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Full-fledged Operation of Electrostatic Precipitators for Coal-fired Power Plant in Turkey
Provides World's Highest Level of Performance by Hitachi Plant Construction’s Original MEEP Technology

Tokyo, February 27, 2015 – Hitachi Plant Construction, Ltd. (“Hitachi Plant Construction”) today announced that it has started full-fledged operation of the two electrostatic precipitators*1 for a coal-fired power plant, the 350 MW-class Izdemir Plant, located in the Izmir region in western Republic of Turkey (“Turkey”). Hitachi Plant Construction won the order from and delivered the systems to Izdemir Enerji Elektrik Üretim A. Ş. (“Izdemir Enerji”), a power utility operator in Turkey. The electrostatic precipitators in operation remove dust from the gases emitted from the coal-fired boilers. The systems use moving electrode electrostatic precipitators (“MEEP”*2) Hitachi Plant Construction’s original technology. As a result, the system has been designed to satisfy the world’s highest level of performance*3 of a dust density in the emitted gas of less than 10 mg/m³ N. This is the first order for electrostatic precipitators and their operation that Hitachi Plant Construction has received in Europe and the Middle East.

Currently, Turkey is continuing its economic growth in line with the target set by the Government for the country to become the 10th largest economic power in the world by 2023. Demand for electric power is increasing due to this economic growth, and Turkey plans to increase its total power generating capacity from its current level to more than double at 125 GW, by 2023. Coal-fired power generation currently accounts for approximately 30% of Turkey’s total power generating capacity. Going forward, coal-fired
power generation is expected to continue to play a key role in the power sector as a base power source. At the same time, however, environmental protection measures are needed and the regulations covering the emission of dust from coal-fired power plants are being strengthened. In particular, the Izdemir Plant is located in Turkey’s third largest city which also includes a resort area, and consequently the regulation values are being set to strict levels.

It is against this backdrop that Izdemir Enerji has adopted Hitachi Plant Construction’s electrostatic precipitators for its Izdemir Plant, a coal-fired power plant. The order’s electrostatic precipitator has an improved performance in comparison with an ordinary electrostatic precipitator because it has one section more: it is a four-section type (configured of dust collection units in four sections). The front three sections are fixed electrode electrostatic precipitators, and the rear section is a moving electrode electrostatic precipitator that uses Hitachi Plant Construction’s original technology, namely, MEEP. Hitachi Plant Construction’s MEEP scrapes the dust off with a brush while moving the dust collecting electrode to collect the dust. As a result, the system can thoroughly separate off the fine dust and even the high-resistivity dust\textsuperscript{4} that it is difficult for conventional fixed electrode electrostatic precipitators to remove. Moreover, because the dust collection efficiency is high, in comparison with a fixed electrode electrostatic precipitator, the number of dust collecting electrodes and the number of discharge electrodes can be reduced, resulting in the realization of a much more compact\textsuperscript{5} device. This combination of high-performance dust collecting and a small size has won acclaim, and so Izdemir Enerji has adopted Hitachi Plant Construction’s electrostatic precipitator for its coal-fired power plant.

Hitachi Plant Construction has formulated the basic plan for this overall dust collecting system, delivered the key components, proposed a design that calls for components such as the steel frames and casings to be made in Turkey, and sent assigned instructors to assemble the system and conduct trial operations. This electrostatic precipitator has been designed to be able to satisfy environmental regulations as they are further strengthened, and includes a vacant room at the front stage to allow the installation of extra fixed electrode components.

