PROSPECTUS

AWARDS ISSUED UNDER RTI INTERNATIONAL METALS, INC. 2004 STOCK PLAN, AS AMENDED AND 2014 STOCK AND INCENTIVE PLAN, AS AMENDED AND ASSUMED BY ALCOA INC.

This document constitutes part of a prospectus required by Section 10(a) of the Securities Act of 1933, as amended (the "Securities Act"), and relates to shares of common stock, par value $1.00 per share (the "Alcoa Shares"), of Alcoa Inc. ("Alcoa" or the "Company") that may be issued pursuant to certain awards granted under the RTI International Metals, Inc. 2004 Stock Plan, as amended (the "2004 Plan") and the RTI International Metals, Inc. 2014 Stock and Incentive Plan, as amended (the "2014 Plan" and together with the 2004 Plan, the "Plans") that were assumed by Alcoa in connection with Alcoa's acquisition of RTI International Metals, Inc. ("RTI").

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of the prospectus of which this document is a part. Any representation to the contrary is a criminal offense.

The date of this document is July 23, 2015.

This document constitutes part of a prospectus covering securities that have been registered under the Securities Act of 1933, as amended.

AVAILABILITY OF ADDITIONAL INFORMATION ABOUT THE COMPANY

Alcoa is subject to the informational requirements of the Securities Exchange Act of 1934, as amended (the "Exchange Act") and, in accordance with the Exchange Act, Alcoa files reports and other information with the Securities and Exchange Commission (the "Commission"). The Commission allows Alcoa to "incorporate by reference" in this prospectus the information in the documents that it files with the Commission, which means that Alcoa can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be a part of this prospectus, and information in documents that Alcoa files later with the Commission will automatically update and supersede information contained in documents filed earlier with the Commission or contained in this prospectus. Alcoa incorporates by reference in this prospectus the documents listed below and any future filings that it may make with the Commission under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act until all of the securities that may be offered pursuant to this prospectus are sold, except that Alcoa is not incorporating by reference any information that is deemed to have been furnished and not filed in accordance with Commission rules.

- Alcoa's Annual Report on Form 10-K for the year ended December 31, 2014;
- Alcoa's Quarterly Reports on Form 10-Q for the quarters ended March 31, 2015 and June 30, 2015;
- Alcoa's Current Reports on Form 8-K and 8-K/A filed on January 22, 2015; February 25, 2015; March 9, 2015; May 5, 2015 (two filings); May 13, 2015, July 6, 2015, July 13, 2015 and July 23, 2015 (two filings) (in each case, except to the extent furnished but not filed); and
- The description of Alcoa's common stock, par value $1.00 per share contained in the Registration Statement on Form S-4 (File No. 333-203275) initially filed under the Securities Act with the Commission on April 7, 2015, as amended by Pre-Effective Amendments Nos. 1 and 2 respectively filed on May 18, 2015 and June 10, 2015 (the "Form S-4"), including any amendments or reports filed for the purpose of updating such description.

Alcoa will furnish without charge to you, upon written or oral request, a copy of any or all of the documents described above, except for exhibits to those documents, unless the exhibits are specifically incorporated by reference into those documents. Requests for copies should be addressed to:

Alcoa Inc.
Attention: Investor Relations
390 Park Avenue
New York, New York 10022-4608
Telephone: (212) 836-2674

These documents are also available, without charge, at the Commission's website at http://www.sec.gov.

AWARDS ISSUED UNDER THE
RTI INTERNATIONAL METALS, INC.
2004 STOCK PLAN, AS AMENDED AND
2014 STOCK AND INCENTIVE PLAN, AS AMENDED
AND ASSUMED BY ALCOA

INTRODUCTION

This document is intended to summarize for you the key provisions of the Plans, as modified by the Agreement and Plan of Merger (the "Merger Agreement"), dated March 8, 2015 among RTI, Alcoa and Ranger Ohio Corporation ("Merger Sub"), that are applicable to the stock options ("Options"), restricted stock unit awards ("RSU Awards") and performance share awards ("PSA Awards") granted under the Plans and assumed by Alcoa and is qualified in its entirety by reference to the complete text of the Plans, as modified by the Merger Agreement. In the event of an inconsistency between this document and the actual provisions of the Plans and/or any award agreement under the Plans, as modified by the Merger Agreement, with respect to Options, RSU Awards and PSA Awards assumed by Alcoa, the provisions of the Plans and/or the applicable award agreement will govern. A copy of the Plans will be provided to you upon request.

