations, by actively combating smoke pollution and carrying out reforestation programs. Our operations, particularly mining and smelting, may have a significant impact on the nearby environment. Given this nature of our business, we consider biodiversity conservation to be an important theme that we must pursue to conduct business in a sustainable manner.

Initiatives at the Caserones Copper Mine

Of the total 385 square kilometers (38,500 hectares) of land owned by Minera Lumina Copper Chile (MLCC), operator of the Caserones Copper Mine, MLCC has designated 0.87 square kilometers (87 hectares) as an area to be protected from the impact of construction of the mining equipment and other such activities, and takes steps to preserve biodiversity by protecting the animals and plants in this area.

MLCC observes the following rules for the protected area: (1) If trees are cut in a certain area, another area 1.6 times larger than the felled forest area must be planted; and (2) if it is necessary to cut any protected plant, 10 times the number of the same type of plant must be planted. Under the guidance of experts, plants in a wetland plant zone spanning 9,400 square meters of the Caserones Valley were wholly transplanted to the La Ollita Valley, the nearest place with an appropriate habitat. The vega plant, one of the protected plants at the Caserones Valley site, was then confirmed to have taken root at the transplanted site. In addition, due to severe depletion of water resources in the Copiapó River system located downstream from the Caserones Copper Mine, MLCC took steps to control water consumption, buying an alfalfa farm to halt its cultivation and cutting weeds along the river bank to limit evaporation. To offset new water usage by the mine, the company also provides desalinated seawater for downstream irrigation use.

Reforestation Activities in Japan

The Group has been promoting reforestation activities, especially at the sites of closed mines. Examples of these efforts during fiscal 2016 are introduced here. We will endeavor to maintain and improve biodiversity by continuing to plant trees, clear underbrush, and conduct other necessary work at each site.

Closed Oe Mine Site (Niki Town, Hokkaido)

Maintenance of this site has been ongoing since fiscal 2008, working with the local Yotei Forestry Cooperative. Building on the success of an initial five-year reforestation plan (to fiscal 2012), activities were continued under a new five-year plan starting in fiscal 2013. In fiscal 2016, maintenance such as weeding was performed to ensure sufficient forest road width, and underbrush was cleared in places that have been reforested up to now (19.30 hectares).

Closed Toyoha Mine Site (Sapporo City, Hokkaido)

With the aim of transforming the tailings dam site at the closed Toyoha Mine into a scenic forest, Japanese white birch growing naturally on this site are being thinned and trees are being planted in the resulting spaces. These efforts have been made in response to requests from local community associations. Activities in fiscal 2016 focused on preserving the scenic appearance, such as cutting trees and weeding.

Closed Kameda Mine Site (Hakodate City, Hokkaido)

Reforestation of this site has continued since fiscal 2007, working with the local Hakodate Wide Area Forestry Cooperative. In the five-year period from fiscal 2007 to 2011, approximately 31,300 saplings were planted in an area spanning some 14.52 hectares. In fiscal 2016, underbrush around the planted saplings was cleared (8.52 hectares) and field mice extermination was carried out (14.52 hectares).

Closed Takatama Mine Site (Koriyama City, Fukushima)

Reforestation of this site and maintenance of previously improved areas have continued since fiscal 2005, working with the local Koriyama City Forestry Cooperative. In fiscal 2016, 2,120 broadleaf chestnut, zelkova, konara oak, and flowering cherry saplings were planted in a 1.06-hectare area where the ground had been prepared in the previous fiscal year for tree planting. Underbrush was cleared in a 7.72-hectare area where trees had been planted earlier, and ground spanning 1.2 hectares was prepared for tree-planting in fiscal 2017.

Management of Closed Mines

From its founding in 1905, the JX Nippon Mining & Metals Group was engaged in mining operations across Japan. By ensuring a steady supply of nonferrous metals and other resources, we contributed to Japan's economic growth. Today, however, nearly all the mining operations have been stopped* due to the depletion of mineral resources. Currently, the Group is working to maintain and restore the natural environment in and around the closed mines. One such effort is the treatment of acid mine drainage (AMD).

* Currently, the Kasuga Mine in Kagoshima Prefecture is the only Group mine in Japan still operating.

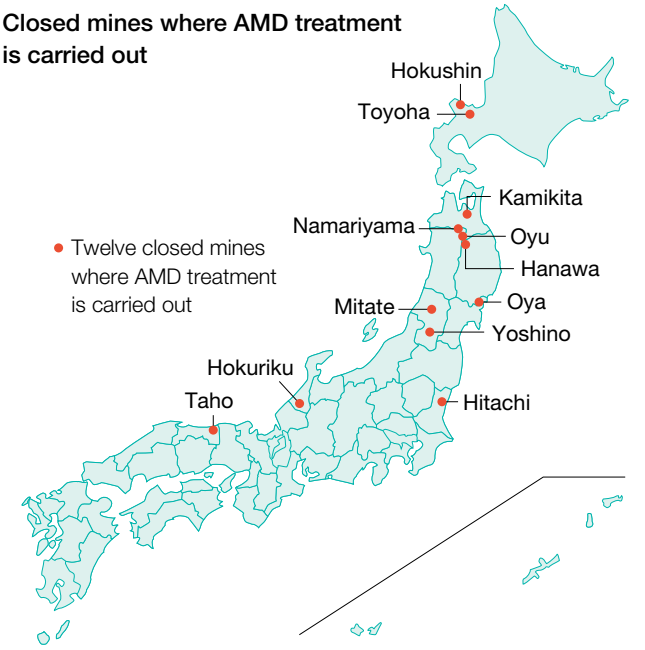
Management Work at Closed Mines

Of the 39 closed mines managed by the Company, AMD treatment is an ongoing obligation at 12 mines pursuant to the Mine Safety Act. JX Nippon Mining Ecomanagement is responsible for the work at these mining sites, including AMD treatment and the management of tailings dams.

The work mainly consists of treating the highly acidic mine drainage generated from the mines and tailings dams, which contain heavy metals, and maintaining and preserving the tailings dams, underground drives, and shafts of the mining sites, making sure harmful water does not flow into the surrounding environment.

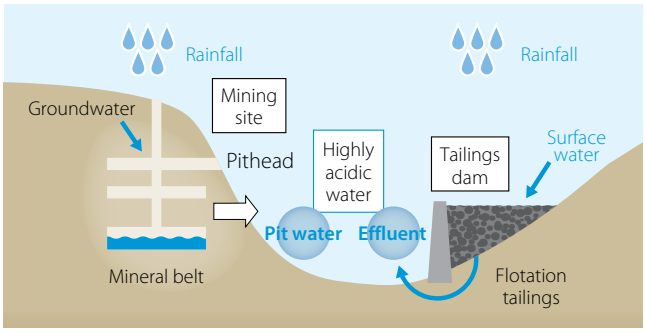
The operation of treatment facilities has to be kept up 365 days a year, since AMD is generated continuously after a mine is closed. This is a result of the chemical reaction of rainwater and other water with ores remaining in the mine and tailings in the dams.

Closed mines where AMD treatment is carried out



How AMD Occurs

AMD from closed mines consists of pit water rising up from inside the mine and effluent discharged from tailings dams or other mine facilities. It occurs as a result of rainwater and other water coming into contact with such materials as ores remaining after the mine is closed, the nearby altered rock, and flotation tailings that have accumulated in the dams. These ores and altered rock contain iron, zinc, manganese, and other metals in the form of sulfide minerals, as a result of bonding with sulfur. These sulfide minerals are oxidized in the presence of oxygen and dissolve in water in the form of metal ions, hydrogen ions, or sulfuric acid ions, causing the drainage water to become highly acidic.



Motoyama AMD treatment facility at Toyoha Mine

Gallery inspection at Hanawa Mine

Management of Closed Mines

Construction Work to Protect Tailings Dams from Earthquakes and Torrential Rain

After the Great East Japan Earthquake, starting in fiscal 2012 we began conducting voluntary risk assessments of all tailings dams under management of the Group relative to a Level 2 earthquake (seismic motion of the maximum intensity conceivable for the particular area both now and in the future). At the same time, we assessed their stability in localized torrential rain of the kind that has become increasingly common in recent years, as well as the possible downstream impact of the outflow of tailings from the dams.

After determining the risks by means of these voluntary inspections, we set priorities for those tailings dams identified as requiring further measures and began the necessary construction work starting in fiscal 2013.

The construction work includes soil stabilization to ensure earthquake resistance and building new drains to obtain sufficient drainage capacity during torrential rain.

Earthquake countermeasures being implemented at Oya Mine, Takasegamori Tailings Dam

Torrential rain countermeasures at Tada Mine, Shiroishi Tailings Dam

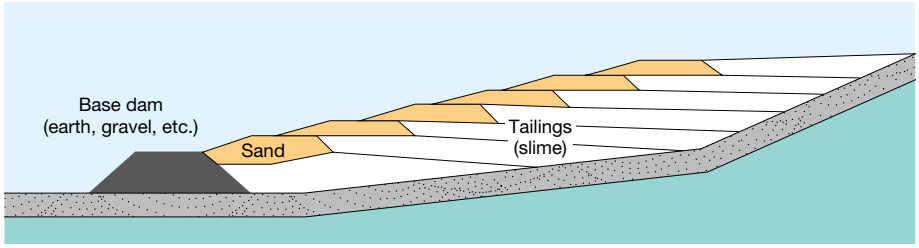
1. Locations of Countermeasures Implemented in Fiscal 2016

Earthquake-related: two locations	Oya Mine, Takasegamori Tailings Dam (upstream method; completed)
	Namariyama Mine, waste rock storage facility (ongoing)
Torrential rain-related: four locations	Tashiro Mine, 1st and 2nd Tailings Dams (downstream method; completed)
	Tada Mine, Shiroishi Tailings Dam (downstream method; ongoing)
	Komori Mine, 2nd Tailings Dam (upstream method; completed)
	Fujigatani Mine, 2nd and 3rd Tailings Dams (upstream and downstream methods; completed)

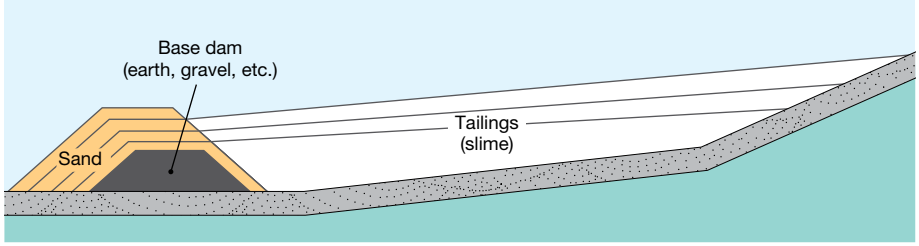
2. Locations of Countermeasures Planned for Fiscal 2017

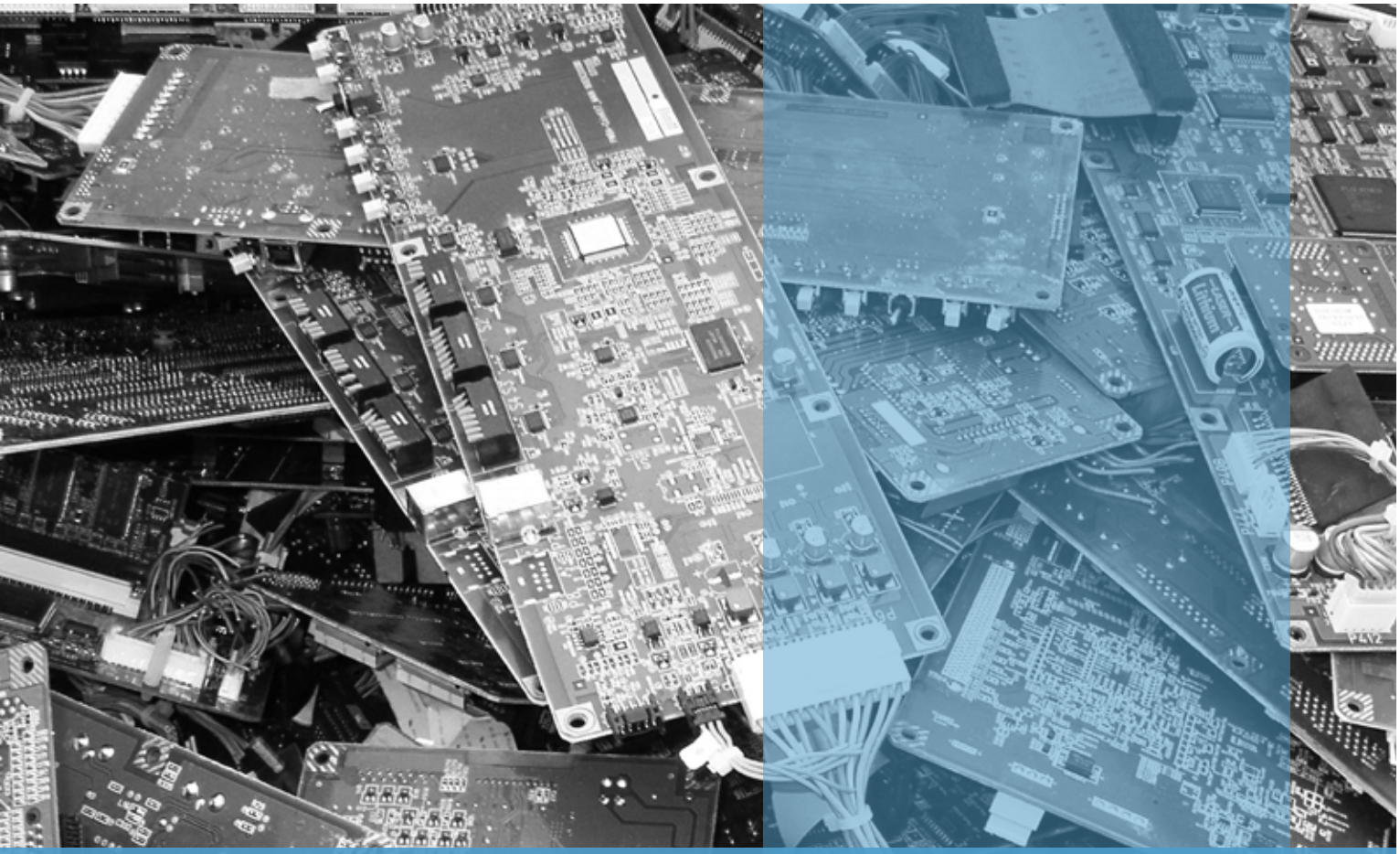
Earthquake-related: two locations	Hanawa Mine, Nakanosawa Tailings Dam (downstream method)
	Namariyama Mine, Oyu 1st and 2nd Tailings Dams (upstream method)
Torrential rain-related: one location	Yoshino Mine, Osagasawa Tailings Dam (upstream method)

Upstream Method (raising embankment height)



