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CONSULTATION MEETINGS ON THE IRON AND STEEL INDUSTRY,

REPORT OF THE WORKING GROUP MEETING ON COKING COAL*

Vienna, 6-8 April 1978

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1. Mr. Nijhawan, Chairman of the UNIDO Task Force on Iron and Steel opened the Meeting and outlined the salient feature of the items for discussion as set out in the Working Paper UNIDO EX.36 of 24 February 1978 circulated to participants. A full list of participants is attached, including 10 from developed countries, 7 from developing countries, and 2 from international organizations.
2. Mr. Anibal Gomez, Secretary-General of ILAFA, was elected Chairman of the Working Group and Mr. R. Else, BSC (Overseas Services) Ltd., United Kingdom, Co-Chairman.
3. The Meeting agreed to proceed with the Agenda Items set out in the Working Paper.

Agenda Item A. Present situation and future prospects of the reserves, production and international market of coking coal, including access to its supplies

Reserves

4. The Meeting discussed the data on coal reserves given in Annex 1 of the Working Paper and debated the question whether an international classification of coking coal qualities should be established considering that at the present time countries were operating with their own classifications. Revised estimates of reserves put forward by the Xth World Energy Conference were also considered. It was suggested that there should be an approach by UNIDO before the XIth World Energy Conference to ensure that further revisions of reserve estimates took full account of changing economic circumstances.
5. Participants commented that the reserve figures had to be interpreted in the light of the qualities and classification of coals. The existing classifications depended to a large extent on the applications of coal in various countries and on other local circumstances. Having regard to the work already carried out on coal classification by bodies such as the Coal Committee of the ECE and the ISC it was recommended that UNIDO should keep in touch with all the work in progress on the subject.
6. In a discussion of the three questions in the Working Paper on the subject of future exploration for coking coal reserves it was pointed out that developing countries held reserves which in total were substantially less than would be needed to support the plans for steel industry development. There might be a need for regional groups of developing countries not possessing adequate coal resources to combine their requirements and make a joint approach to countries possessing such reserves. It was agreed that early information about future requirements should be given in this way so that a well co-ordinated effort could be made to undertake the necessary mining development.

7. Delegates outlined the co-operative activities in progress between developed and developing countries in technical assistance for coal mine development and coal beneficiation treatment. Reference was made to the experience of India, Federal Republic of Germany, Poland, the United Kingdom and USSR. The examples of co-operation quoted included the support given to companies needing to explore for new deposits and operate new mining techniques together with training management and operating staff in mining and the utilization of coals.

8. There was a reference to the proposed regional co-operation (corresponding to the programmes of the Organisation of American States) among Colombia, Venezuela, Mexico and Chile relating to the classification of coals by petrographic and other criteria and to techniques of coal usage including gasification and liquefaction; also to the initiative taken by ILAFA towards setting up a Latin American Centre on Coals.

9. There was also reference to the possible co-operation between Brazil and Canada in relation to the development of coal mines and steel works in Western Canada using ore supplied from Brazil. The two-way transport of ore and coal between the countries would yield substantial benefits for both parties.

Prospects for demand and supply

10. In a discussion of the estimates of demand and supply of coking coal for the years 1985 and 2000 it was suggested that the figures used should be correlated with the steel production figures taken for the purpose of the iron ore estimates discussed at the previous working group.

11. After detailed discussion of the factors underlying the calculations in Table I, it was agreed that the table represented a reasonable consumption forecast.

12. Some doubt was expressed whether the share of coking coal in hard coal production in the year 2000 would be as high as 21.6 % as in Table II. Estimates of hard coal production made by the Xth World Energy Conference gave a figure of 3.323 billion tons for 1985 and 5.031 billion tons in the year 2000, both these figures being markedly above the estimates provided in Table II.

13. A few participants expressed doubt whether the future production of coking coal would be sufficient to meet the requirements of the steel industry but several others expressed confidence that as demand evolved mine development would be undertaken to meet it. It was emphasized that finance was likely to be available for mine development on the security of long term contracts and that this factor underlined the importance of early arrangements between countries undertaking steel works development and countries from which supplies of coking coal would be drawn.

14. Rising prices of energy and new mining techniques might play a part in increasing the availability of coking coal. For example in Western Canada new techniques of mining including hydraulic mining were promising to give higher coal extraction from a coal mine than could be secured by conventional techniques.

15. On the question how the use of coking coal might be reduced outside the steel industry it was mentioned that in the United States for the period between 1971 and 1977 a few power stations had burnt metallurgical coal with a low sulphur content in order to keep within the limit of sulphur-emission into the atmosphere. Subsequently it was made compulsory for them to install flue gas desulphurization which made it possible for the power stations to relinquish their claim on the best grades of coal. Reference was also made to the transfer of control of coking coal reserves in India from the railways to the steel industry.

Access to supplies

16. In a discussion of the experience of developing countries in importing coking coal a number of participants referred to the difficulties caused by the shortage of supplies in 1974 and to other temporary shortages. The shortages had caused reductions in steel production, increased costs and the breaking of delivery promises for steel. Others made the point that it would not be right to over-emphasize the problems of 1974 since the shortage of coking coal supplies had arisen largely as a result of a sudden upsurge in the demand and production of steel. Steel producers in developed countries had also been affected by the supply difficulties.

17. On the more important point of obtaining access to supplies of coking coal, participants referred to various methods adopted such as tendering, long term contracts and the possibility of combined buying by a group of companies to take up the whole output from a particular mine. Governments might also be associated with such arrangements.

18. It was generally agreed that long term contracts were a satisfactory way of securing supplies of coking coal. It was however important to be clear about the conditions to be included in such contracts, particularly those relating to the necessity or otherwise of providing finance by the buyer for mine development. When purchasing countries arranging long term contracts were not asked to provide finance it was sometimes necessary for them to agree to firm conditions about the tonnages of coal which they would accept in good times and in bad.

