Part 3

ASH AND SLAG HANDLING

3.7. Analytics

3.7.1. About a system approach for solution of THE problem on ash and slag from TPPs

Ph.D. Putilov V.Y., Ph.D. Putilova I.V. MPEI(TU)

ABSTRACT.

In the paper the basic issues concerning system approach for effective solution of the problem on ash and slag from TPPs in the separate countries and worldwide are observed. They are: regular monitoring of existing and potential commodity market of ash and slag from thermal power plants; constant research of sanitary-and-hygienic properties of ash and slag and restrictions for their use by commodity product manufacture; perfection of normative and legal documents on ash and slag handling; supplying producers and users of ash and slag with information on technological, legal and other questions on beneficial ash and slag handling in view of the world experience; a role of bodies of legislative and executive authority of all levels of the government in solution of an interbranch problem on ash and slag handling; influence of international economic communities - EU, WTO and other economic cooperation organizations on use of ash and slag as substituents of natural raw material in the countries worldwide; informing the world community on the best available state-of-the-art technologies for beneficial use of ash and slag and potential danger of landfilling them in ecologically imperfect ways; creating international terminology on ash and slag handling and other issues.

ON NECESSITY OF THE SYSTEM APPROACH FOR THE EFFECTIVE SOLUTION OF A PROBLEM ON ASH AND SLAG FROM TPPS IN THE SEPARATE COUNTRIES AND WORLDWIDE.

In connection with civilization evolution and creation of conditions for comfortable life of population use of natural resources is strongly increased. This leads to producing the large volumes of by-products from industry, agriculture and household wastes. Natural resources are not infinite and already now some countries are short of them for realization of economic activities. At the same time most countries of the world are facing to a serious problem on utilization of industrial by-products and household wastes. There is a question: whether it is possible to reduce limited natural resources due to their replacement by industrial by-products? We shall consider this situation with reference to coal combustion by-products from thermal power plants. Burning coal in power boilers by-products in the form of fly ash and bottom ash/boiler slag are produced. Ashes and slags are valuable mineral raw materials of man-made origin in view of their chemical and mineralogical composition. The future of these materials from power generation strongly depends on how we identify them: «Ashes and slags are wastes» or «ashes and slags are valuable mineral raw material of man-made origin».

Script №1: «Ashes and slags are wastes» and aftereffects of such a definition. The concept "wastes" means, that it is impossible to use ashes and slags in economic targets and they are to be disposed on sites for constant storage. At annual production of ashes and slags from power generation in the amount of hundreds million tons worldwide significant areas for landfills construction situated near to large cities, are required. It's well-known, that ash landfills of thermal power plants even at accomplishment of a necessary complex of nature protection provisions impact environment strongly not only in a zone of their arrangement, but also outside the limits owing to dusting and water pollution by filtrates. Hence, defining ashes and slags as wastes and landfilling them, we are intentionally poisoning environment and, this way, we deliberately make an ecological crime against humanity.

Script №2: «Ashes and slags are valuable mineral raw material of man-made origin» and aftereffects of such a definition. If it so, what is necessary to do for maximum ash and slag use for manufacturing various types of products both as substituents of natural raw material, and as components for manufacturing other types of products, analogs of which are absent. As an instance it is possible to result microspheres or rare-earth elements, quantity of which in an earth's crust is very small.

If we are for the second ash and slag definition, so they are considered to be marketable products, and every product has its price. What is the price of these goods? There is no univocal answer to this question because of the following reasons:

1. Initial consumer ash and slag properties are defined by conditions of power generation and depend in the core on these factors:

chemical and mineralogical composition and combustion technologies of coal;

technologies of bottom ash/boiler slag evacuation from the furnace of boiler plants;

technologies of fly ash collecting;

technologies of ash and slag extraction from boiler plants, internal and external transportation of ash and slag, unloading them to users and disposing of not demanded part of ash and slag at landfills.

2. A possible market price of coal combustion ash and slag in most cases is a variable quantity and essentially depends on the following major factors:

presence and development of the market of natural raw material users that can be substituted for ash and slag and/or products of their processing;

coverage with mineral and nonmetallic natural resources of a region where a thermal power plant is situated;

presence or absence of sanitary-and-hygienic restrictions on use of ashes, slags, ash and slag mixtures and products of their air-conditioning for use in various branches of economy;

volumes and seasonal prevalence of demand for natural resources, which can be substituted for ashes and slags in traditional branches of economy (production of building materials, construction of industrial and civil objects, transport construction, agriculture, etc.);

development of a transport infrastructure;

demand for separate ash and slag fractions for manufacturing new types of a finished product using nanotechnologies or for producing composite materials which can not be manufactured only from natural raw material components.

trends of demand increase for natural raw material which can be substituted for ash and slag and products of their processing, etc.;

A state policy plays significant, and more often defining role not only in questions of price formation on coal combustion ash and slag, but also in solving the problems on ash and slag from thermal power plants and handling of by-products from power generation (often incorrectly determined as a common term “wastes"), in the following areas:

environmental protection;

rational nature management;

handling of industrial by-products.

In this connection state bodies of legislative and executive authority should provide continuous system work finding necessary financing in the following directions:

regular monitoring of an existing and potential commodity market of ash and slag from thermal power plants for estimating ash and slag need as substituents of natural raw material;

research of sanitary-and-hygienic properties of ash and slag and restrictions on their use by manufacture of a commodity output;

perfection of normative and legal deeds on ash and slag handling;

supply with information of producers and users of ash and slag on technological, legal and other questions on effective ash and slag handling in view of the world experience.

Thus, it is necessary to emphasize an importance of effective interacting of legislative and executive authority bodies of all levels of the government in solving an interbranch problem on ash and slag handling;

Considering an universal integration processes in economy, an important mission should be carried out by international economic communities such as EU, WTO, Shanghai Cooperation Organization, CIS and other organizations of economic cooperation on effective solution of two interconnected problems on ash and slag use and coal combustion by-products handling for the maximum man-made impact decrease; informing of the world community on the best available state-of-the-art technologies on beneficial use of ash and slag and potential danger of disposing them in ecologically imperfect ways; formation of the international terminology on ash and slag handling and other issues.