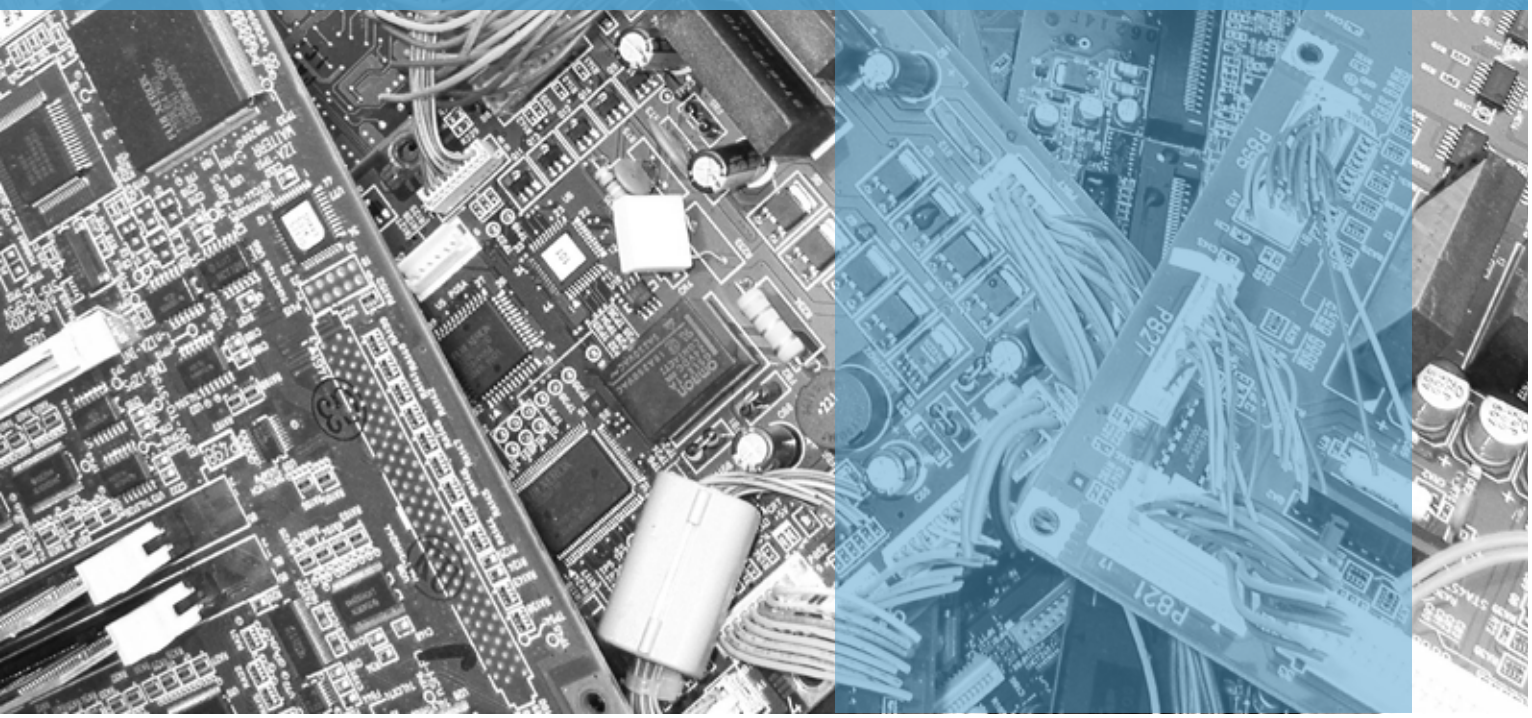
Downstream Method





Using Resources Effectively

Copper, used in electrical wires and electronic materials, and other nonferrous metals are essential resources on which the abundant life enjoyed by modern society depends. As their reserves are finite, however, their effective use is an important issue for preserving the earth's environment and achieving the sustainable development of society. Drawing on the technologies and knowledge in nonferrous metals that JX Nippon Mining & Metals has accumulated over more than a century, we are working on many fronts toward achieving effective use of resources. Efforts to that end include efficient extraction, concentration, and refining in our resources development business and our smelting and refining business; efficient recovery and reuse of resources from end-of-life products discarded by the public in our recycling and environmental services business; and drawing out potential properties in our electronic materials business.



TOPIC 1

Participants in the round-table talk between project professors of the JX Metals Endowed Unit and Company officers (May 18, 2017)

Start of Phase 2 of the Endowed Unit for Non-ferrous Metal Resource Recovery Engineering (JX Metals Endowed Unit)

JX Nippon Mining & Metals in January 2017 launched Phase 2 of the Endowed Unit for Nonferrous Metal Resource Recovery Engineering (JX Metals Endowed Unit), in collaboration with the Institute of Industrial Science of the University of Tokyo. Besides continuing the initiatives of Phase 1, which involve building a platform transcending the boundaries of industry, government, and academia, Phase 2 will emphasize public relations, showing the appeal of the nonferrous metals field to the general public, especially young people of high school age and below. By helping to develop the next generation responsible for this field, we are contributing to sustainable growth of the nonferrous metals industry.

Summary of Activities in Phase 1 (2012 to 2016)

Mines today are increasingly having to be developed at higher elevations and in more remote locations, while the quality of ores is declining. Another problem is rising resource nationalism in various parts of the globe. A major issue for the sustainable development of society is recycling resources while conserving the environment, to establish a resource-recycling society. Yet the number of researchers and engineers in Japan working in fields relating to smelting, refining, and recycling nonferrous metals continues to decrease.

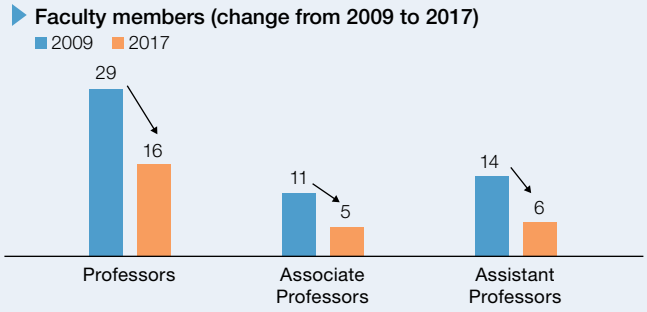
Phase 1 of the JX Metals Endowed Unit was begun as a five-year initiative in January 2012, aimed at unifying the forces of industry, government, and academia toward energizing the industry and raising the level of efforts to respond to this situation. These unified forces have carried out various initiatives from investigations and research on nonferrous metals recycling technologies to development of the human resources in charge of carrying out the work in this field.

Universities Engaged in Research Related to Nonferrous Metal Smelting (Number of Faculties and Departments)

2009
18 schools

→

2017
14 schools



Source: Compiled from data provided by project professor Takashi Nakamura

Institute of Industrial Science, the University of Tokyo

A major focus of activities in Phase 1 was on providing opportunities for learning about nonferrous metals. During the five-year period, symposiums and workshops were held nine times, attended by a total of 1,600 persons from industry, government, and academia. The Endowed Unit can be considered to have grown into one of Japan's leading platforms built through industry-government-academia collaboration in the field of nonferrous metal smelting, refining, and recycling.

The Unit also held facility tours, mainly for students, as part of active efforts to develop young engineers in this field.

Example of Initiatives in 2016

E-scrap Symposium 2016

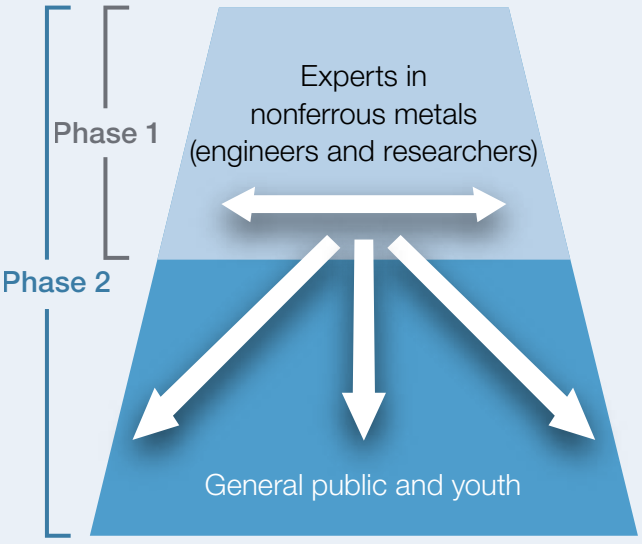
Facilities tour (Nippon Mining Museum)

Start of Phase 2 (2017 to 2021)

A plan announced by the Ministry of Economy, Trade and Industry in 2015 for boosting competitiveness of metal materials called for strengthened cooperation between the arterial (manufacturing) industries and venous (recycling) industries in the nonferrous metals industry, and for industry-government-academia collaboration to actively support human resources development. This is precisely in line with the thinking that leads to establishment of the Endowed Unit.

To go on meeting these demands of society, Phase 2 of the Endowed Unit activities began in January 2017. Phase 2 will continue with the initiatives of Phase 1 while further broadening the scope of activities. We will continue enhancing the industry-government-academia collaboration, lateral alliances, and development of young researchers and students in related fields that we worked on in Phase 1. At the same time, nonferrous metals industry PR will be directed at the broader public, including the youth. By touting the importance and future potential of the nonferrous metals industry to young people, from elementary school to high school students, the Unit will secure the human resources who will lead the next generation and contribute to building a resource-recycling society.

Scope of Phase 2 Activities



Press Event at the Start of Phase 2 (January 6, 2017)

TOPIC 1

Start of Phase 2 of the Endowed Unit for Non-ferrous Metal Resource Recovery Engineering (JX Metals Endowed Unit)

Phase 2 Project Professors

In Phase 2, the three project professors from Phase 1 (Masafumi Maeda, Toru H. Okabe, and Takashi Nakamura) are joined by Professor Chiharu Tokoro of Waseda University, further strengthening the lineup for carrying out the mission.

Masafumi Maeda Project Professor
Professor, The University of Tokyo

Principal research theme
Optimizing metal production processes and developing recycling methods for valuable metals

Toru H. Okabe Project Professor
Director Professor, Integrated Research Center for Sustainable Energy and Materials, Institute of Industrial Science, The University of Tokyo

Principal research theme
Development of efficient recycling technologies for rare metals

Takashi Nakamura Project Professor

Principal research theme
Metal recycling based on the new concept of “artificial deposit”

Chiharu Tokoro Project Professor
Professor, Faculty of Science and Engineering, Waseda University

Principal research theme
Development of separation and concentration technology to utilize waste/refractory ore as “resource”

VOICE Opening Eyes to the Importance of the Nonferrous Metals Industry

Chiharu Tokoro
Professor, Faculty of Science and Engineering, Waseda University

The nonferrous metals industry plays a highly important role by supplying various materials on which high-tech products depend. It is also a field employing the latest technology used by Japan to manufacture high-purity materials. Unfortunately, it is also an industry that lacks the recognition other industries enjoy, because of the few opportunities in daily life to encounter the industry directly. The public may be even less aware that the nonferrous metals industry recycles many different metals from end-of-life products, so that they can be used again as resources.

Now that I have the chance to participate in Phase 2 of the JX Metals Endowed Unit activities, I want to make full use of this opportunity to show a wide range of the public the importance of the nonferrous metals industry in supporting our everyday conveniences. I hope this will lead to many talented young individuals going out into the world to carry on with the work of ensuring a future sustainable society.

Initiatives for Developing the Next Generation of Human Resources

Ahead of the start of Phase 2, activities were carried out from fiscal 2016, with project professor Okabe playing a central role in developing the next generation of human resources. In fiscal 2017, such activities will be stepped up further, including collaboration with universities.

Youngsters’ Science Festival of Tokyo in Koganei

Communication for Energizing Industry-Government-Academia Collaboration

Lively communication has continued during Phase 2 about initiatives and approaches for encouraging industry-government-academia collaboration and developing the next generation of human resources.

Round-table talk between project professors of the JX Metals Endowed Unit and Company officers (May 2017)

TOPIC ❷

Developing Resources by the JX-Iodine Process

Background

Over the years, the grade of copper ores available throughout the world has been declining. Much of the copper ore mined these days is low-grade ore with a copper grade of less than 1%. Low-grade ores for which ordinary flotation processes are not economically feasible have therefore not been exploited as resources. Among such ores, primary copper sulfide ores have been considered particularly difficult to leach out the copper.

We developed the JX-iodine process as an original technology for efficiently leaching and recovering copper from these ores, and are moving closer to commercialization.

The JX-Iodine Process

This is a relatively simple process for oxidative leaching of copper from primary copper sulfide ores. Key features of the process are the addition of iodine as a catalyst and use of iodine recovery equipment along with the solvent extraction and electrowinning (SX/EW) equipment used for conventional heap leaching.* While taking advantage of the technological features, the process complies with various environmental regulations and is designed with due consideration for environmental protection.

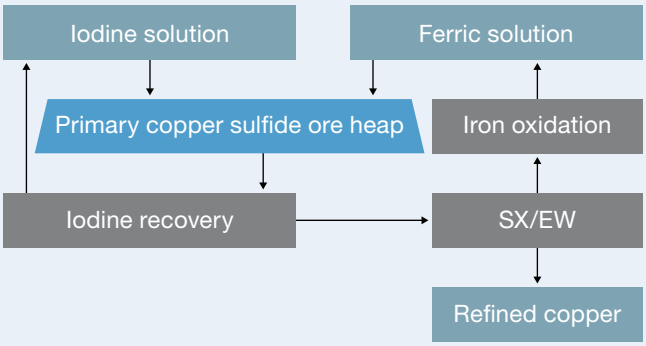
The JX-iodine process is original technology that will contribute to effective use of limited copper resources and their stable and efficient supply, while bringing a technological advantage to the resources development business of JX Nippon Mining and Metals.

* **Heap leaching:** A process of piling up ores that have been crushed in a heap and pouring dilute sulfuric acid on them to leach out the copper.
SX/EW: Solvent extraction and electrowinning. The process of adding a solvent to the copper leachate obtained by soaking in sulfuric acid, selectively extracting the copper ions (solvent extraction), and then producing refined copper from the liquid copper sulfate by electrowinning.

Current Assessment of Feasibility and Future Outlook

For approximately one year starting in 2014, we conducted heap-leaching experiments in Chile using the JX-iodine process, verifying its commercial feasibility and effectiveness in improving copper leaching performance. Currently we are conducting testing to determine the mines and ores to which the technology is applicable. We hope to conduct verification testing at mine sites in the near future.

Recovering Copper by the JX-Iodine Process



Heap-leaching experiments in Chile to verify the JX-iodine process

Refined copper extracted in JX-iodine process heap-leaching experiment

Crude ores containing primary copper sulfide ore used in the experiments

TOPIC ❸

Recycling Business in Taiwan

History of the Zhangbin Recycling Center

JX Nippon Mining & Metals has long worked to advance recycling business in Taiwan. Collection points were readied early on, and efforts were made to improve sampling reliability, obtain stable processing capacity, and build up good relationships with customers. Various recycled materials are assembled at the collection yard of the Zhangbin Recycling Center established in 2009, which is currently run by a staff of 18 persons, including those involved in sales. Equipped with raw material shredding and sampling equipment, it is helping to advance the recycling business.

At the Zhangbin Recycling Center, waste printed circuit boards taken mainly from discarded home appliances, PCs, and mobile phones, etc., as well as materials thrown away by factories, are collected and preprocessed before being sent to the Saganoseki Smelter & Refinery, where valuable metals such as gold, silver, and copper are recovered. In Taiwan, with its fast-growing IT-related markets, the amount of resulting scrap is expected to expand. Another factor behind expectations for stable collection volume is the enactment of laws concerning printed circuit board recycling from discarded electronic devices.

