Epilogue

Professional insights from the Environmental Workshop

Tel Aviv November 2005

General

The discussions of the workshop positioned Israeli researchers at the cutting edge of world knowledge and provided a forum for the exchange of information and opinions regarding the environmental and health implications of the use of coal ash in its various applications and the implications of this use under Israeli conditions.

The aims of the workshop:

- To sum up the existing knowledge regarding Israeli coal ash and the environmental and health implications of its use;
- With the help of guest lecturers from abroad, to compare Israeli coal ash and its effects to coal ash in other places in the world; to compare environmental policies and approaches;
- To propose environmental standardization for the use of coal ash in Israel.

Subjects of the discussion

- Environmental criteria and measurement, and control methods in uses;
- Occupational hygiene conditions in work with coal ash;
- Environmental standardization for the use of coal ash.

The discussions reflected a consensus on a number of issues and brought to the surface problems for which it is still necessary to consolidate the positions of the experts in Israel and the recommendations that need to be presented to the environmental and health authorities.

These are the principal conclusions drawn following the workshop in the professional teams:

Pollutants in infrastructures – noted by the Profession-Scientific (Pollutants) Team

- **Hexavalent chromium** Despite the toxicity of hexavalent chromium, the total amount that could be leached from fly ash is negligible. These values have already been confirmed in the past by Prof. Frank Huggins of the University of Kentucky in the United States and Dr. Hans van der Sloot of the ECN research institute in Holland. Moreover, in the application of fly ash in infrastructures (under the required conditions of wetness and compacting as determined by the paving specifications), its permeability to water is very low and decreases with time. Consequently, the danger of ground and water pollution is low. Nevertheless, due to its high toxicity, the PSPT decided to reassess the maximum permitted level for all chrome in “usable” ash.

- **Methods of testing ash** – At the recommendation of the professional-scientific committee, which preceded the current PSPT, the TCLP test of the USEPA has been adopted for two main reasons: simplicity and the existence of a list of maximum values permitted for hazardous elements.
Generally speaking, this method suffers from a number of essential defects, and in relation to the implementation of coal ash in particular. Consequently, the committee at that time decided to look into the European system, which better reflects the situation on the ground, but at that time was in a preparation stage, and it was expected that when it is completed, a list of maximum values will be determined for it. Following its presentation at the workshop, the PSPT began to look into it. The system is comprised of two levels of testing: detailed one-time characterization for ashes from new sources and an ongoing compliance test for the criterion of “usable” coal ash. The PSPT is expected to recommend the adoption of the EN characterization test only and to continue apply the TCLP compliance test.

Test method for ash in infrastructure – Based on the studies that have been carried out in Israel and at the recommendation of Dr. Hans van der Sloot, the PSPT will look into the proposal to classify embankments, which are processes in accordance with road-paving specifications, as a monolithic (solid) material and to assess the danger to groundwater and the aquifer that they represent according to the criterion of the appropriate test (compacted granular leach test - CGLT) which partially facilitates the testing of the ash as a powder (shaking). Due to the dependence on the quality of the ash processing, it may be assumed that this facilitation will not be applied per se in areas of high sensitivity, especially ground water.

Radiation in construction – noted by the Profession-Scientific (Radioactivity) Team

Level of background radiation and calculation model – Despite the disagreement that still exists among the experts regarding the definition of the level of background radiation and radiation calculation model, it was made clear at the workshop as well as at the radiation workshop held at the initiative of the NCAB a month earlier, that the reference value should reflect the radiation from the domestic natural aggregates for building products and the permitted dose constraint should make possible the use of coal ash in building products at the accepted scales in the world, i.e. define the use of new industrial byproducts, such as coal ash, in building products as a “practice” according to ICRP terminology and therefore to introduce into the calculation model the radiation concentration of concrete made of natural aggregates only, as a background. The testimony of Dr. Chas Mason of the International Atomic Energy Agency that the Israeli experts are leaders in the standardization of construction products in the world bolstered the need for a firmer basis of vast survey of radiation levels from various prevailing construction products for the standardization proposals and for professional international appraisals of the proposals as calculation models.

Justification of the use of coal ash – The justification of coal ash in construction products in accordance with the principles of the ICRP was authorized some years ago in discussions held in professional teams and committees of experts. Following the comments made by Prof. Tuvia Schlesinger in the summary discussion, the PSRT has decided to create a database and estimates for calculation and justification according to the
updated economic terms (cancer prevention cost-benefit) of the ICRP and the alternative value of the ash in its use in construction.

Occupational and environmental hygiene – noted by the Profession-Scientific (Hygiene) Team

- **Classification of fly ash** – There appears to be a consensus among the experts to the effect that fly ash should be classified as nuisance dust (discontinuing the need, according to the Hazardous Dust Regulations, to carry out a chest x-ray – dangerous itself – every six months, for workers exposed to dust in that category), both regarding the concentration of free crystalline silica in the respirable fraction of the ash as well as regarding the concentration of radioactive elements. The NCAB has been requested by the Ministry of the Environment to prepare a document justifying the exclusion of fly ash from the Hazardous Dust Regulations.

- **Hexavalent chromium** – At a meeting of the PSHT held after the workshop, concern was raised that according to the new standardization proposal for concentrations of permitted pollutants in the air (environmental requirement), which is currently being examined in the Ministry of the Environment, the concentration of chromium in the ash could deviate from the limits of the standard. A detailed calculation of the expected concentration of chromium when dispersed in the air completely dispelled this concern.

Legislation

- **Memorandum of Understanding** – Following the workshop, the chief scientist of the Ministry of the Environment, Dr. Yishayahu Bar-Or proposed regulating the control of ash designated to be utilized in the context of a Memorandum of Understanding with the Israel Electric company (IEC) that would include the maximum values for pollutants, combustion procedures, storage sites, sampling and testing procedures in the context of routine control. The MOE is intended to serve as a complementary and preliminary condition for the environmental regulations of coal ash uses.

- **Use regulations** – In opposition to the position taken by the legal advisor of the Ministry of the Environment, which in principle tends to lean in the direction of granting individual business licenses for each user, NCAB presents the argument that the proper functioning of a complex economy requires a high level of certainty, both on the part of the user and the supervision, and that this requires the equal application of consistent standardization to every customer. In addition, the characteristics of the various uses of ash make it possible to introduce effective standardization of uniform and equal rules of wide application, making the need to determine specific requirements for each user superfluous. Until then, NCAB's proposal for environmental standards for the use of coal ash has been introduced into the 2006 work plan of the legal advisor of the Ministry of the Environment.