Hitachi Plant Construction will leverage this order and the start of operations in Turkey to position MEEP as a key technology going forward, and aggressively increase sales of electrostatic precipitators where higher demand is forecast, particularly in emerging markets.
Outline of the Installed Electrostatic Precipitators

<table>
<thead>
<tr>
<th>Power plant name</th>
<th>Izdemir Coal-fired Thermal Power Station</th>
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<tbody>
<tr>
<td>Location</td>
<td>Izmir, Turkey</td>
</tr>
<tr>
<td>Customer</td>
<td>IZDEMIR ENERJI ELEKTRIK ÜRETİM A. Ş.</td>
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<tr>
<td>Order details</td>
<td>Proposal of the basic plan of two electrostatic precipitators (a four-section type: three sections are fixed electrode electrostatic dust collection units, and one section is a moving electrode electrostatic precipitator), proposal of a design that calls for some components such as the steel frames and casings to be made in Turkey, and the sending of assigned instructors to assemble the system and conduct the trial operation</td>
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Outline of Moving Electrode Electrostatic Precipitators (“MEEP”)

Electrostatic precipitators are devices that collect dust by drawing it to the dust collecting electrode by using a discharge electrode to electrostatically charge the dust in the gas included in the flue emissions. With conventional fixed electrode electrostatic precipitators, the collection plate is hammered at regular intervals to knock off the collected dust. However, it is difficult to sufficiently remove highly adhesive, high resistivity dust from the plate. As a result, the surface of the collecting plate becomes covered by layers of adhered high-resistivity dust. If operation continues under these conditions, high-resistance obstruction and the back corona phenomenon will occur due to the dust covering the collecting plate. The corona current from the discharge electrode will be abated, and the dust deposited on the collecting electrode will cause dielectric breakdown, seriously degrading the dust collection performance.

For the moving electrode electrostatic precipitator, a moving electrode mechanism and a new method that removes dust by means of brushes were developed, enabling the efficient collection of high-resistivity dust and a space-saving footprint.
Advantages

(1) High-performance
The collecting electrode, divided into rectangular strip-shaped plates, is moved slowly toward the lower roller by the rotation of the drive wheel. It is turned in the opposite direction by the roller, and dust electrostatically charged by negative ions emitted from the discharge electrode is captured on the collecting plates. The adhered dust is scraped off by two brushes positioned on either side of the collecting plates, thereby keeping the collecting electrodes clean and maintaining the dust collection efficiency. The brushes’ scraping is conducted outside the dust collection area, thus preventing re-entrainment of the dust and maintaining the dust collection performance.

(2) Space-saving and energy-conserving
Because the dust collection efficiency is high, in comparison with a fixed electrode electrostatic precipitator, the number of dust collection electrodes and the number of discharge electrodes can be reduced, resulting in the realization of a much more compact device. This enables a reduction in electricity consumption for the charging, thereby also contributing to conserving energy with the electrostatic precipitator.
About Hitachi Plant Construction, Ltd.

Hitachi Plant Construction, Ltd. is a company established on October 1st, 2013 after merging and integrating the Energy System Division of Hitachi, Ltd., Infrastructure System Company with Hitachi Plant Engineering and Service, Ltd. As a member of Hitachi Group we are deployed on Social Innovation Projects worldwide, providing Engineering, Construction and Construction Support Services in the fields of Electric Power and Industrial Plants following fundamental precepts of Safety and Quality as our top priority. Now, in pursuit of further enhancement, we are committed to becoming a major global player who shall provide the fields of Social and Industrial Infrastructures with far reaching solutions, being trusted by our stakeholders and counted on by society and communities, as a construction professional possessing a prominent technologies and excellent quality on the basis of expertise and know-how gained and accumulated over many years. For more information on Hitachi Plant Construction, please visit the company's website at http://www.hitachi-plant-construction.com/index.html.

About Hitachi, Ltd.

Hitachi, Ltd. (TSE: 6501), headquartered in Tokyo, Japan, delivers innovations that answer society’s challenges with our talented team and proven experience in global markets. The company’s consolidated revenues for fiscal 2013 (ended March 31, 2014) totaled 9,616 billion yen ($93.4 billion). Hitachi is focusing more than ever on the Social Innovation Business, which includes infrastructure systems, information & telecommunication systems, power systems, construction machinery, high functional materials & components, automotive systems, healthcare and others. For more information on Hitachi, please visit the company's website at http://www.hitachi.com.

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