Zhangbin Recycling Center Collection Yard

Future Role

There is currently strong awareness of the need to establish a recycling-oriented society as a matter of urgency. The recycling business is highly significant for society, making a major contribution toward realizing this goal.

By successfully carrying out recycling in Taiwan, JX Nippon Mining & Metals has devoted effort to building a solid business base and establishing a resource-recycling society. In addition to our business operations, we are attempting to carefully explain to customers, governments, and other related organizations our thinking about the importance of establishing a resource-recycling society.

Drawing on the experience accumulated to date to make active approaches to customers, we will expedite the entire recycling business. The Taiwan collection yard is a key part of our Company's quest to build a venous network for resource collection and contribute to resource recycling on a global scale.

Waste printed circuit boards collected for raw materials recycling

VOICE Improvement Activities at the Zhangbin Recycling Center

Shuhei Saito
Zhangbin Recycling Center,
Nikko Metals Taiwan

Since its establishment in 2009, the Zhangbin Recycling Center collection yard has steadily increased its collection volume. As the volume has increased, achieving the necessary high level of crushing capacity has always been an issue. It will soon be two years since I was assigned to Taiwan. During this time, the teamwork with the Taiwan staff and active exchange of views have led to many improvement measures and higher processing capacity. More than anything, this success has been the result of employees working together to tackle the issues in earnest.

Taiwan is in a subtropical zone, where the hot and humid weather similar to Japan's summers lasts through half the year. In this Taiwanese climate, employees at the Zhangbin Recycling Center carry out their work while wearing helmets, dust masks, and other protective clothing, making it a tough working environment. To make this situation just a little more bearable, I introduced dust masks fitted with electric fans along with large spot coolers. These measures were favorably received, with employees saying they eased the burden of the protective clothing, enabled them to work in cooler conditions and raised their concentration. It was highly gratifying to have the measures so well appreciated.

Together with the Taiwan staff, I intend to continue contributing toward realization of the resource-recycling society.

TOPIC ❹

Role of JX Nippon Takasho Co., Ltd. in the Recycling and Environmental Services Business

Company Overview

JX Nippon Takasho became a member of our Group after JX Nippon Mining & Metals acquired all the shares of Takasho Co., Ltd. in August 2015. Takasho was originally established in 1974; at a time when pollution was a major societal problem, the company was a pioneer in the creation of recycling systems, focusing on the reuse and recycling of scrapped materials and industrial waste. Today its main operations are collection, crushing, and separation of circuit board scraps. Its presence in our Group is expected to further expand our network in Japan for collecting scrapped materials and industrial wastes.

Capital	30 million yen
Main business	Collection, crushing, and separation of circuit board scraps and industrial wastes
Head office and operating site	Head office: Nihonbashi, Chuo-ku, Tokyo Shirakawa Plant: Yabuki-cho, Nishishirakawa-gun, Fukushima Shirakawa Plant site area: 20,000 square meters
Net sales	1.8 billion yen (fiscal 2016)
Employees	48 (fiscal 2016)
Representative	President Meiichiro Matsuura

Operations

The main roles of JX Nippon Takasho in our Recycling and Environmental Services Business extend from collection to the treatment processes of separation and crushing. The collected scrapped materials are dismantled, separated, and crushed at the company's Shirakawa Plant. Thereafter the valuable metals are concentrated and supplied as raw materials for Group operations. The company draws on its long experience and store of expertise to propose recycling plans in line with customer wishes. As a one-stop service addressing the waste treatment issues faced by society, it handles consultations on waste materials as well as their collection and management.

- **Recycling of circuit boards**
  Recycling of circuit boards is a core part of the business, by which a variety of valuable metals are recovered. Today, most of waste materials relating to circuit board manufacturing are treated and supplied as secondary raw materials.
- **Waste treatment coordination**
  The company provides one-stop coordination, from consultations on waste materials to their collection and management. It assists with reducing the costs and supporting the efficiency of recycling.
- **Transportation services**
  The company has established an extensive distribution network covering all of Japan, establishing the capability for safe and proper collection and transportation of waste materials.

Examples of Recycled Materials


Printed circuit boards


Edge of CCL (Copper Clad Laminate)


Scrapped CCL

VOICE

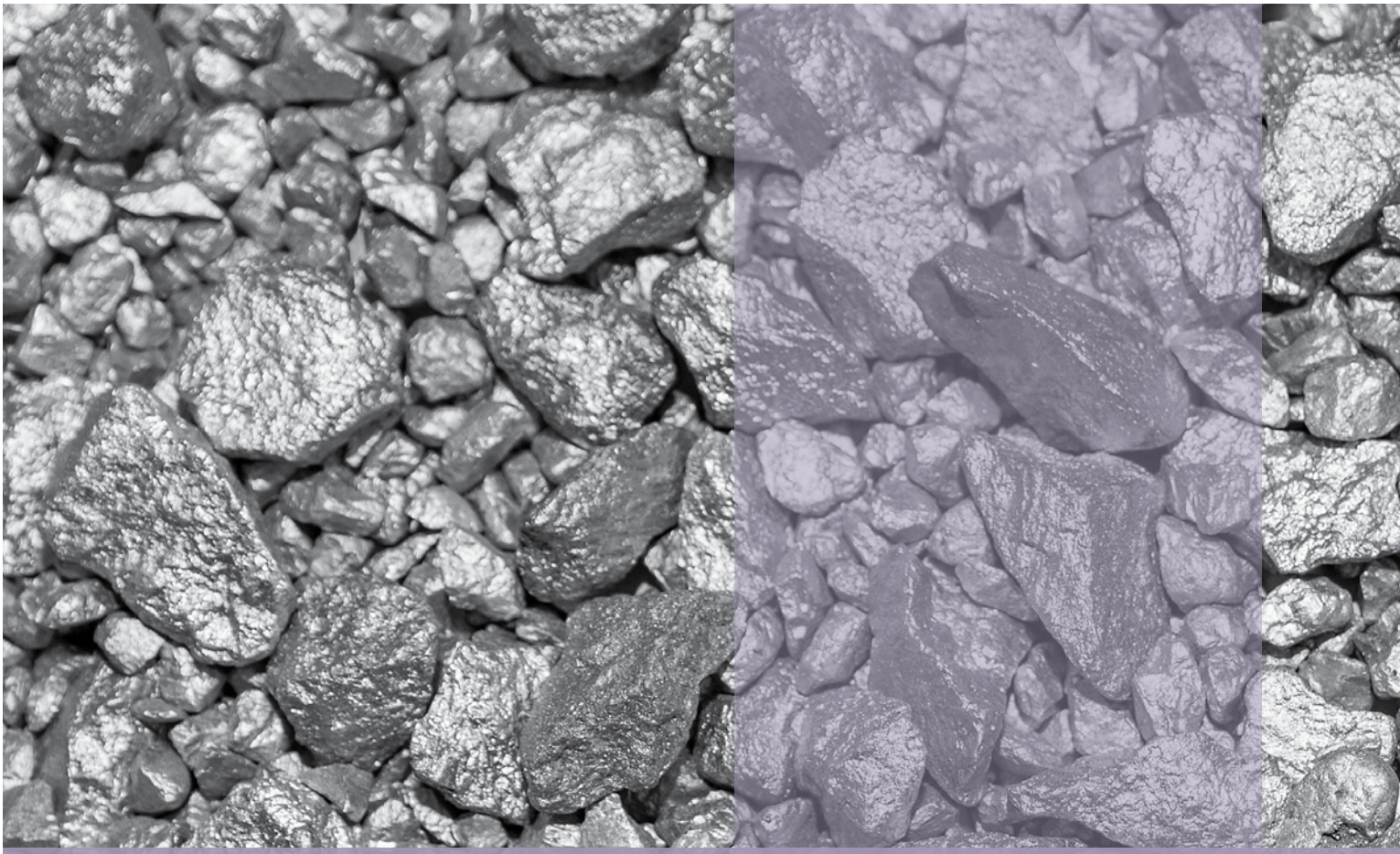
Further Advancing the Recycling Business

Hiroshi Ito
General Manager,
Sales Group
JX Nippon Takasho Co., Ltd.

JX Nippon Takasho was established in an age of mass production, mass consumption, and mass disposal. The disposal of waste consisted of landfills or dumping in the ocean, which led to the spread of pollution and became a major problem for society. Scrapped circuit boards being difficult to process, they were mostly disposed of in landfills, a practice with a large environmental impact. Although much time and effort were needed to develop an understanding of environmental protection and effective use of resources, we wished to recover nonferrous metals despite the difficulty. Today, however, it is the norm that such scrapped circuit boards are recycled for use as smelting raw materials.

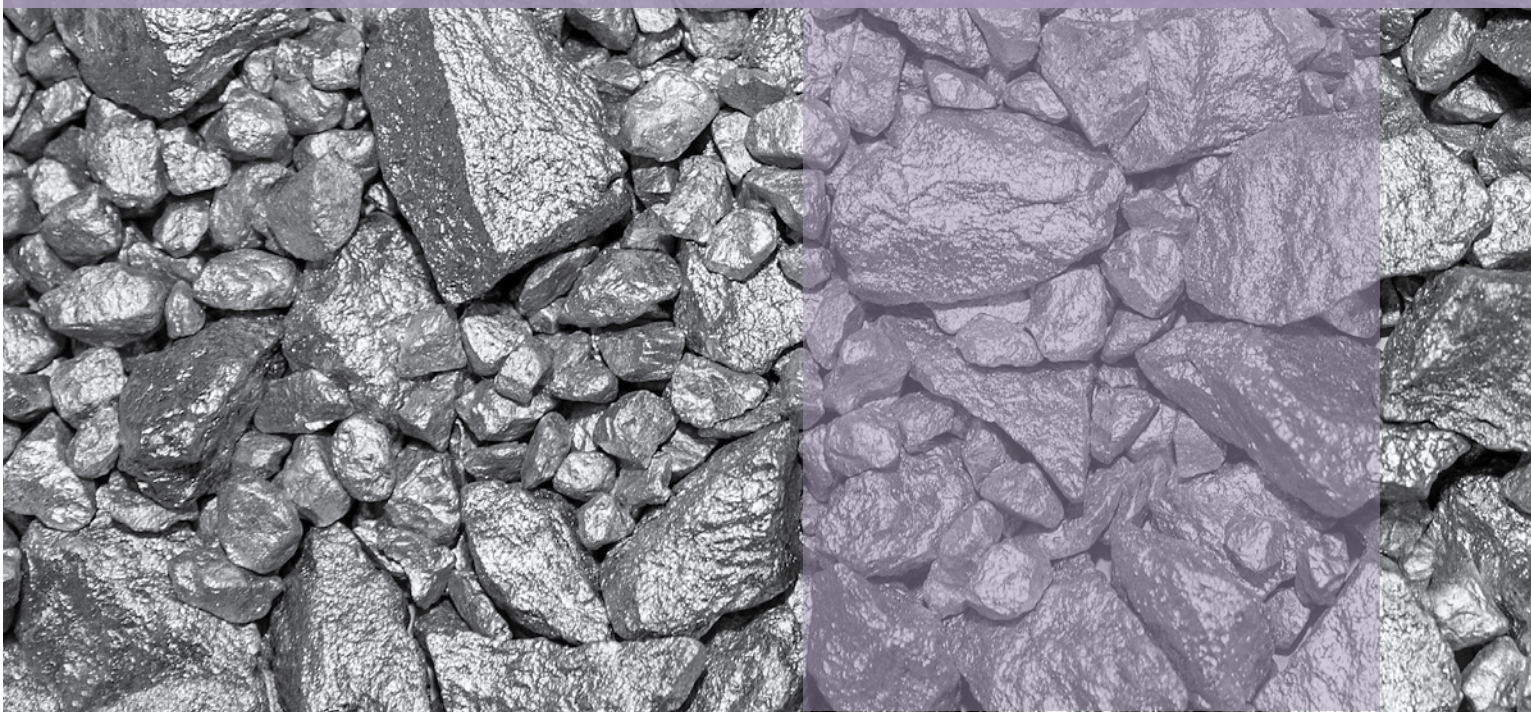
We are currently engaged both in making effective use of various waste materials and in reducing the volume of waste itself. Our goal is to respond to customer needs with countermeasures for environmental issues in mind, as we recycle resources safely and properly, while protecting the global environment.

We carry out our daily activities in the proud belief that our company's operations themselves are contributing to society.



Insisting on Full Compliance

The JX Nippon Mining & Metals Group recognizes that earning the trust of stakeholders is essential to carrying out its business, and it therefore endeavors to enhance the integrity and transparency of its management through corporate governance. To make sure those efforts are effective, we have established and implement an appropriate internal control system, carry out periodic checks, and take a proactive approach to compliance, risk management, and other internal control activities.



TOPIC ❶

Enhancing Management of Confidential Information

JX Nippon Mining & Metals is seeking to further enhance the management of confidential information as a measure to control material risk for the Company. Information leakage in corporations has become a recurring problem in recent years. Once information has leaked, the damage cannot be undone. As such incidents can cause a company enormous damage, information management is increasingly important. Given this growing importance, progress is also being made in preparing the legal framework enabling more practical measures to be taken.

In response to this changing environment, the Company moved to enhance the management structure for highly material information (confidential information), forming a working group consisting of sales and marketing, technology, and corporate departments for a cross-organizational approach. Among other initiatives, the working group revised the rules for confidential information management, based on the situation at the time as determined by questionnaire surveys, and on examples from other companies. Under the new rules, each organization is to establish a structure tailored to the materiality of its information. To instill awareness, education was carried out by various means including e-learning, risk management training, and issuing a Q&A list.

Risk Management Training

Head Office

Kurami Works

Isohara Works

VOICE Raising Awareness of Proper Information Management

Taeko Kato
Risk Management Department

The Company provided training regarding confidential information at five operating sites in Japan and the Head Office, for a total of 290 persons. Since the content and materiality of the information handled in each department and unit differ widely, the training was aimed at creating a management structure suited to the realities of each organization. To this end, it sought to create a strong awareness of the link between each organization's operations and the information handled.

The focus of confidential information management is on achieving clear recognition of material information to be treated as confidential, and on managing it effectively. For the sake of proper information management, we intend to continue with efforts to raise the awareness of employees.

Compliance Initiatives

The JX Nippon Mining & Metals Group insists that officers and employees comply fully with laws, regulations, and other rules.
We are building an organizational structure for compliance, aimed at ensuring corporate activities are conducted fairly, and at increasing public trust in the Group. To those ends, we are implementing a multilayered system of checks, providing relevant rules and regulations, and enhancing education to raise awareness, among other initiatives.

In fiscal 2016 as in previous years, there were no adverse dispositions from regulatory authorities (license revocation, orders for improvement, fines, etc.) for violations of laws and regulations, including those governing bribery and anti-competitive behavior.

Performance regarding Key Compliance Goals in Fiscal 2016

1. Provision of compliance rules and ensuring full compliance

(1) Checking and improving the implementation of compliance rules

We determined the extent to which compliance rules were being implemented at each Group company, and took steps to rectify organizational or operational issues that were identified.