The Plans were originally adopted by the Board of Directors of RTI and provided for the issuance of shares of RTI common stock, par value $0.01 ("RTI Shares") and other awards to employees and non-employee directors in accordance with the terms of the Plans. The Plans were assumed by Alcoa in connection with the merger between Merger Sub (a wholly owned subsidiary of Alcoa) and RTI (the "Merger"), which became effective on July 23, 2015 (the "Closing Date"). Outstanding vested and unvested Options and 2014 PSA Awards granted under the 2004 Plan and vested and unvested Options, 2015 PSA Awards and RSU Awards granted under the 2014 Plan have been assumed by Alcoa, as explained further below, and have been converted into corresponding awards relating to Alcoa Shares. Such converted Options are referred to in this prospectus as "Alcoa Options," and such converted PSA Awards and RSU Awards are collectively referred to in this prospectus as "Alcoa RSU Awards" (together with the Alcoa Options, the "Converted Awards"). An individual holding an RTI Option, RTI RSU Award or RTI PSA Award, or a Converted Award, as applicable, is referred to in this prospectus as a "participant".

DESCRIPTION OF THE PLANS

Administration

The Plans were originally administered by the Compensation Committee of RTI's Board of Directors (the "RTI Committee"). Following the Merger, the Compensation and Benefits Committee (referred to herein as the "Administrator") of Alcoa's Board of Directors (the "Board") will administer the Plans. Members of the Administrator are appointed by Alcoa's Board of Directors in accordance with the By-Laws of Alcoa, as in effect from time to time.

Further information about the Plans and the Administrator is available without charge upon written or oral request to:

Alcoa Inc.
Attention: Alcoa Manager, Stock Administration
201 Isabella Street
Pittsburgh, PA 15212
AlcoaStockIncentives@Alcoa.com

Eligibility

Employees, non-employee directors and individuals engaged to become employees or non-employee directors of RTI, its affiliates and/or its subsidiaries were eligible to be selected to participate in the Plans prior to the Merger. Following the Merger, the Administrator does not intend to grant any new awards under the Plans.

Shares Available for Issuance

Up to a total of 2,631,814 Alcoa Shares may be issued pursuant to the Converted Awards. Alcoa Shares delivered pursuant to the Converted Awards may consist, in whole or in part, of authorized and unissued shares, treasury shares or shares purchased on the open market.

If any Alcoa Options expire or are cancelled or forfeited, it is expected that the Alcoa Shares underlying the unexercised Alcoa Options will no longer be available for issuance under the Plans, since the Administrator does not intend to grant any new awards under the Plans following the Merger.

If any Alcoa RSU Awards are forfeited or cancelled, it is expected that the Alcoa Shares underlying such Alcoa RSU Awards will no longer be available for issuance under the Plans, since the Administrator does not intend to grant any new awards under the Plans following the Merger.

Type of Awards

Alcoa Options

RTI Options granted under the Plans represented a right to purchase RTI Shares at a price equal to or greater than the fair market value of the RTI Shares on the date of grant on terms and conditions determined by the RTI Committee and evidenced by an award agreement setting forth such terms and conditions. The terms under which the Options may be exercised, including the manner of payment of the exercise price, and the effect of a participant's termination of employment or service, whether for or without cause, or as a result of death, disability or retirement, on an Option were determined by the RTI Committee and set forth in the applicable award agreement.

At the effective time of the Merger, in accordance with the terms of the Plans and the Merger Agreement, each RTI Option outstanding under the Plans converted into an Alcoa

Option to purchase, on the same terms and conditions as were applicable to such Option immediately prior to the effective time, the number of Alcoa Shares, rounded down to the nearest whole number of shares, determined by multiplying the number of RTI Shares subject to such Option immediately prior to the effective time by the exchange ratio of 2.8315, at an exercise price per Alcoa Share, rounded up to the nearest whole cent, equal to the per share exercise price of such Option immediately prior to the effective time divided by the exchange ratio of 2.8315.

Alcoa RSU Awards

RSU Awards and PSA Awards granted under the Plans represented the right to receive RTI Shares, or the fair market value thereof, subject to certain service-based and, in the case of PSA Awards only, performance-based, vesting conditions, as determined by the RTI Committee. The terms under which the RSU Awards and PSA Awards may become vested and/or earned, and the effect of a participant's termination of employment or service, whether for or without cause, or as a result of death, disability or retirement, on an RSU Award or PSA Award were determined by the RTI Committee and set forth in the applicable award agreement.

