

**International Workshop on
Environmental Aspects of Coal Ash Utilization**

Tel Aviv, Israel
December 15th – 16th 2009

Discussion platform:

Monitoring trace elements in coal ash

[Appendix – Discussion platform: maximum values for leachable trace elements](#)

Background

- Restriction on a coal from a given source are implemented according to the guidelines of the Chief Scientist of the Ministry regarding maximum values for pollutants in ash and based on the recommendations of the professional-scientific panel (pollutants). The restriction pre-supposes exploitation of all the ash that is produced for beneficial uses. The Israel Electric Corporation (IEC) is examining proposals to purchase coal on the basis of its accumulated knowledge and on its experience regarding the correlation between the concentrations of trace elements in laboratory ash¹ (produced during testing before a purchase) and concentrations in industrial ash (obtained during the combustion of coal in power stations).²
- Environmental requirements for the combustion of coal are included in the requirements for the operation of power stations (program for the prevention of air pollution hazards), and as such they are also the restrictions regarding the purchase of coal (e.g. restrictions on sulfur concentration). Together with the other properties included in the specifications for coal purchase, these requirements determine, considerably, the chemical characterization of coal ash.³
- In light of the findings of the tests conducted in Holland regarding organic pollutants in Israeli ashes, no restrictions on the source of the coal, as related to the organic pollutants content in the ash, are necessary, as long as the coal is bituminous or sub-bituminous, and as long as no other fuel is burnt together with the coal.⁴
- A significant change in the properties of the ash as a result of a change in the constituents of the basket of fuel sources for power stations, or in the combustion procedures, which according to existing knowledge can cause a rise in the concentrations of pollutants in the ash designated for use, will be conditioned on a recommendation by the professional-scientific (pollutants) panel and on authorization by the Ministry.⁵
- Routine tests include analyzing for concentration of trace elements (metals and radioisotopes) in coal and coal ash using appropriate standard procedures

¹ Laboratory ash – obtained from coal combustion in the laboratory.

² [Background document](#) prepared by Ariel Metzger.

³ [Background document](#) prepared by Ariel Metzger.

⁴ Based on the findings of the KEMA tests of Israeli ash, R. Meij [report](#).

⁵ Agreement of understanding with IEC – Chief Scientist, Ministry of Environmental Protection

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under the supervision of the National Professional Echelon in the framework of the "Environmental Damages Prevention Plans" issued as parts of the power stations operation licenses.⁶ The guidelines were formulated before the development of a variety of uses of the ash and are related to a mixture of all ashes produced over a period of six months. They therefore reflect a situation in which there is an accumulation and removal of large stockpiles over prolonged periods.

- The method for testing leachates (as a condition for the use of ash that meets the "useable ash" criterion) was determined provisionally to be Method TCLP-1311 of the US-EPA⁷.

Existing monitoring requirements

- Analyzing for concentration of trace elements in coal, fly ash and bottom ash and in fly ash leachates using TCLP-1311.
- Testing of composite samples is performed every six months

Subjects for discussion

- The correlation between concentrations of trace elements in coal, laboratory ash and concentrations in industrial ash as dependent on the properties of the coal and the ash and on the combustion conditions⁸
- A recommended Israeli version for another method of leaching characterization test and its practical context for the various types of ash applications^{9 10}
- A definition of representative coal ash for the purpose of testing its compliance with the "designated use" criterion:
 - Semi-annual mixture of sources
 - Periodical samples of individual sources

Proposed monitoring requirements

- Testing of pollutant concentrations in coal ash leachates in accordance with an Israeli version of elution method EN 12457-2, used in parallel with TCLP – 1311 for a transition period, until sufficient data will be collected for a final resolution of a preferred elution method. New leaching test procedures, currently in progress in US-EPA and CEN, will be considered as well.

⁶ [Survey](#) by Ariel Metzger

⁷ [Summary](#) of professional-scientific committee for coal ash

⁸ Findings of KTM model in Israeli ash will be presented in the workshop by R. Meij.

⁹ [Proposal](#) by Y. Nathan

¹⁰ [Comparison](#) of TCLP findings with findings of EN-12457-2

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- Checking the possibility of coal purchase proposals with the aid of a model that could help to predict pollutant concentrations in coal ash produced at the power station on the basis of their concentrations in coal.
- Continuation of the monitoring tests on composite samples to check the evolution of ash quality with time.
- Testing of periodically collected industrial ash samples that are representative of individual new sources (mines) or sources that have undergone a significant change or sources that haven't been tested over more than two years. The samples will be composed of a mixture of representative sub-samples from each source periodically collected at the time of combustion. The collection period of the sub-samples will be determined in consultation with the professional-scientific (pollutants) panel.