(2) Taking steps to eliminate association with antisocial forces and implementing anti-bribery measures

The Code of Conduct of the JX Nippon Mining & Metals Group calls for "Compliance with laws and regulations and engagement in fair trade." In line with this requirement, we take measures to ensure not only that laws, regulations, and rules are observed but also that social norms are followed in conducting fair, transparent transactions, both in Japan and overseas. Strong measures for eliminating association with "antisocial forces" (the term used to refer to organized crime groups in Japan) were taken in 2010, and measures for preventing bribery were taken in 2014. In the second half of fiscal 2016, audits were conducted to confirm the extent to which the measures were in place and being followed at the Company and at Group companies. We also revised the related rules applying to association with antisocial forces.

(3) Program for ensuring compliance with laws for prevention of unfair competition

Given the growing trend in countries around the world to make competition laws more rigorous, the JX Nippon Mining & Metals Group established a program to ensure compliance with such laws and initiated it in July 2015. The program specifies checks that must be made prior to attending gatherings of competing firms or engaging in transactions that may violate competition laws, and mandates regular reporting by managers to the office in charge. Audits of the program's implementation status during fiscal 2016 verified that it is generally being carried out properly.

2. Effective response to matters identified in inspections of environment and safety-related compliance and labor compliance

In fiscal 2016, we conducted inspections of environment and safety-related compliance at nine of the Group's operating sites to confirm their compliance with laws and regulations relating to the environment and safety. Overall, laws and regulations on the environment and on occupational safety and health were well understood at these sites, and the inspections did not find any major deficiencies in comprehension. Appropriate measures were taken to address matters identified in the inspections.

Also in fiscal 2016, the Group conducted inspections at eight operating sites to check legal compliance regarding human resources and labor, and verified that the relevant laws and regulations were being implemented appropriately for the most part.

3. Enhancing compliance knowledge and awareness among officers and employees

The Group seeks to educate officers and employees fully to increase their knowledge and awareness of compliance, so that they will act properly from a compliance standpoint in each of their work processes. In fiscal 2016, a total of 42 compliance education sessions were provided to approximately 950 persons. They included level-specific sessions targeting improvements in knowledge and awareness relating to particular work duties, and sessions on laws and legal affairs aimed at drawing attention to specific legal requirements. Questionnaires administered following the sessions showed that most of the attendees found the education useful.

(1) Level-specific compliance education

Compliance education was given for officers of the Company, management-level employees, and newly appointed managers, with content geared to their respective roles and responsibilities. A total of 26 sessions were provided for approximately 550 persons.

(2) Education on laws and legal affairs

At Group operating sites, 16 sessions were given for approximately 400 persons. Topics covered included the law preventing late payments to subcontractors, security trade control, the Stamp Tax Act, and the Waste Management Act.

4. Implementation of compliance inspections and effective response to matters identified

Besides addressing matters identified in the compliance inspections conducted in fiscal 2015, we carried out inspections in fiscal 2016 aimed at determining the status of legal compliance in each department, operating site, and affiliated company. These included investigations, questionnaires, interviews, self-statements, environment and safety audits, reports of close calls, and the above-noted inspections of environment and safety-related compliance and labor compliance.

Compliance Committee

Measures related to compliance in the Group, including basic policy, priority issues for the fiscal year, and education, are determined at meetings of the Compliance Committee (held twice a year as a rule). The committee consists mainly of the officers in charge of compliance at each department of the Company and at major Group companies in Japan and overseas. It receives reports on the status of compliance from each department of the Company and from Group companies. Based on these reports, the committee evaluates the risk of fraudulent acts, legal violations, and other misconduct related to business operations, and reflects its conclusions primarily in setting priority issues and formulating educational plans.

Compliance Committee meeting

Corporate Governance System

Board of Directors

The Company has established the Board of Directors to discuss matters stipulated in laws, regulations, and the Articles of Incorporation, as well as other important management issues. The Board is composed of the president and eight other directors (all male).* Auditors also attend Board of Directors meetings and can offer their opinions.

* All nine directors are internal directors and serve concurrently as executive officers.

Executive Meeting

The Company has established an Executive Meeting as an advisory body to the president. The Executive Meeting consults on matters important for the management of the Company. The status of execution of operations and other issues are also reported and communicated to it. The Executive Meeting consists of the president and executive officers designated by the president. Full-time auditors also attend Executive Meetings and can offer their opinions.

Auditors

Auditors attend Board of Directors meetings, Executive Meetings, and other important meetings, offering their views as necessary for raising the effectiveness of audits. They also review important documents and meet with officers and employees of JX Nippon Mining & Metals and each Group company, endeavoring to keep aware of the execution of duties by officers and employees.

In addition, auditors receive regular reports from the Internal Audit Department and independent auditors regarding auditing plans and their implementation status and results, while coordinating with these parties by exchanging views and information.

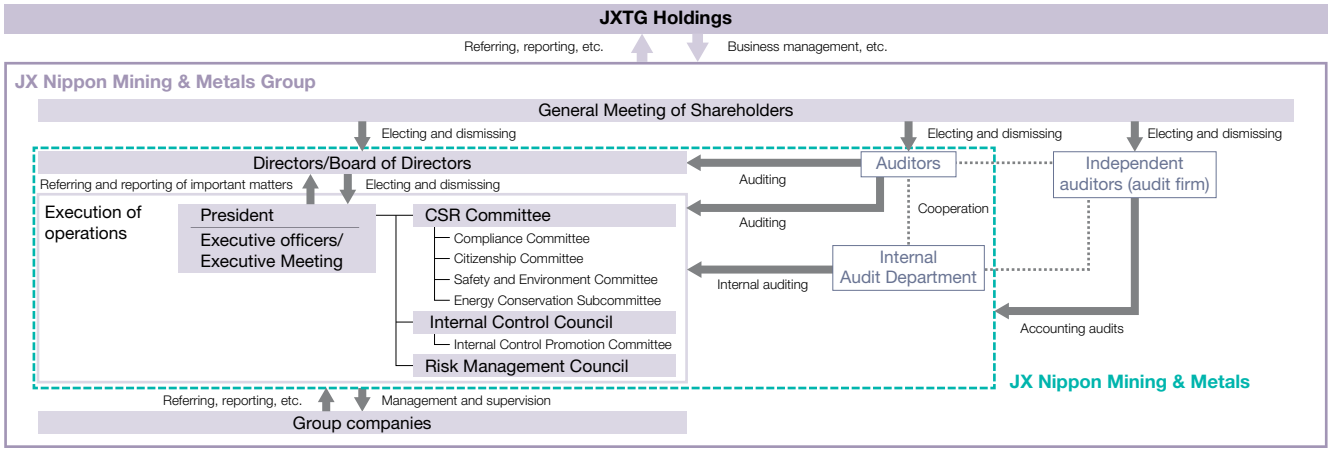
Compensation for Directors

The directors of JX Nippon Mining & Metals receive a monthly fixed compensation based on their role, and variable performance-based bonus payments. Bonus amounts are based on the consolidated business results of JX Nippon Mining & Metals as well as JXTG Holdings. We have neither a retirement benefit program nor a stock option program. In July 2017, a stock remuneration plan was introduced.

Management of Group Companies

Each Group company is placed under the jurisdiction of the appropriate operating or corporate department of the Company based on its business line, and the execution of its operations is managed and supervised by that department. Important matters pertaining to the management of individual Group companies are communicated to the Company via the supervising department, and these matters are referred and reported to Board of Directors meetings, the Executive Meetings, and other important meetings as necessary.

Corporate Governance Structure of the JX Nippon Mining & Metals Group



Internal Control System

The JX Nippon Mining & Metals Group has drawn up a basic policy for the establishment and operation of an internal control system, laying out rules on such matters as corporate governance, compliance, internal auditing, and risk management. Based on this policy, we have established an internal control system that ensures operations are carried out efficiently and properly.

Internal Control Council

To develop and operate the Group's internal control system, we set up the Internal Control Council as an advisory body to the president, with the role of monitoring the status of internal controls and holding discussions to address issues as necessary.

As a rule, the council meets once a year.

Internal Control Promotion Committee

The Internal Control Promotion Committee was set up for advising and assisting with the duties of the Internal Control Council. The committee's responsibilities include monitoring internal control activities.

As a rule, the committee meets twice each fiscal year, once in the first half and once in the second half of the year.

Whistleblower Program

To increase the reliability of the whistleblower program in the Group, we asked an external organization to take over responsibility for accepting reports under the program and adopted a policy of accepting anonymous reports.

We have also taken a range of measures to spread awareness of the program throughout the Group, such as displaying posters to publicize the program at operating sites, handing out pocket editions of the Group Philosophy to all employees, creating a section on the Company intranet dedicated to the program, and including the program in compliance education sessions.

In fiscal 2016, multiple reports were confirmed. Necessary measures were carried out for all incidents in accordance with relevant rules and regulations, while taking due care to protect the whistleblowers.

Information Management

1. Protection of personal information

The Group strives to properly handle personal information by setting forth Personal Information Protection Rules and taking other necessary measures based on the situation at each Group company.

2. Management of confidential information

We have drawn up the JX Nippon Mining & Metals Group Basic Policy of Confidential Information Management and taken other measures to manage information properly, geared to the situation at each Group company and the materiality of the information it handles.

3. Information security

We have drawn up the JX Nippon Mining & Metals Group Information Security Regulations and accompanying Information Security Guidelines, and we implement security measures governing the use of computers, networks, and USB memory devices in the Company.

Internal Auditing

Internal auditing is carried out across the entire JX Nippon Mining & Metals Group to investigate, study, and assess the status of business administration, operations, and assets preservation from the standpoints of their legality, efficiency, and effectiveness. The Internal Audit Department is responsible for these functions.

The Internal Audit Department draws up a medium-term policy at about three-year intervals and drafts auditing plans for each fiscal year, carrying out internal auditing systematically. Internal auditing of Group companies is conducted with the collaboration and cooperation of auditors sent from the Company to Group companies. Based on the results of the audits, improvements are recommended as needed, and implementation of the recommended measures is tracked. Auditing results and findings are reported to the relevant Group company and to the president of JX Nippon Mining & Metals, as well as being reported as necessary to the Executive Meeting.

Risk Management

The JX Nippon Mining & Metals Group has established and is operating a system that helps further enhance risk management from a Group-wide perspective.

Risk Management Council

The Company has established a Risk Management Council as an advisory body to the president. Besides the comprehensive identification of risks for the Group, the council selects important risks and deliberates ways of responding to them. Given the diverse risks that exist in our business, we have engaged Attorney Hideaki Kubori as an advisor to the council to help energize the discussions. Mr. Kubori is the founding partner of Hibiya Park Law Offices and one of the leading authorities on corporate governance in Japan.

In fiscal 2016, the Risk Management Council met each quarter for a total of four meetings.

Meetings of the Risk Management Council

Activities in Fiscal 2016

We carried out the following activities to improve the Group's risk management during fiscal 2016.

1. Addressing important risks

We selected and addressed important risks based on risk surveys conducted in fiscal 2015. To address these risks, we formed working groups for respective important risks.

The working groups investigated the current situation, studied rules for operation, formulated measures, and reported to the Risk Management Council. At the same time, the necessary rules and regulations were drawn up, and training programs were provided.

2. Selecting important risks (risk surveys)

Potential risks in the Group were identified using questionnaires, and the results were used to select important risks to be addressed in fiscal 2017.

3. Raising risk awareness

In support of our efforts to establish and implement a risk management system, we conducted training to enhance risk sensitivity of the Group's officers and employees. Top management training was provided for officers, and risk management training was carried out for manager-level employees. The manager-class training was held eight times, at the Head Office, Hitachi Works, Isohara Works, Kurami Works, Saganoseki Smelter & Refinery, and Hibi Smelter. The training was intended to raise risk awareness through lectures on the necessity of risk management and related topics, as well as by group discussions on specific examples.

Risk management training

Commitment to Local Communities

Since the inception of the business at the Hitachi Mine, the JX Nippon Mining & Metals Group has emphasized the spirit of maintaining good relations with local communities in performing its business operations. Keeping alive that spirit today, Group companies actively carry out social contribution activities in accordance with the Code of Conduct, seeking coexistence and coprosperity with society as good corporate citizens. Through corporate citizenship activities and interchanges rooted in the local community at each of our operating sites in Japan and overseas, we endeavor to forge relationships of trust with the societies in which we conduct our business.

Saganoseki Smelter & Refinery of Pan Pacific Copper Marks 100 Years of Operation

The Saganoseki Smelter & Refinery of Pan Pacific Copper has continued in operation since September 1916 as a key operating site in the copper smelting and refining business of the JX Nippon Mining & Metals Group. Among the reasons Saganoseki was chosen as the site for a smelting and refining plant are the convenience of receiving ores by ship, the abundance of nearby energy sources, and the location on the tip of a promontory for minimal land impact from exhaust smoke.

When the plant went into operation in this well-situated natural environment, initially there was one smelting furnace with annual production capacity of 8,400 tons. The introduction of a flash smelting furnace in 1970 and a series of other measures to improve the efficiency of production systems steadily built the plant into one of the most cost-competitive smelting and refining facilities in the world, with an annual copper production capacity of 450,000 tons. Its giant stack has become a symbol of the local community.

Having grown in this way together with the surrounding community, the plant marked 100 years of operation in September 2016, celebrating the milestone with various commemorative events. These included a ritual to announce this achievement to the deity at the local Sanjinsha shrine, accompanied by a commemorative tree planting. In addition, a ceremony was held in Oita City, attended by some 130 persons including the mayor, the governor of Oita Prefecture, and other government and local representatives. JX Nippon Mining & Metals President Oi addressed those in attendance, thanking the community for their understanding and support of the plant and for their cooperation.

Another aspect of the centennial commemoration was a set of events for local elementary and junior high school students (an essay and painting contest, tours of the plant and other facilities) in support of the next generation in the community. Copper plates were also distributed to public offices and other sites in Saganoseki as symbols of regional revitalization.

First giant stack under construction (ca. 1916)

First giant stack (right) and second giant stack (left) (ca. 1973)

Second giant stack under construction (ca. 1972)

Purification ritual at commemorative tree planting

The Saganoseki Smelter & Refinery today

Blister copper casting

Electrorefining

Awards ceremony for essay and painting contest

Social Contribution Activities outside Japan

Introduced here are initiatives by Minera Lumina Copper Chile (MLCC), operator of the Caserones Copper Mine in the Republic of Chile, on behalf of the communities in the mine region.

Help with Community Center Refurbishment

Refurbishment of the local community center in the Hornitos district was completed in December 2016. This old building, which had been in disrepair for many years, received a new lease on life, as the flooring was replaced and new kitchen facilities were installed, enhancing its role as a gathering place for local residents. MLCC provided financial assistance together with the local government. Additionally, the company actively assists with refurbishment of other public facilities, such as the local pool.

Refurbished community center

Local residents who use the facility

Assistance with Introduction of New Reservoir System

In 2015, record rainfall and flooding brought heavy damage to the districts of the Atacama Region. To prepare for any recurrence of such an emergency, MLCC joined with government agencies to contribute funds for use in countermeasures. As one example of how the funds were used, in June 2016, a new system was installed enabling remote wireless monitoring and automatic control of water levels in the Lautaro Reservoir, which connects to the Copiapó River.

The Lautaro Reservoir for which the new system was introduced

Hosting of Movie Shows for Local Children

In December 2016, MLCC put on movie shows as a Christmas present to around 500 children living in the districts that link the Caserones Copper Mine with the city of Tierra Amarilla. The movies were shown in four different schools taken over for the occasion, one in each district. The children received candies in addition to watching the film show. Children with few opportunities to go to a movie theater welcome this event, which has been held since 2010 and is also enjoyed by parents and teachers.