At the effective time of the merger, in accordance with the terms of the Plans and the Merger Agreement, each RTI RSU Award, RTI 2014 PSA Award and RTI 2015 PSA Award converted into an Alcoa RSU Award on the same terms and conditions as were applicable to such RSU Award, 2014 PSA Award or 2015 PSA Award, respectively, immediately prior to the effective time (except for performance-based vesting conditions, which ceased to apply as of the effective time), in respect of the number of Alcoa Shares, rounded down to the nearest whole number of shares, determined by multiplying the number of RTI Shares subject to the RSU Award, 2014 PSA Award (assuming, for this purpose, achievement of the maximum target performance percentage) or 2015 PSA Award (assuming, for this purpose, achievement of 125% of target performance), respectively, by the exchange ratio of 2.8315.

Change in Control

The Merger constitutes a change in control of RTI for purposes of the Plans and the following is a general summary of the impact of the Merger on the vesting and payment of the Converted Awards. This summary is qualified in its entirety by reference to the terms of the documents governing the Converted Awards, including the Plans, the applicable award agreements, the Merger Agreement and any applicable employment letter agreement or severance policy.

As described above, in connection with the Merger, all RTI Options outstanding immediately prior to the effective time of the Merger were converted into Alcoa Options and all unvested RTI RSU Awards, 2014 RTI PSA Awards and 2015 RTI PSA Awards outstanding immediately prior to the effective time of the Merger were converted into Alcoa RSU Awards.

All unvested RTI Options granted under the 2004 Plan that remained unvested as of immediately prior to the effective time were converted into vested Alcoa Options in accordance with the terms of the 2004 Plan.

All unvested RTI Options granted under the 2014 Plan were converted into unvested Alcoa Options, and all unvested RTI RSU Awards, 2014 RTI PSA Awards and 2015 RTI PSA Awards were converted into unvested Alcoa RSU Awards, which vest in each case based on continued employment with Alcoa and its affiliates following the Merger. In accordance with the terms of the 2014 Plan and the Merger Agreement, upon a termination of a participant's employment by the Company without "cause" (as defined in the 2014 Plan or the applicable award agreement) or by the participant with "good reason" (if the participant is entitled to terminate his or her employment for "good reason" pursuant to his or her employment, severance or other similar agreement) occurring during the period of twenty-four (24) months after the Merger, (i) all outstanding unvested Alcoa Options and Alcoa RSU Awards held by the participant would become fully vested, (ii) in the case of Alcoa Options, all such Alcoa Options will be cancelled as of the date of termination in exchange for a payment of cash or shares equal to the excess of the fair market value of an Alcoa Share on the date of termination over the exercise price per share of the Alcoa Option multiplied by the number of Alcoa Shares underlying the Alcoa Option, and (iii) in the case of Alcoa RSU Awards, all such Alcoa RSU Awards will be cancelled as of the date of termination in exchange for a payment of cash or shares (to be paid or delivered at the time or times specified in the applicable award agreements or applicable employment letter agreement or severance policy) equal to the fair market value of the Alcoa Shares underlying the Alcoa RSU Award on the date of termination.

Recapitalizations and Reorganizations

The number of Alcoa Shares underlying the Converted Awards and the exercise price of each Alcoa Option are subject to adjustment in connection with certain transactions or events impacting outstanding Alcoa Shares, including a stock dividend, share exchange, recapitalization or similar event transaction or event which the Administrator determines requires an adjustment to prevent dilution or enlargement of the benefits or potential benefits intended to be made available under the Plans.

Forfeiture and Clawbacks

Converted Awards are subject to forfeiture as set forth in the applicable award agreements. In addition, each Converted Award originally granted under the 2014 Plan is subject to forfeiture to the extent provided in any applicable clawback policy adopted by the Company or otherwise required by applicable law.

Amendment or Termination

In general, the Plans may be terminated or amended, and the Converted Awards may be amended, by the Administrator in the case of the 2014 Plan or the Board of Directors of Alcoa in the case of the 2004 Plan, subject to certain limitations set forth in the Plans, including that, in general, no such termination or amendment may adversely affect the rights of any participant under any outstanding Converted Award without such participant's consent, unless certain conditions exist.

Rights to Employment

Neither the Plans nor any Converted Awards will provide a promise of future employment by the Company or its affiliates or will interfere in any way with the rights of the Company or any affiliate to terminate the employment of any participant at any time or to adjust the compensation of any participant at any time.

CERTAIN FEDERAL INCOME TAX CONSEQUENCES

The following is a brief summary of the principal U.S. federal income and employment tax consequences of the Converted Awards to participants and the Company. It is based upon an interpretation of present federal income tax laws and regulations and may be inapplicable if such laws and regulations are changed. This summary is not intended to be exhaustive or constitute tax advice and does not describe state, local or foreign tax consequences. To the extent any Converted Awards are subject to Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), the following description assumes that such awards will be designed and administered to conform to the requirements of Section 409A of the Code and the regulations promulgated thereunder (or an exception thereto). The Plans are not subject to the Employee Retirement Income Security Act of 1974, as amended, and are not intended to be qualified under Section 401(a) of the Code. If you have any questions as to the federal, state or other tax consequences of participating in the Plans, you are advised to consult your personal legal or tax advisors.