Children watching a movie

Assistance to Areas Affected by Major Disaster

In January 2017, assistance was provided to San Nicolás and other parts of the Bío Bío Region of central Chile that suffered from a wide-ranging wildfire outbreak. MLCC supported the efforts of volunteers from the Los Loros fire brigade in distributing a total of 40,000 tons of relief supplies, including 1,000 bottles of drinking water, around 1,700 emergency meals, and daily needs sets for 200 persons. The company also provided relief goods to other municipalities.

Supplying drinking water

Assembled relief goods

Commitment to Local Communities

Social Contribution Activities in Local Communities

Each of the JX Nippon Mining & Metals Group companies and plants actively participates in social contribution activities in their respective communities.

Cleanup Campaigns

JX Nippon Tsuruga Recycle

Award for Taking Active Part in Operation Cleanup Fukui

With its Operation Cleanup Fukui, Fukui Prefecture encourages activities that protect the rich and beautiful natural environment of the prefecture. In April 2016, it gave first prize in the corporate group (cleanup campaign) division to JX Nippon Tsuruga Recycle for its participation in the activities during fiscal 2015. The company actively engages in local cleanup efforts, not only around the plant but in the Mikata Goko lakes cleanup campaign and in waterway management at the Nakaikemi Wetlands.

Participation in Kehi no Matsubara Cleanup Campaign

In June 2016, local residents conducted a cleanup campaign at the Kehi no Matsubara beach, a nationally designated place of scenic beauty. Among those taking part in the activities were 23 people from the company, including employees and family members. They picked up plants and trash that had drifted to the beach, and collected fallen pine leaves and other debris. In November, eight persons took part in raking Matsubara pine leaves.

Kehi no Matsubara Cleanup Campaign

Isohara Works

Organizing and Participating in Improving the Environment around the Plant

When the city of Kitaibaraki held its Otsu Fishing Port cleanup campaign in May 2016, about 130 employees and family members from the Isohara Works and affiliates took part, picking up cigarette butts, cardboard boxes, plastic bottles, and many other kinds of trash.

Trash picked up in Otsu Fishing Port cleanup campaign

The Isohara Works also organizes its own after-hours cleanup sessions around the plant as part of its regular activities to improve the appearance of the local environment. A total of 280 persons from each of the departments participated during fiscal 2016, conducting cleanup activities along nearby sidewalks and around the Kitaibaraki civic baseball field, among other places.

JX Nippon Tomakomai Chemical

Organizing Cleanup Activities in the Community

The company conducts cleanup activities around the plant four times a year, in which a total of 55 persons took part in fiscal 2016. This initiative is officially listed among the volunteer activities of Tomakomai City, and is one in which employees are highly motivated to participate. The efforts have made an impact in reducing the amount of trash along nearby roads.

The result of a community cleanup

Educational Activities and Plant Tours

Hitachi Works and JX Nippon Environmental Services

Certificate of Appreciation Given at Lecture Event Commemorating 10 Years of Support for Hitachi City Environmental Education

A lecture event was held in October 2016 to commemorate the JX Nippon Mining & Metals Group's support for environmental education activities in Hitachi City. It was attended by 500 persons from the educational field and the general public. The event marked 10 years since such support began in fiscal 2006 with a 100 million yen donation by the former Nippon Mining Holdings. At the conclusion of the event, the mayor of Hitachi City presented a certificate of appreciation to the general manager of the Hitachi Works for its contributions to promotion of environmental education.

Exhibit at Eco Festival Hitachi 2016

In July 2016, JX Nippon Mining & Metals and JX Nippon Environmental Services jointly exhibited in Eco Festival Hitachi 2016 held by Hitachi City. Panels displayed in the booth introduced our recycling and environmental services business, including detoxification of waste asbestos, and afforestation at the Hitachi Mine.

JX Nippon Exploration and Development

Cooperation with Outside Institution for Learning and Training

In July 2016, the company cooperated in offering the Fiscal 2016 Training Course on Mining Development sponsored by the International Institute for Mining Technology. Held for the ninth time, this course seeks to foster and improve capabilities for comprehensively promoting mineral resources development. Undergoing the training this time were 21 young employees of nonferrous metals companies and trading companies. The company was responsible for teaching about the role of boring in metal resource exploration. The classroom session was followed up by a visit to the company's Odate site to see actual boring equipment.

Students from Akita University learning about various tools

Kurami Works

Plant Tour for Elementary School Children

In November 2016, the Kurami Works provided a plant tour for children from the Asahi Elementary School in the local town of Samukawa, as part of their social studies and general learning program. After watching rolling mills, annealing furnaces, and other facilities in operation, they took part in a Q&A session, enabling them to find out about the business of the JX Nippon Mining & Metals Group and the Kurami Works.

Children listening to an explanation of rolling mill operation

Events

Hitachi Works, Kurami Works, and the Saganoseki Smelter & Refinery of Pan Pacific Copper

Summer Festivals

Every year, JX Nippon Mining & Metals and Pan Pacific Copper plan and put on summer festivals for the enjoyment of the local communities around our major domestic operating sites.

Summer festival put on by Saganoseki Smelter & Refinery, Pan Pacific Copper (August)

Kurami Works Hazukisai festival (August)

The festivities are enlivened by refreshment stands run by employees, lotteries, and local children playing instruments and dancing. Some of the festivals include traditional arts and fireworks shows. For the local residents, these events have become a much-anticipated summer tradition.

Hitachi Works Sanjinsai festival (July)

JX Nippon Tsuruga Recycle

Firefly Watching Event

Firefly watching is an annual event the company has been offering for more than a decade. In June 2016, with the cosponsorship of Fukui Prefecture, the event drew 113 nearby residents and others. Prior to the actual firefly viewing, attendees enjoyed a picture-story show, explanation of the habitat distribution of fireflies in the Tsuruga area, and a craft workshop. At the viewing, large numbers of fireflies could be seen, enabling local children to experience the wonder of the natural environment.

Craft workshop

Introducing the habitat distribution of fireflies

Sports Promotion

Hibi Smelter of Pan Pacific Copper

Baseball Classes at Kindergartens and Nursery Schools

Starting in fiscal 2015, the Hibi Smelter's baseball team has been holding baseball classes at local kindergartens and nursery schools as one of its volunteer activities. In fiscal 2016, having received requests from six schools, the team gave baseball lessons to the children in February and March. The participating children enjoyed ball throwing practice and intramural games.

Intramural game at a baseball class

Toho Titanium

Football Clinics

The company's football team provided football clinics twice during the fiscal year for local boys' teams and elementary school children. While teaching football skills through practice and games, the clinics were also a chance to build ties with local children. This was a new activity begun in fiscal 2016, but will be continued in coming years as well.

Children working on their dribbling skills

Donations to Local Communities

The Group donates to local communities for many different causes, including reforestation around closed mines, academic assistance to universities and other research institutions, and funding for events put on by local organizations. The total donations of the Group in fiscal 2016 were approximately ¥0.27 billion* (¥0.08 billion in Japan and ¥0.19 billion outside of Japan).

* The amount of donations by overseas Group companies is converted to yen using the average exchange rates during fiscal 2016.

Commitment to Customers

Quality Management Report

The JX Nippon Mining & Metals Group is dedicated to being the best partner to its customers. Accordingly, we work to supply high-quality, safe products and to meet the precise quality improvement needs of customers, thereby building relationships of trust with them.

Promoting Quality Management Systems

Customer demands for quality continue each year to become more advanced and diverse. To address these demands quickly and efficiently, the Group has instituted the Basic Quality Policy and Quality Management Rules.

JX Nippon Mining & Metals Basic Quality Policy

The JX Nippon Mining & Metals Group hereby sets forth, and acts in observance of, this Basic Quality Policy in order to contribute to the development of a sustainable society while recognizing that its social mission is to stably supply nonferrous metals and materials.

1. Correctly grasp the requirements of customers and society in order to offer products and services that customers can trust and that satisfy their needs.
2. Improve and maintain quality at all processes from development, design, and production to delivery, while paying due attention to safety and environmental conservation.
3. Establish a quality management system, carry out continual improvements, and develop human resources.
4. Comply with all pertinent laws and regulations of Japan and other countries, and provide customers and society with accurate information on quality.

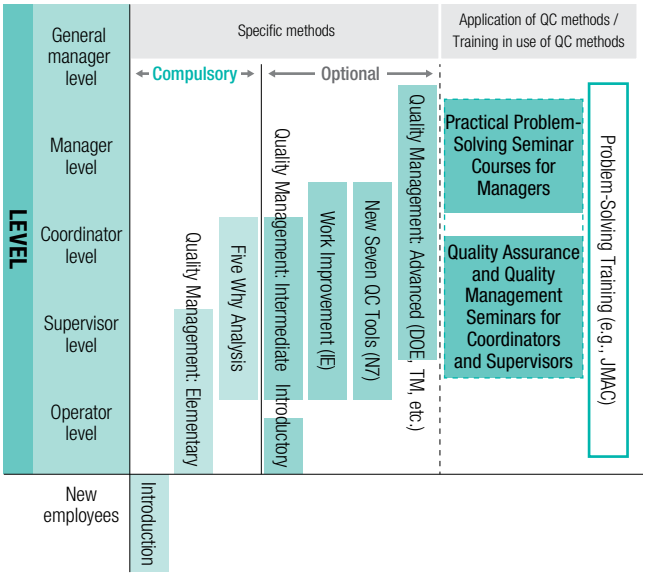
Quality Management Education

A quality management education system has been developed with the following three objectives:

- To standardize and raise quality management levels across the Group;
- To improve problem-solving capability, enabling employees to logically deduce the causes of problems and take the lead in solving them; and
- To pass along and inculcate quality management techniques.

To achieve these objectives, we have made it compulsory for all employees to take the Elementary and “Five Why Analysis” quality management courses.

Quality Management Education System



Sharing of Quality-Related Information across Operating Sites

Quality assurance managers’ meetings are organized by the general manager of the Technology Development Group twice a year for Group companies and operating sites directly run by JX Nippon Mining & Metals. At these meetings, quality assurance managers report on the quality loss and complaints status and introduce quality improvement efforts being made at their sites, enabling this information to be shared throughout the Group. In fiscal 2016, the 14th such meeting was held in June and the 15th meeting was held in December.

Quality Assurance Systems at Operating Sites

The Group does not limit quality improvement efforts to products and services but broadens the concept to include operations and administration. Based on quality management systems such as those defined in ISO 9001 and on various quality improvement programs such as total productive maintenance, quality assurance systems are established as appropriate to the characteristics of operations at each site. These systems are made up of personnel responsible for sales, manufacturing, production management, technology, and product development. Applying the plan-do-check-act cycle, each operating site is pursuing goals for reducing the percentage of defective products, lowering the number of quality-related complaints, and other matters.

Many domestic and overseas operating sites have obtained ISO 9001 certification, the international standard for quality management systems.

Operating Sites That Have Obtained ISO 9001 Certification

Domestic	Hitachi Works (Copper Foil Dept.); Isohara Works; Kurami Works; JX Nippon Exploration and Development Co., Ltd.; Pan Pacific Copper Co., Ltd. (Hibi Smelter, Saganoseki Smelter & Refinery, Hitachi Refinery); Hibi Kyodo Smelting Co., Ltd.; Japan Copper Casting Co., Ltd.; JX Nippon Coil Center Co., Ltd.; JX Metals Trading Co., Ltd. (Takatsuki Plant); Ichinoseki Foil Manufacturing Co., Ltd.; JX Metals Precision Technology Co., Ltd. (Tatebayashi Works, Esashi Works, Nasu Works, Kakegawa Works); and Toho Titanium Co., Ltd. (Headquarters/Chigasaki Plant, Hitachi Plant, Yahata Plant, Wakamatsu Plant, Kurobe Plant)
Overseas	Nippon Mining & Metals (Suzhou) Co., Ltd.; Nikko Fuji Precision (Wuxi) Co., Ltd.; Nikko Metals Shanghai Co., Ltd.; Nikko Metals Taiwan Co., Ltd.; JX Nippon Mining & Metals Philippines, Inc.; Materials Service Complex Malaysia Sdn. Bhd.; JX Nippon Mining & Metals USA, Inc.; and JX Nippon Mining & Metals Korea Co., Ltd.

Quality Management of Electronic Materials Products

Customers demand a high level of quality and reliability in the electronic materials products of the Group. To meet these demands, we employ meticulous quality-control measures at all stages of product provision, from development and manufacturing to shipment.

Product development stage

Quality-evaluation systems have been developed to analyze physical properties, surface conditions, purity, and other characteristics of products, by introducing analytical equipment and establishing evaluation techniques, for instance. Only products that have been confirmed to possess the necessary levels of quality can move to mass-production stages.

Manufacturing stage

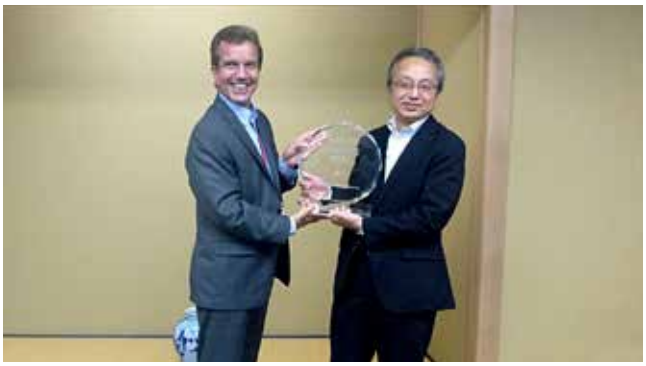
By introducing systems utilizing travel sheets, statistical process control, and other methods, we have developed an astringent quality-control regime, which covers every stage from the acceptance of raw materials to the shipping of products.

Pre-shipping stage

We have developed analysis systems that enable thorough and continuous inspections of products. We adhere strictly to internal standards developed for each product. Data from inspections is fed back to development and manufacturing divisions through a statistical quality control system to maintain and improve the quality and reliability of our products.

Awards Received from Our Customers

Each year, we receive awards from customers in recognition of our stable supply of high-quality products, promotion of business continuity planning, and other efforts. In fiscal 2016, we received a Supplier Excellence Award from Texas Instruments, a US-based customer of our sputtering targets for semiconductors, in recognition of our efforts to improve quality while lowering costs.



Commemorative photograph with the trophy received (on the right is Hirohito Miyashita, general manager of the Electronic Materials Group)

Commitment to Our Suppliers

The JX Nippon Mining & Metals Group is committed to fulfilling its corporate social responsibilities throughout the entire supply chain. Based on the JX Nippon Mining & Metals Group Basic Procurement Policy, we strive to build relationships of cooperation and trust with suppliers by conducting transparent and fair transactions with them.

Partnering with Suppliers

On April 1, 2017, the Company merged with and absorbed JX Nippon Procurement Corporation, to which the procurement operations of the former JX Group had been entrusted, and formed a new Procurement Department in the Head Office Technology Group. The Procurement Department is now in charge of handling relations with our suppliers, and will endeavor to ensure swift, fair, and equitable transactions.

JX Nippon Mining & Metals Group Basic Procurement Policy

1 Comply with laws, regulations, and rules and engage in fair transactions.

- Respect the letter and spirit of relevant laws and social norms in executing business operations.
- Conduct purchasing activities based on fair evaluations.
- Maintain appropriate relationships with business partners based on the highest ethical values.

2 Protect intellectual property rights.

- Strictly control personal information obtained in the course of procurement activities.
- Do not illegally obtain or illegally use intellectual property, including the patents, utility models, designs, and trademarks of third parties, and do not infringe such rights.

3 Build relationships with business partners based on mutual understanding and trust.

- Provide business partners with high reliability and satisfaction through accurate, fast, and highly transparent activities.
- Endeavor to achieve robust communication with business partners and consistently promote creativity and innovation through advanced ideas.
- Contribute to the development of a sustainable society by promoting the purchase of environmentally friendly materials and machinery.

4 Follow the below principles regarding conflict minerals.

- Do not engage in raw materials procurement that contributes to illegal activities in conflict-affected regions or to human rights infringements through such illegal activities.
- Respect the guidance of the Organisation for Economic Co-operation and Development related to raw materials procurement from conflict-affected areas, and control supply chains in an appropriate manner.

Promotion of Green Purchasing

The JX Nippon Mining & Metals Group has drawn up the Green Purchasing Policy, which dictates that the reduction of environmental and social impact is taken into account when making decisions on purchasing materials and equipment necessary to its business operations. Based on this policy, we have also drawn up Green Purchasing Guidelines setting out specific requirements for choosing suppliers.

In addition, the Group periodically conducts green purchasing surveys of suppliers, which include items regarding their use of banned substances in the manufacturing process, the presence of banned substances in supplied products, and procurement from companies with human rights problems. In fiscal 2016, the surveys were conducted from January to December 2016, covering 584 suppliers that account for 95% of the value of the items purchased and accepted by the Company, as well as JX Nippon Environmental Services and Pan Pacific Copper. Responses were received from 537 suppliers, for a response rate of 92%. Survey results are reflected in supplier reviews as applicable.

Green Purchasing Policy

We pursue green purchasing initiatives to contribute to the formation of a recycling-oriented society, prevention of global warming, and promotion of a "reduce, reuse, and recycle" approach.

This policy applies to all materials and equipment to be purchased. When items have similar functions, prices, and delivery dates, we evaluate their potential to reduce environmental impact based on mandatory and voluntary conditions, and purchase the item with superior environmental performance.

Confronting the Problem of Conflict Minerals

The Group's Basic Procurement Policy includes a clause on avoidance of conflict minerals, and we have established and operate management systems to appropriately address this issue.

What Are Conflict Minerals?

"Conflict minerals" is the general term for minerals that are mined (illegally, in most cases) in conflict-affected regions, providing a source of funds for local armed groups. The use of these minerals may lead to the prolonging of conflicts and the expansion of human rights abuses and dehumanizing acts.

Global Moves to Impose Trade Restrictions

Global moves to restrict trade of conflict minerals began in the late 1990s, and today various organizations have devised rules and programs. In 2011, the Organisation for Economic Co-operation and Development established the Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, advising corporations and others to manage their own operations so as to avoid involvement in the trade of conflict minerals. In the United States, from 2013 the Dodd-Frank Wall Street Reform and Consumer Protection Act obligated companies listed on the U.S. stock exchanges to submit reports on their usage of specific conflict minerals (tin, tantalum, tungsten, and gold) to the Securities and Exchange Commission. The aim of such measures is to stop companies from using conflict minerals through information disclosure and social pressure. The European Union and other organizations are moving to introduce a conflict minerals management and certification system.


LBMA

RESPONSIBLE GOLD CERTIFICATE

Certificate from the LBMA

Group Response to the Issue

In line with these global trends, industry organizations relevant to the Group (including the LBMA[*1] and EICC) have established monitoring programs for eliminating conflict minerals. These programs request that companies cooperate with surveys and undergo external audits by an independent organization. Pan Pacific Copper, a producer of gold bullion, has established and operates a management system for supply chain due diligence that calls for the following actions to be taken:

1. Performing supply chain due diligence before purchasing mineral raw materials (confirming the place of origin of the materials, assessing risks, confirming materials after delivery, confirming distribution route, preserving relevant documents, etc.).
2. Notifying suppliers of the policy on exclusion of conflict minerals.
3. Conducting in-house education on supply chain due diligence and its background.
4. Conducting internal audits and undergoing external audits.

The implementation status of supply chain due diligence is audited by an independent organization specified by the LBMA, and the results are reported to the LBMA. As a result of following these procedures, the gold bullion produced at Pan Pacific Copper's Saganoseki Smelter & Refinery is included on the LBMA's Good Delivery List. At the same time, the Saganoseki Smelter & Refinery has been included on the Conflict-Free Smelter list compiled by the EICC and GeSI[*2]—recognition that it is taking proper measures to exclude conflict minerals.

*1 LBMA: London Bullion Market Association. An industry association composed of financial institutions and others that deal in gold bullion. Inclusion on this association's Good Delivery List is viewed as a guarantee of high quality and reliability.

*2 GeSI: Global e-Sustainability Initiative (a trade association of the information and communications technology industry in Europe)

The EICC and GeSI together created the Conflict-Free Smelter certification program, based on their relationship with the electronic and communications equipment industries, where the risk of conflict mineral use is especially high.

Respect for Human Rights

The JX Nippon Mining & Metals Code of Conduct states, “In international business operations, we aim to contribute to sustainable development by protecting the fundamental human rights of people in countries and areas where we operate, and by respecting their cultures and customs.” Carrying out sound business practices, while respecting the human rights of local citizens, employees, customers, business partners, and all others in the supply chain, is seen as a major premise for the continued operation of the Group.

Respect for Human Rights: Principles and Rules

In fiscal 2008, JX Nippon Mining & Metals joined the United Nations Global Compact, agreeing to a set of international principles that include protection of human rights and compliance with labor standards. To instill the spirit of respect for human rights in the Group, its Compliance Regulation likewise states explicitly the commitment to protecting consumers, prohibiting unjust discrimination, preventing harassment, protecting personal information, and preventing child labor, forced labor, and other abuses.

Respecting the Human Rights of All Stakeholders

Employees

Approximately 9,200 employees work in the Group worldwide. By means of annual factfinding at each Group company, we confirm and enforce our absolute prohibition against any form of forced labor or child labor. Furthermore, we strictly observe each country’s labor laws and regulations governing pay, working hours, and other conditions. As our business becomes even more global, we will continue to create environments where employees can work with peace of mind.

Business Partners

We conduct green purchasing surveys each year of suppliers and other business partners based on the JX Nippon Mining & Metals Group Basic Procurement Policy. Among the matters confirmed in these surveys are elimination of forced labor and child labor, and compliance with the prohibition against purchasing conflict minerals. (See page 88 for details.)

Efforts to Raise Employee Awareness of Human Rights

To create a corporate climate where human rights are respected, the Group makes efforts to raise employee awareness and educate workers about relevant issues. In fiscal 2016, we offered an e-learning course to all Group employees. The course content was designed to remind employees that corporate activities can have a major impact on the human rights of stakeholders.

We make a particular effort to prevent harassment, providing harassment-related education as part of level-specific training for newly promoted managers and supervisors.

Mine Development and Respecting the Human Rights of Local Residents

Development and operation of mines can have a particularly significant impact on the surrounding environment. It is therefore essential to pay due consideration to the human rights of local residents and implement measures to ensure coexistence and coprosperity with local communities. Ever since its origins as the Hitachi Mine, the JX Nippon Mining & Metals Group has always made a point of being a good neighbor, and its CSR is rooted in this commitment. (See pages 13–14 for details.)

Today, Minera Lumina Copper Chile, the operator of the Caserones Copper Mine, applies a basic three-point policy for supporting local communities: respect for life, respect for the community and environment, and respect for current law. In keeping with this policy, from the project launch in 2007, the operator began holding explanatory meetings and engaging in dialogue with the Collas, the indigenous people living in the area around the mine site, endeavoring to build up trust. With respect to water resources in particular, which are vital both to local agriculture and to the mining operations, the operator provides support in various forms such as improving reservoirs. (See page 82 for details.)

Other Communications

Communicating Internationally

As a Member Company of the ICMM

The International Council on Mining and Metals (ICMM) is a global association of companies involved in mining and metal smelting and refining. Its aim is for nonferrous metals industries to help society grow sustainably. As an ICMM member, JX Nippon Mining & Metals has formulated its Code of Conduct in accordance with the ICMM 10 Principles for sustainable development, and works to solve the issues described in these principles and the ICMM Position Statements that supplement them.

ICMM member companies are required to ensure transparency of reporting on their sustainability efforts. The Company prepares its sustainability reports and discloses its initiatives in accordance with the Core option defined in the GRI G4 Guidelines.

ICMM 10 Principles

1. Apply ethical business practices and sound systems of corporate governance and transparency to support sustainable development.
2. Integrate sustainable development in corporate strategy and decision-making processes.
3. Respect human rights and the interests, cultures, customs and values of employees and communities affected by our activities.
4. Implement effective risk-management strategies and systems based on sound science and which account for stakeholder perceptions of risks.
5. Pursue continual improvement in health and safety performance with the ultimate goal of zero harm.
6. Pursue continual improvement in environmental performance issues, such as water stewardship, energy use and climate change.
7. Contribute to the conservation of biodiversity and integrated approaches to land-use planning.
8. Facilitate and support the knowledge-base and systems for responsible design, use, re-use, recycling and disposal of products containing metals and minerals.
9. Pursue continual improvement in social performance and contribute to the social, economic and institutional development of host countries and communities.
10. Proactively engage key stakeholders on sustainable development challenges and opportunities in an open and transparent manner. Effectively report and independently verify progress and performance.

ICMM Position Statements

- Mining & Protected Areas
- Indigenous Peoples and Mining
- Principles for climate change policy design
- Transparency of Mineral Revenues
- Mining: Partnerships for Development
- Mercury Risk Management
- Tailings governance
- Water stewardship

Endorsement of and Support for the EITI

The Extractive Industries Transparency Initiative (EITI) is a multinational cooperative framework that seeks greater transparency in the flows of funds from extractive industries, such as oil, natural gas, and metal mining, to the governments of resource-producing countries. The aim is to prevent corruption and conflicts, promoting responsible resource development that will lead to poverty reduction and growth.

JX Nippon Mining & Metals, with its involvement in global resources development, endorses the EITI and actively supports its activities.

The EITI Principles

1. We share a belief that the prudent use of natural resource wealth should be an important engine for sustainable economic growth that contributes to sustainable development and poverty reduction, but if not managed properly, can create negative economic and social impacts.
2. We affirm that management of natural resource wealth for the benefit of a country's citizens is in the domain of sovereign governments to be exercised in the interests of their national development.
3. We recognize that the benefits of resource extraction occur as revenue streams over many years and can be highly price dependent.
4. We recognize that a public understanding of government revenues and expenditure over time could help public debate and inform choice of appropriate and realistic options for sustainable development.
5. We underline the importance of transparency by governments and companies in the extractive industries and the need to enhance public financial management and accountability.
6. We recognize that achievement of greater transparency must be set in the context of respect for contracts and laws.
7. We recognize the enhanced environment for domestic and foreign direct investment that financial transparency may bring.
8. We believe in the principle and practice of accountability by government to all citizens for the stewardship of revenue streams and public expenditure.
9. We are committed to encouraging high standards of transparency and accountability in public life, government operations and in business.
10. We believe that a broadly consistent and workable approach to the disclosure of payments and revenues is required, which is simple to undertake and to use.
11. We believe that payments' disclosure in a given country should involve all extractive industry companies operating in that country.
12. In seeking solutions, we believe that all stakeholders have important and relevant contributions to make—including governments and their agencies, extractive industry companies, service companies, multilateral organizations, financial organizations, investors, and non-governmental organizations.

Other Matters for Reporting

Participation in the United Nations Global Compact

JX Nippon Mining & Metals joined the United Nations Global Compact in August 2008. We support the 10 principles on human rights, labor, the environment, and anti-corruption, and are committed to realizing these ideals.

Ten Principles of the United Nations Global Compact

Human Rights	
Businesses should support and respect the protection of internationally proclaimed human rights; and	Principle 1
make sure that they are not complicit in human rights abuses.	Principle 2
Labour	
Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;	Principle 3
the elimination of all forms of forced and compulsory labour;	Principle 4
the effective abolition of child labour; and	Principle 5
the elimination of discrimination in respect of employment and occupation.	Principle 6
Environment	
Businesses should support a precautionary approach to environmental challenges;	Principle 7
undertake initiatives to promote greater environmental responsibility; and	Principle 8
encourage the development and diffusion of environmentally friendly technologies.	Principle 9
Anti-Corruption	
Businesses should work against corruption in all its forms, including extortion and bribery.	Principle 10

Communication with Industry Organizations

The JX Nippon Mining & Metals Group plays key roles in various industry organizations, making active use of the opportunities for communication with associated stakeholders.

Organization	Role within the organization	Overview and activities of the organization
Japan Mining Industry Association (JMIA)	Chairman, director	JMIA represents companies engaged in the resource development and/or smelting and refining of nonferrous metals. With a view to the sound growth of the industry, it conducts surveys and other research on improving technologies, disseminates and publicizes knowledge, and proposes policies to government agencies, with respect to resource development, smelting and refining, and recycling. JX Nippon Mining & Metals is a governing member, serves on various committees, and participates in running the association.
The Sulphuric Acid Association of Japan	Director	The association works toward the growth of the sulfuric acid industry and promotes friendly relations and mutual benefits for sulfuric acid manufacturers. The Company serves on the Operations Committee and the General Affairs Committee, is involved in surveys and reports on sulfuric acid supply and demand conditions, and takes part in governance of the association.
Japan Copper and Brass Association (JCBA)	Vice chairman	JCBA is an industry association of companies manufacturing copper alloy products, namely plates, strips, pipes, and wires made by melting and rolling copper and copper alloys. By encouraging contacts and cooperation among members, it promotes the progress and growth of the industry as a whole. The Company serves on the Road Map Committee, is involved in developing new demand and improving quality, and as a member of the Statistics Subcommittee, is involved in surveys and reports on market size.
Japan Society of Newer Metals	Director	The society focuses on new metals that are supporting the advance of high-tech industries. By conducting surveys and research, collecting and providing information, and promoting fellowship and cooperation among relevant organizations in Japan and overseas, it aims for the sound growth of the new metals industry and related industries. As a member of the Compound Semiconductors Subcommittee and the Target Subcommittee, the Company is involved mainly in market size surveys and reports and in making proposals to government agencies. The Company also works to improve health and safety as a member of the Safety Committee.
Japan Catalyst Recovering Association	Chairman	The association is made up of companies engaged in the reuse of catalysts and aims to promote the recycling of precious metals, rare metals, and other metal resources through the proper treatment of spent catalysts, etc. It conducts surveys and compiles statistics on recycling, and holds regular training sessions to improve technologies and promote friendship among members. A Company representative is the chairman of the association and serves on the Public Relations Committee, and is involved in the issuance of survey reports and the organization of general meetings.