Alcoa Options

A participant will recognize ordinary income when an Alcoa Option is exercised, in an amount generally equal to the excess of the fair market value of the Alcoa Shares received over the exercise price paid by the participant. The Company is generally entitled to a tax deduction in an amount equal to the ordinary income recognized by the participant. Upon a subsequent disposition of the Alcoa Shares acquired under an Alcoa Option, the participant will realize short-term or long-term capital gain (or loss) depending on the holding period. The capital gain (or loss) will be short-term if the Alcoa Shares are disposed of within one year after the Alcoa Option is exercised and long-term if the Alcoa Shares were held for more than one year as of the sale date.

Alcoa RSU Awards

Upon settlement of an Alcoa RSU Award, the participant will recognize ordinary income in an amount equal to the amount of the cash received or, if the Alcoa RSU Award is settled in Alcoa Shares, the fair market value of the Alcoa Shares received. The Company is generally entitled to a tax deduction in an amount equal to the ordinary income recognized by the participant. If the participant is an employee of the Company, the participant may, depending on the terms of the award, be subject to Social Security and Medicare taxes at the time the Alcoa RSU Award becomes vested for this purpose, even though no cash is paid and no Alcoa Shares are delivered at that time.

Consequences of Change in Control

To the extent that the Merger causes the accelerated vesting and/or payment of the Converted Awards, the participants could, in some cases, be considered to have received "excess parachute payments," which could subject participants to a 20% excise tax on the excess parachute payments and could result in a disallowance of the Company's tax deductions under Section 280G of the Code.

Internal Revenue Code Section 409A

Converted Awards may, in certain instances, result in the deferral of compensation that is subject to the requirements of Section 409A of the Code. Generally, to the extent that these awards fail to meet certain requirements under Section 409A, the regulations issued thereunder or an exception thereto, the participant will be subject to immediate taxation, interest and tax penalties in the year the award vests. It is intended that the Converted Awards be structured and administered in a manner that complies with the requirements of Section 409A of the Code, but there is no guarantee that the Converted Awards will so comply.

ADDITIONAL INFORMATION REGARDING THE PLAN

Requests for additional information about the Plan and the Administrator should be directed to:

Alcoa Inc.
Attention: Alcoa Manager, Stock Administration
201 Isabella Street
Pittsburgh, PA 15212
AlcoaStockIncentives@Alcoa.com

RESTRICTIONS ON TRANSFERS AND SALES

Generally, a participant cannot sell, transfer, pledge, assign or otherwise alienate or hypothecate a Converted Award, other than by will or the laws of descent and distribution or a qualified domestic relations order, depending on the terms of the Plans and/or the participant's award agreement. Unless otherwise provided in the Plans and/or the applicable award agreement, during a participant's lifetime, only the participant can exercise the rights associated with an Alcoa Option.

Alcoa filed a Registration Statement on Form S-8 as Post-Effective Amendment No. 1 to the Form S-4 to register the Alcoa Shares to be issued under the Plans. Persons who are not "affiliates" of Alcoa under Commission rules and who acquire Alcoa Shares pursuant to the Plans generally will be entitled to sell such Alcoa Shares without complying with the requirements of Rule 144 under the Securities Act or the registration requirements of the Securities Act.

In general, persons who are considered to be "affiliates" under Commission rules (including directors and certain executive officers of Alcoa) may offer or sell Alcoa Shares acquired under the Plans only if such shares are registered by Alcoa under the Securities Act or if the person complies with the restrictions imposed by Rule 144 under the Securities Act, which provides an exemption from registration.

It is illegal to buy or sell Alcoa Shares while you are in possession of material nonpublic information about Alcoa. Please refer to Alcoa's Insider Trading Policy for further information.

The foregoing is not intended to be a complete statement of applicable law, and you should consult your own legal counsel for information regarding restrictions on the sale of Alcoa Shares acquired pursuant to the Plans under the Securities Act and the Exchange Act.

SUPPLEMENTS TO PROSPECTUS

A supplement to this prospectus may be furnished to you from time to time as appropriate to reflect changes in the information contained in this prospectus, such as material amendments to the Plans.

U.S. Circular 230 Notice: Any U.S. federal tax advice included in this prospectus was not intended or written to be used, and cannot be used, for the purpose of avoiding U.S. federal tax penalties. You should consult your own tax advisor regarding the U.S. federal, state, local and other tax consequences of participation in the Plans that apply to your particular circumstances.