CSR Glossary

Term	Meaning	Page(s)
Basel Convention	The official name is the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal. It is an international treaty setting conditions such as approval and advance notice when exporting hazardous wastes, and requirements such as reimporting in the case of improper export or disposal. (Source: Ministry of Economy, Trade and Industry)	P.56
Biodiversity	The variability among all living organisms, including diversity within species, between species, and of ecosystems. (Source: Ministry of the Environment Convention on Biological Diversity)	P.8, 56, 65, 90
Compliance	Observance of laws and regulations. Laws and regulations include the statutes, ordinances, rules, and conventions prescribed by public institutions, and also in-company rules such as articles of incorporation and various regulations, as well as contracts and agreements made with those outside the company.	P.4, 5, 6, 9, 11, 12, 47, 75, 77, 78, 79, 89
Conflict minerals	Mineral resources mined in conflict-affected regions, mostly in Africa. The US Dodd-Frank Wall Street Reform and Consumer Protection Act defines these minerals as tantalum, gold, tin, and tungsten, as well as their derivatives, mined in the Democratic Republic of the Congo or surrounding countries. These minerals are believed to be a source of funding for conflicts in the regions.	P.87, 88, 89
CSR	Corporate social responsibility: the responsibility when conducting corporate affairs to make decisions that properly address the needs of all kinds of stakeholders, in awareness of how a company's activities impact society, rather than simply pursuing financial gain.	P.1, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 47, 58, 78, 89, 94
Global Compact	A voluntary initiative officially launched at the United Nations Headquarters in New York in 2000, encouraging businesses to adopt certain principles of conduct. Participating corporations commit to putting into practice 10 globally established principles in the four areas of human rights, labor, the environment, and anti-corruption.	P.4, 89, 91
Governance	Corporate governance: a corporate management system for raising corporate value by improving competitiveness and preventing fraudulent acts.	P.1, 75, 78, 79, 80, 90
Green purchasing	A form of CSR procurement. Giving priority in purchasing to products and services with the smallest possible environmental impact, and to suppliers who strive to reduce their environmental impact. (Source: Green Purchasing Network)	P.88
GRI	Global Reporting Initiative: an institution established in 1997 aimed at improving the quality, credibility, and comparability of sustainability reporting. It publishes guidelines on global standards of reporting. The GRI is a United Nations Environment Programme partner, and is headquartered in Amsterdam, the Netherlands.	P.1, 95, 99
GRI G4 Guidelines	The fourth generation of GRI Sustainability Reporting Guidelines, issued in May 2013.	P.1, 11, 12, 90, 94, 95
Internal control	A system for establishing and implementing rules and controlling an organization to prevent in advance improper or illegal actions in the pursuit of business objectives.	P.75, 78, 79
Lockout	The temporary closing of a business establishment (offices, factories, etc.) by an employer in a labor dispute, refusing to allow employees to come to work and denying them payment of wages, to counter a strike or similar action by labor.	P.50
Mining and Metals Sector Disclosures	Guidelines covering supplementary reporting elements specific to the mining and metals industries that are not included in the GRI G4 Guidelines.	P.1
PDCA cycle	A management approach for maintaining and raising quality and promoting ongoing efforts to improve operations, by repeating the cycle of plan, do, check, and act.	P.63, 86
PRTR Act	A legal system that governs chemicals with the potential of harming human health and ecosystems. Under the system, business operators keep track of and report to the government the amounts of these chemicals that are released from their operating sites to the environment (air, water, soil) and transferred as waste outside their operating sites. The government then compiles and makes public the amounts released and transferred, based on the reported data and estimates. (Source: Ministry of Economy, Trade and Industry)	P.64
REACH Regulation	The European Union's Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. REACH applies to all chemical substances manufactured or imported into the EU in quantities of one ton or more per year. It mandates that the manufacturers and importers of these substances evaluate their impact on human life and the global environment, and apply to the European Chemicals Agency for authorization and registration.	P.64
Resource nationalism	The policy of countries wanting to control and develop the natural resources within their borders on their own.	P.69
SPC	Statistical process control: a technique for preventing defective products from being manufactured by monitoring the statistical stability of manufacturing processes and detecting trouble signs in the early stages.	P.86
Specified-scale electricity utilities	Of the businesses supplying electricity, those that supply electricity on a retail basis to customers in need of 50 kilowatts or more of high-voltage power.	P.60

CSR Glossary

Term	Meaning	Page(s)
SQC	Statistical quality control: a quality control technique using statistical methods that, rather than measuring the quality of individual products, measures the quality-based characteristics of the production process as a whole (materials, equipment and machinery, work, products), and controls quality by confirming their distribution (variability).	P.86
Stakeholders	All those affected for better or worse by corporate activities. Stakeholders are many and varied, including shareholders, investors, suppliers, customers, consumers, and employees.	P.1, 4, 8, 9, 12, 47, 55, 75, 89, 90, 91
Sustainability	The ability to last. For corporations striving for the sustainable growth of society and their own growth into the future, business administration must take account of economic, environmental, and social impact.	P.1, 4, 9, 10, 90, 99
Type-2 Designated Energy Management Factory	As defined in the Act on Rationalizing Energy Use, a production plant consuming an amount of energy (heat and electricity) equivalent to a minimum of 1,500 kiloliters and a maximum of less than 3,000 kiloliters of crude oil per year.	P.1, 56
Urban mine	Nonferrous metals that are subject to recycling, after being extracted from natural ores, going through smelting and refining processes, and being used in various forms in human economic activities.	P.4, 16
Work-life balance	Harmony between professional and personal life. Meeting work responsibilities and finding a sense of accomplishment and satisfaction in work, while also choosing and achieving a satisfying life in the home or community from among diverse possibilities, at each stage of life including child rearing, middle age, and older age. (Source: Cabinet Office)	P.43, 45, 46
Zero emissions	A concept advocated by the United Nations University calling for full use of resources and reduction of waste to as close to zero as possible, with the aim of creating a sustainable recycling-oriented society. In this report, it is used chiefly to mean “discharging no secondary waste that is subject to landfill in a final disposal site.”	P.8, 17, 25

The JX Nippon Mining & Metals Group's CSR Issues and GRI G4 Guidelines Categories and Aspects

CSR Issues	Description	Material Issues	Corresponding Categories or Sub-Categories: Aspect	Main Boundaries
Establishing a global organizational governance system	1 Establish internal control systems for ensuring operations are carried out properly and efficiently 2 In assessing the propriety of operations, adopt a broad viewpoint including ethics, global trends, and the views of stakeholders 3 Establish mechanisms for checking progress in implementing 1 and making corrections 4 Include overseas operating sites as well as domestic ones in 1 to 3		—	Within the organization
Promoting communication	1 Maintain close communication with each stakeholder to keep track of developments and problem areas regarding each CSR issue		—	Within the organization
Creating sustained economic value and providing stakeholders with fair returns	1 Continually create an appropriate level of economic value (profit) through the conduct of business 2 Distribute the economic value created to stakeholders in a proper manner		Economic: Economic Performance Economic: Market Presence Economic: Indirect Economic Impacts Economic: Procurement Practices	Within the organization
Respecting human rights	1 Keep the business free of discrimination, child or forced labor, violations of indigenous rights, violations of employee rights, and other human rights abuses 2 Establish mechanisms for checking progress in implementing 1 and making corrections 3 Establish a system for educating employees regarding 1		Human Rights: Investment Human Rights: Non-discrimination Human Rights: Freedom of Association and Collective Bargaining Human Rights: Child Labor Human Rights: Forced or Compulsory Labor Human Rights: Security Practices Human Rights: Indigenous Rights Human Rights: Assessment Human Rights: Human Rights Grievance Mechanisms	Within the organization
Developing and utilizing human resources	1 Promote the use of diverse human resources (including foreign nationals, women, and people with disabilities) 2 Promote worker training and skills improvement 3 Provide a favorable working environment	○	Labor Practices and Decent Work: Diversity and Equal Opportunity Labor Practices and Decent Work: Training and Education	Within the organization
Ensuring occupational health and safety	1 Ensure health and safety in the workplace	○	Labor Practices and Decent Work: Occupational Health and Safety	Within the organization
Providing fair and equitable conditions of work	1 Provide appropriate labor agreements and conditions of work 2 Provide equal employment opportunities regardless of gender, nationality, or place of origin 3 Maintain ongoing dialog with workers and institute necessary corrective measures		Labor Practices and Decent Work: Employment Labor Practices and Decent Work: Labor/Management Relations Labor Practices and Decent Work: Equal Remuneration for Women and Men Labor Practices and Decent Work: Labor Practices Grievance Mechanisms	Within the organization
Using resources effectively	1 Endeavor to reduce the use of raw materials, energy, and water by reducing consumption intensity and promoting recycling and reuse	○	Environmental: Materials Environmental: Energy Environmental: Water	Within and outside of the organization
Protecting the environment	1 Promote reduction in emissions (including greenhouse gases), water discharge, and waste materials, while carrying out proper management 2 Endeavor to protect ecosystems 3 Establish mechanisms for checking progress in implementing 1 and 2 and making corrections 4 When choosing suppliers, take into account their implementation of 1 , 2 , and 3	○	Environmental: Biodiversity Environmental: Emissions Environmental: Effluents and Waste Environmental: Transport Society: Closure Planning*	Within and outside of the organization
Insisting on full compliance	1 Comply with laws and regulations (on the environment, labor, competition, and anti-bribery) in conducting business 2 Establish mechanisms for checking progress in implementing 1 and making corrections 3 Establish a system for educating employees regarding 1	○	Society: Anti-corruption Society: Anti-competitive Behavior Society: Compliance Environmental: Compliance	Within the organization
Promoting social responsibility in the entire supply chain	1 Address each CSR issue, focusing not just within the Group but broadening the scope to encompass suppliers, employees, and other affected stakeholders		Human Rights: Supplier Human Rights Assessment Labor Practices and Decent Work: Supplier Assessment for Labor Practices Environmental: Supplier Environmental Assessment Society: Supplier Assessment for Impacts on Society	Within and outside of the organization
Promoting innovation in technology and productivity	1 Contribute to the sustainable development of society by providing greater convenience, using resources effectively, and preventing environmental pollution, through innovation in products and production technology		—	Within the organization
Raising customer satisfaction	1 Achieve timely and stable supply of products and services needed by customers 2 In providing products and services, take all due measures to ensure customer health and safety 3 Take steps to protect customer information 4 Always listen to customer views and respond to them as needed		Product Responsibility: Customer Health and Safety Product Responsibility: Marketing Communications Product Responsibility: Customer Privacy Product Responsibility: Compliance Product Responsibility: Materials Stewardship*	Within the organization
Promoting community involvement and development	1 Promote coexistence and coprosperity with local communities by preventing harmful impacts and providing benefits 2 Maintain ongoing dialog and take necessary corrective measures		Society: Local Communities Society: Grievance Mechanisms for Impacts on Society Society: Emergency Preparedness* Society: Artisanal and Small-scale Mining* Society: Resettlement* Environmental: Environmental Grievance Mechanisms	Within the organization

* Sector-specific Aspects

GRI Content Index

This report is in accordance with the Core option defined by the GRI G4 Guidelines.

General Standard Disclosures

GRI indicator	Description of indicator	Page(s)	Relevant contents
Strategy and Analysis			
G4-1	A statement from the most senior decision-maker of the organization about the relevance of sustainability to the organization and the organization's strategy for addressing sustainability	P.3–6	Message from the President
Organizational Profile			
G4-3	Name of the organization	P.28	Corporate Data (Company Name)
G4-4	Primary brands, products, and services	P.17–18, 22–26, 28	Overview of JX Nippon Mining & Metals Business Segments; The Medium-Term Management Plan (Fiscal 2017 to 2019); Corporate Data (Business Lines)
G4-5	Location of the organization's headquarters	P.28	Corporate Data (Head Office)
G4-6	Number of countries where the organization operates, and names of countries either where the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report	P.28	Production Sites in Japan and Overseas Operating Sites; Corporate Data (Domestic Operating Sites; Overseas Operating Site)
G4-7	Nature of ownership and legal form	P.28	Corporate Data (Company Name; Paid-in Capital)
G4-8	Markets served (including geographic breakdown, sectors served, and types of customers and beneficiaries)	P.15–18, 20	Relationship between the JX Nippon Mining & Metals Group and Society; Overview of JX Nippon Mining & Metals Business Segments; Net Sales by Region
G4-9	Scale of the organization, including: • Total number of employees • Total number of operations • Net sales (for private sector organizations) or net revenues (for public sector organizations) • Total capitalization broken down in terms of debt and equity (for private sector organizations) • Quantity of products or services provided	P.51	Employees Active in Japan and Overseas (No. of employees [by employment status and employment contract type])
		P.28	Production Sites in Japan and Overseas Operating Sites
		P.28	Corporate Data (Net Sales; Employees)
		P.19	Financial Performance (Consolidated) (Net sales; Total assets and total liabilities)
		P.57	Our Business Activities and the Environment (Mass Balance Table for the Group [Principal products])
G4-10	Total number of employees by employment contract and gender, etc.	P.51	Employees Active in Japan and Overseas
G4-11	Percentage of total employees covered by collective bargaining agreements	P.50	Maintaining Good Labor-Management Relations (Membership in labor unions)
G4-12	Organization's supply chain	P.15–16, 23, 25, 26	Relationship between the JX Nippon Mining & Metals Group and Society; Smelting and Refining Business; Recycling and Environmental Services Business; Titanium Business
G4-13	Reporting of any significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain	–	Not applicable
G4-14	Reporting of whether and how the precautionary approach or principle is addressed by the organization	P.64	Compliance with the REACH Regulation
		P.91	Communicating Internationally
G4-15	List of externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses	P.90–91	Communicating Internationally
G4-16	List of memberships of associations (such as industry associations) and national or international advocacy organizations in which the organization: • Holds a position on the governance body • Participates in projects or committees • Provides substantive funding beyond routine membership dues • Views membership as strategic	P.90–91	Communicating Internationally; Communication with Industry Organizations
Identified Material Aspects and Boundaries			
G4-17	List of all entities included in the organization's consolidated financial statements or equivalent documents, etc.	P.1–2	Boundary of the Report; Group Companies Covered by This Report
G4-18	Process for defining the report content and the Aspect Boundaries, etc.	P11–12	Our Six Material Issues
G4-19	List of all the material Aspects identified in the process for defining report content	P.94	The JX Nippon Mining & Metals Group's CSR Issues and GRI G4 Guidelines Categories and Aspects
G4-20	For each material Aspect, reporting of the Aspect Boundary within the organization	P.1–2, 94	Boundary of the Report; Group Companies Covered by This Report; The JX Nippon Mining & Metals Group's CSR Issues and GRI G4 Guidelines Categories and Aspects
G4-21	For each material Aspect, reporting of the Aspect Boundary outside the organization	P.94	The JX Nippon Mining & Metals Group's CSR Issues and GRI G4 Guidelines Categories and Aspects

GRI indicator	Description of indicator	Page(s)	Relevant contents
G4-22	Reporting of the effect of any restatements of information provided in previous reports, and the reasons for such restatements	P.61	Activity Results in Fiscal 2016 (Volume of Final Disposal of Waste Materials; Total Volume of Waste Materials Generated; Discharge Volume by Type of Waste Materials)
G4-23	Significant changes from previous reporting periods in the Scope and Aspect Boundaries	–	Not applicable
Stakeholder Engagement			
G4-24	List of stakeholder groups engaged by the organization	P.8	Our Relationships with Stakeholders
G4-25	Basis for identification and selection of stakeholders with whom to engage	P.8	Our Relationships with Stakeholders
G4-26	Organization's approach to stakeholder engagement	P.8, 10, 50, 87	Our Relationships with Stakeholders; CSR Surveys; Maintaining Good Labor-Management Relations; Commitment to Our Suppliers
G4-27	Key topics and concerns that have been raised through stakeholder engagement, and how the organization has responded to those key topics and concerns	P.82–84	Social Contribution Activities outside Japan; Social Contribution Activities in Local Communities
Report Profile			
G4-28	Reporting period for information provided	P.1	Reporting Period
G4-29	Date of most recent previous report	P.1	Publication Date
G4-30	Reporting cycle	P.1	Publication Date
G4-31	Contact point for questions regarding the report or its contents	Back cover	Send your views on this report to
G4-32	The "in accordance" option the organization has chosen, the GRI Content Index for the chosen option, and the reference to the External Assurance Report	P.95–98	GRI Content Index (in accordance with the Core option)
G4-33	Organization's policy and current practice with regard to seeking external assurance for the report, etc.	P.99	Independent Assurance Report
Governance			
G4-34	Governance structure of the organization	P.9, 78	CSR Committee and Subcommittees; Corporate Governance System
Ethics and Integrity			
G4-56	Organization's values, principles, standards and norms of behavior	P.7, 8	JXTG Group Philosophy; JX Nippon Mining & Metals Code of Conduct

Specific Standard Disclosures

GRI indicator	Description of indicator	Page(s)	Relevant contents
Category: Environmental			
Aspect: Materials			
DMA	Management approach	P.52, 55–56, 58, 61	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Initiatives for Effective Resource and By-Product Use and Waste Reduction (Fundamental Policy)
EN1	Materials used by weight or volume	P.57, 61	Our Business Activities and the Environment (Mass Balance Table for the Group [Raw materials]); Activity Results in Fiscal 2016 (Usage of Recycled Resources as Raw Materials)
EN2	Percentage of materials used that are recycled input materials	P.61	Activity Results in Fiscal 2016 (Usage of Recycled Resources as Raw Materials)
Aspect: Energy			
DMA	Management approach	P.52, 55–56, 58, 59	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Energy Conservation (Fundamental Policy)
EN3	Energy consumption within the organization	P.57, 59	Our Business Activities and the Environment (Mass Balance Table for the Group [Energy]); Activity Results in Fiscal 2016 (Energy Consumption and Energy Consumption Intensity in Manufacturing Activities)
EN4	Energy consumption outside of the organization	P.60	Activity Results in Fiscal 2016 (Energy Consumption and CO_2 Emissions in the Logistics Stage)
EN5	Energy intensity	P.59	Activity Results in Fiscal 2016 (Energy Consumption and Energy Consumption Intensity in Manufacturing Activities)
EN6	Reduction of energy consumption	P.59	Activity Results in Fiscal 2016 (Energy Consumption and Energy Consumption Intensity in Manufacturing Activities)

GRI Content Index

GRI indicator	Description of indicator	Page(s)	Relevant contents
Aspect: Water			
DMA	Management approach	P.52, 55–56, 58, 61	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Initiatives for Effective Resource and By-Product Use and Waste Reduction (Fundamental Policy)
EN8	Total water withdrawal by source	P.57, 62	Our Business Activities and the Environment (Mass Balance Table for the Group [Water resources]); Activity Results in Fiscal 2016 (Efficient Use of Water Resources [Water Usage])
Aspect: Biodiversity			
DMA	Management approach	P.52, 55–56, 58, 65	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Initiatives for Biodiversity Conservation (Fundamental Policy)
EN11	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	P.65	Initiatives at the Caserones Copper Mine
EN12	Description of significant impacts of activities, products, and services on biodiversity in protected areas and areas of high biodiversity value outside protected areas	P.65	Initiatives at the Caserones Copper Mine
EN13	Habitats protected or restored	P.65	Initiatives at the Caserones Copper Mine; Reforestation Activities in Japan
MM1	Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated	P.65	Initiatives at the Caserones Copper Mine
MM2	Number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place	P.65	Initiatives at the Caserones Copper Mine
Aspect: Emissions			
DMA	Management approach	P.52, 55–56, 58, 59, 63	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Energy Conservation (Fundamental Policy); Environmental Risk Management (Fundamental Policy)
EN15	Direct greenhouse gas (GHG) emissions (Scope 1)	P.57, 60	Our Business Activities and the Environment (Mass Balance Table for the Group [Emissions]); Activity Results in Fiscal 2016 (CO_2 Emissions from Energy Consumption for Manufacturing Activities [CO_2 Emissions from Energy Consumption]; CO_2 Emissions Other than from Energy Consumption, and Other Greenhouse Gas Emissions from Manufacturing Activities)
EN16	Energy indirect GHG emissions (Scope 2)	P.57, 60	Our Business Activities and the Environment (Mass Balance Table for the Group [Emissions]); Activity Results in Fiscal 2016 (CO_2 Emissions from Energy Consumption for Manufacturing Activities [CO_2 Emissions from Energy Consumption])
EN17	Other indirect GHG emissions (Scope 3)	P.60	Activity Results in Fiscal 2016 (Energy Consumption and CO_2 Emissions in the Logistics Stage)
EN18	GHG emissions intensity	P.60	Activity Results in Fiscal 2016 (CO_2 Emissions from Energy Consumption for Manufacturing Activities [CO_2 Emission Intensity at Smelters and Refineries])
EN21	NOx, SOx, and other significant air emissions	P.57, 63–64	Our Business Activities and the Environment (Mass Balance Table for the Group [Emissions]); Environmental Risk Management
Aspect: Effluents and Waste			
DMA	Management approach	P.52, 55–56, 58, 61, 63	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Initiatives for Effective Resource and By-Product Use and Waste Reduction (Fundamental Policy); Environmental Risk Management (Fundamental Policy)
EN22	Total water discharge by quality and destination	P.57, 62, 63	Our Business Activities and the Environment (Mass Balance Table for the Group [Emissions]); Activity Results in Fiscal 2016 (Effective Use of Water Resources [Water Discharge Volume]; Preventing Water Pollution)
EN23	Total weight of waste by type and disposal method	P.61	Activity Results in Fiscal 2016 (Reuse and Reduction of Waste Materials [Total Volume of Waste Materials Generated])
EN24	Total number and volume of significant spills	P.58	Environmental Accidents
MM3	Total amounts of overburden, rock, tailings, and sludges and their associated risks	P.61, 66	Activity Results in Fiscal 2016 (Reuse and Reduction of Waste Materials [Volume of Final Disposal of Waste Materials]); Management of Closed Mines
Aspect: Compliance			
DMA	Management approach	P.52, 55–56, 58, 63	Title page for "Protecting the Environment"; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System; Environmental Risk Management (Fundamental Policy)
EN29	Monetary value of significant fines and total number of nonmonetary sanctions for noncompliance with environmental laws and regulations	P.58	Compliance with Environmental Laws and Regulations

GRI indicator	Description of indicator	Page(s)	Relevant contents
Aspect: Transport			
DMA	Management approach	P.52, 55–56, 58	Title page for “Protecting the Environment”; Basic Environmental Policy; Action Plan for Environmental Protection; Environmental Management System
EN30	Significant environmental impacts of transporting products and other goods and materials for the organization’s operations, and transporting members of the workforce	–	Not applicable
Category: Social; Sub-Category: Labor Practices and Decent Work			
Aspect: Occupational Health and Safety			
DMA	Management approach	P.33, 36–38	Title page for “Ensuring Occupational Health and Safety”; JX Nippon Mining & Metals Basic Policy on Health and Safety; Management Policy on Health and Safety; Organization for Occupational Health and Safety Management; Achievements of Health and Safety Activities in 2016 and Remaining Issues; Promoting Physical and Mental Health; Other Activities
LA5	Percentage of total workforce represented in formal joint management–worker health and safety committees that help monitor and advise on occupational health and safety programs	P.36	Health and Safety Activities
LA6	Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender	P.37	Health and Safety Performance in 2016 (Occupational Accidents, Etc.)
LA8	Health and safety topics covered in formal agreements with trade unions	P.50	Maintaining Good Labor-Management Relations
MM4	Number of strikes and lock-outs exceeding one week’s duration, by country	P.50	Maintaining Good Labor-Management Relations
Aspect: Training and Education			
DMA	Management approach	P.40, 47	Title page for “Developing and Utilizing Human Resources”; The JX Nippon Mining & Metals Education System
LA9	Average hours of training per year per employee by gender, and by employee category	P.47	Training Programs Implemented in Fiscal 2016
LA10	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings	P.46–48	Self-Innovation Support; The JX Nippon Mining & Metals Education System
Aspect: Diversity and Equal Opportunity			
DMA	Management approach	P.40, 43, 44, 49	Title page for “Developing and Utilizing Human Resources”; Strategy to Energize Individuals and Organizations; Initiatives for Energizing Individuals and Organizations—Enhancement of Childcare and Family Care Systems; Initiatives Promoting Diversity
LA12	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity	P.51, 78	Employees Active in Japan and Overseas (No. of employees [by employment category]); Corporate Governance System (Board of Directors)
Category: Social; Sub-Category: Society			
Aspect: Anti-corruption			
DMA	Management approach	P.75, 77, 78, 79	Title page for “Insisting on Full Compliance”; Compliance Initiatives; Internal Control System; Internal Auditing
SO4	Communication and training on anti-corruption policies and procedures	P.77	Performance Regarding Key Compliance Goals in Fiscal 2016 (1.(2) Taking steps to eliminate association with antisocial forces and implementing anti-bribery measures)
SO5	Confirmed incidents of corruption and actions taken	P.77	Compliance Initiatives
Aspect: Anti-competitive Behavior			
DMA	Management approach	P.75, 77, 78, 79	Title page for “Insisting on Full Compliance”; Compliance Initiatives; Internal Control System; Internal Auditing
SO7	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes	P.77	Compliance Initiatives
Aspect: Compliance			
DMA	Management approach	P.75, 77, 78, 79	Title page for “Insisting on Full Compliance”; Compliance Initiatives; Internal Control System; Internal Auditing
SO8	Monetary value of significant fines and total number of nonmonetary sanctions for noncompliance with laws and regulations	P.77	Compliance Initiatives
Aspect: Closure Planning			
MM10	Number and percentage of operations with closure plans	P.22	Caserones Project (The Caserones Copper Mine began full operation in May 2014. It is to be closed in 2040 when its mineral resources are depleted.)

Independent Assurance Report

Independent Assurance Report

To the President and CEO of JX Nippon Mining & Metals Corporation

We were engaged by JX Nippon Mining & Metals Corporation (the "Company") to undertake a limited assurance engagement of the environmental and social performance indicators marked with ☑ for the period from April 1, 2016 to March 31, 2017 (the "Indicators") included in its Sustainability Report 2017 (the "Report") for the fiscal year ended March 31, 2017; the Company's self-declaration that the Report is prepared in accordance with the Global Reporting Initiative's G4 Sustainability Reporting Guidelines (the "G4 Guidelines") at a core level; the alignment of the Company's policies to the International Council on Mining and Metals ("ICMM")'s 10 Sustainable Development ("SD") Principles and the applicable mandatory requirements set out in ICMM position statements; the Company's identification and prioritization of material issues; and the Company's approach and management of its material issues.

The Company's Responsibility

The Company is responsible for the preparation of the Indicators in accordance with its own reporting criteria (the "Company's reporting criteria"), as described in the Report, which are derived, among others, from the G4 Guidelines; self-declaring that the Report is prepared in accordance with the criteria stipulated in the G4 Guidelines; reporting on the alignment of the Company's policies to the ICMM's 10 SD Principles and the applicable mandatory requirements set out in ICMM position statements; reporting on the Company's identification and prioritization of material issues; and reporting on the Company's approach and management of its material issues.

Our Responsibility

Our responsibility is to express a limited assurance conclusion on the Indicators based on the procedures we have performed. We conducted our engagement in accordance with 'International Standard on Assurance Engagements (ISAE) 3000, Assurance Engagements other than Audits or Reviews of Historical Financial Information', 'ISAE 3410, Assurance Engagements on Greenhouse Gas Statements', issued by the International Auditing and Assurance Standards Board, and the 'Practical Guidelines for the Assurance of Sustainability Information' of J-SUS. The limited assurance engagement consisted of making inquiries, primarily of persons responsible for the preparation of information presented in the Report, and applying analytical and other procedures, and the procedures performed vary in nature from, and are less in extent than for, a reasonable assurance engagement. The level of assurance provided is thus not as high as that provided by a reasonable assurance engagement. Our assurance procedures included:

- Interviewing with the Company's responsible personnel to obtain an understanding of its policy for the preparation of the Report and reviewing the Company's reporting criteria.
- Inquiring about the design of the systems and methods used to collect and process the Indicators.
- Performing analytical reviews of the Indicators.
- Examining, on a test basis, evidence supporting the generation, aggregation and reporting of the Indicators in conformity with the Company's reporting criteria, and also recalculating the Indicators.
- Visiting to the Company's domestic factory selected on the basis of a risk analysis.
- Evaluating the Company's self-declaration that the Report is prepared in accordance with the G4 Guidelines at a core level against the criteria stipulated in the G4 Guidelines.
- Assessing the alignment of the Company's policies to the ICMM's 10 SD Principles and the applicable mandatory requirements set out in ICMM position statements through documentation reviews and interviews.
- Interviewing with the Company's responsible personnel and reviewing documents with respect to the Company's process of identifying and prioritizing its material issues.
- Interviewing with the Company's responsible personnel and reviewing documents with respect to the Company's approach to and management of its material issues.
- Evaluating the overall statement in which the Indicators are expressed.

Conclusion

Based on the procedures performed, as described above, nothing has come to our attention that causes us to believe that:

- the Indicators in the Report are not prepared, in all material respects, in accordance with the Company's reporting criteria as described in the Report;
- the Company's self-declaration that the Report is prepared in accordance with the G4 Guidelines at a core level does not conform to the criteria stipulated in the G4 Guidelines;
- the Company's policies are not aligned to the ICMM's 10 SD Principles and the applicable mandatory requirements set out in ICMM position statements as described on page 90;
- the Company has not identified and prioritized its material issues as described on pages 11-12; and
- the Company has not approached and managed its material issues as described on pages 21-27, 33-40, 43-49, 52, 55, 56, 58-65, 68-70, and 75-78.

Our Independence and Quality Control

We have complied with the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants, which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. In accordance with International Standard on Quality Control 1, we maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

KPMG AZSA Sustainability Co., Ltd.

KPMG AZSA Sustainability Co., Ltd.
Tokyo, Japan
November 27, 2017

JX Nippon Mining & Metals Corporation

We welcome your views and questions regarding *Sustainability Report 2017* as well as suggestions on how to make the next report even better.

Send your views on this report to:
Public Relations and CSR Department
JX Nippon Mining & Metals Corporation
1-2, Otemachi 1-chome, Chiyoda-ku, Tokyo 100-8164, Japan

E-mail: suishin.csr@nmm.jx-group.co.jp
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UN GLOBAL COMPACT
COMMUNICATION ON PROGRESS

This is our **Communication on Progress** in implementing the principles of the **United Nations Global Compact** and supporting broader UN goals.

We welcome feedback on its contents.

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