19. It was not thought practicable to formulate a model long term contract for the purchase of coking coal since each contract had to be prepared between the purchaser and the supplier with their mutual acceptance. However, delegates agreed that UNIDO could assist developing countries with small demands for coking coal by outlining the terms and conditions normally encountered. In this connection participants drew attention to a Coal Congress which would be organized in 1979 by ILAFA and to the ECE seminar to be organized in Warsaw in 1979. Both these meetings might offer an opportunity for discussing contractual arrangements for supplies of coking coal.

20. Participants considered the prospects for co-operative buying of coking coal by regional or sub-regional groups and concluded that there was little scope for doing so in view of the problem of satisfying quality requirements. It was suggested that this question merited further study.

21. The question was raised whether small buyers would prefer to take a ready-made blend of coking coal instead of a range of single supplies. However coal mines were unlikely to have blending facilities to provide such a service, and most new steelworks development schemes included provision for blending coals in order to secure flexibility in their procurement policies for coking coal.

22. In a discussion of the problem of stocking coking coal, it was agreed that stocking for more than short periods of time was not practicable because of the deterioration in the coking quality of the coal. The financial burden of holding stocks should not be overlooked.

23. It was important for countries importing coking coal to take their supplies from a number of sources in order to minimise the effects of interruption of supply from any one particular mine.

Recommendations

24. UNIDO should maintain contact with all organizations undertaking work on the classification and definition of coal qualities as well in compiling information about reserves.

25. UNIDO should review the estimates of demand and supply of coking coal throughout the world taking into account particularly the results of the Xth World Energy Conference.

26. UNIDO should foster regional co-operation in establishing research and development centres to provide information and advice on all aspects of coal mine development and the utilization of coking coal.

27. UNIDO should organize a working group or a seminar for the benefit of buying countries with small demands for coking coal to familiarize them with the procedures for making long term contracts and with the standard forms of terms and conditions which would be normally encountered.

Agenda item B. Present status and availability of alternative technologies that might be used to replace or economise in the use of coking coal

28. In a discussion of these technical points a number of amendments were proposed to the Working Paper together with a revised version of Annex 4. It was stated that pulverised coal slurry injection was an established technique in the USSR and was under implementation in India. The coals used were non-coking and low in ash.

29. The injection of high BTU fuel into the blast-furnace was technically useful and led to lower coke rates.

30. Considerable pilot plant scale investigations were underway to gasify coal to produce a synthetic natural gas but the plants were expensive costing for example up to \$400 million to process 2000 tons a day of coal to a medium BTU gas. A demonstration semi-industrial scale plant to produce 250 million cubic feet of high calorific value gas would cost about \$1 billion.

The efficiency of such plants was limited and it was thought that research and development work could better be devoted towards liquefying coal. A seminar on coal gasification would be held in Pittsburgh, USA in August 1978.

31. There was a reference to the practice in USSR where techniques to economise in the use of metallurgical coke included injection of powdered coal through the tuyers. As a result it was expected that the coke consumption would remain constant over the next ten years in spite of rising production of pig iron.

32. Preheating coal fines before charging to the coke ovens was said to be an established technique for the improvement of the yield and quality from coke ovens. There was little saving in capital cost because the cost of the preheater was roughly the same as the cost of the additional coke ovens which would be needed to provide the extra output secured. Nevertheless, the improvement in quality of the coke combined with the possibility of using low grades of coal made the technique attractive.

33. For commercial operation of coke ovens it was now possible to select from a number of improved techniques including stamping, preheating and the partial addition of coal briquettes in the charge. The right selection depended on quality and cost considerations.

34. On the subject of direct reduction and other processes for the production of sponge iron, it was commented that in Latin America more than 10 % of the steel production was derived from such processes and that this percentage was expected to grow.

35. It was generally agreed that the gas-based DR processes were well established technically and their selection depended upon the price to be paid for gas and ore. Capital costs of new installations were reported to be in the region of 150 dollars per annual ton of sponge iron product where infrastructure facilities were available, but much higher figures were also quoted for some new plants on greenfield sites.

36. Much more development work was needed before solid reductant processes could find wide application in developing countries. The demonstration coal-based DR plant being established in India by UNIDO was referred to.

37. Participants referred to the use of charcoal for iron smelting and the use of the furnace gases in direct reduction.

38. In a full discussion of processes for the production of formed coke many delegates gave a description of the research and development undertaken in their countries. The processes were designed to use lower grades of fuel than were needed for conventional coke ovens. Details were given of formed coke based on low temperature carbonisation or without carbonisation. Experimental plants with daily outputs up to 600 tons had been established.

39. The economic advantage of using formed coke depended on the difference in price between premium grade coking coal and blending grades. In countries where the difference was small formed coke offered little advantage.

40. In a discussion of the suggestion that UNIDO should organize study tours relating to the new technologies directed towards economy in the use of coking coal, several participants agreed with the proposal while others pointed out that much information on the subject was available in published or other documentary form and that it would be important for participants to secure as much benefit as possible from such information before visits to plants were arranged. The study of the available published information would need to cover economic information about capital and operating cost of new processes as well as the technical factors.

41. Some participants referred to their work on formed coke and its use in cupolas as foundry coke. Several million tons had been produced, thus releasing premium grade coking coals for the blast furnaces.

Recommendations

42. UNIDO should consider organizing a working group or seminar for the benefit of developing countries in assessing the technologies available for economising in the use of coking coal taking advantage of the technical and economic information to be provided by organizations which have carried out research and development work in these fields. Subsequently, UNIDO should examine the possibility of organizing study tours to visit plants where new techniques were being applied.

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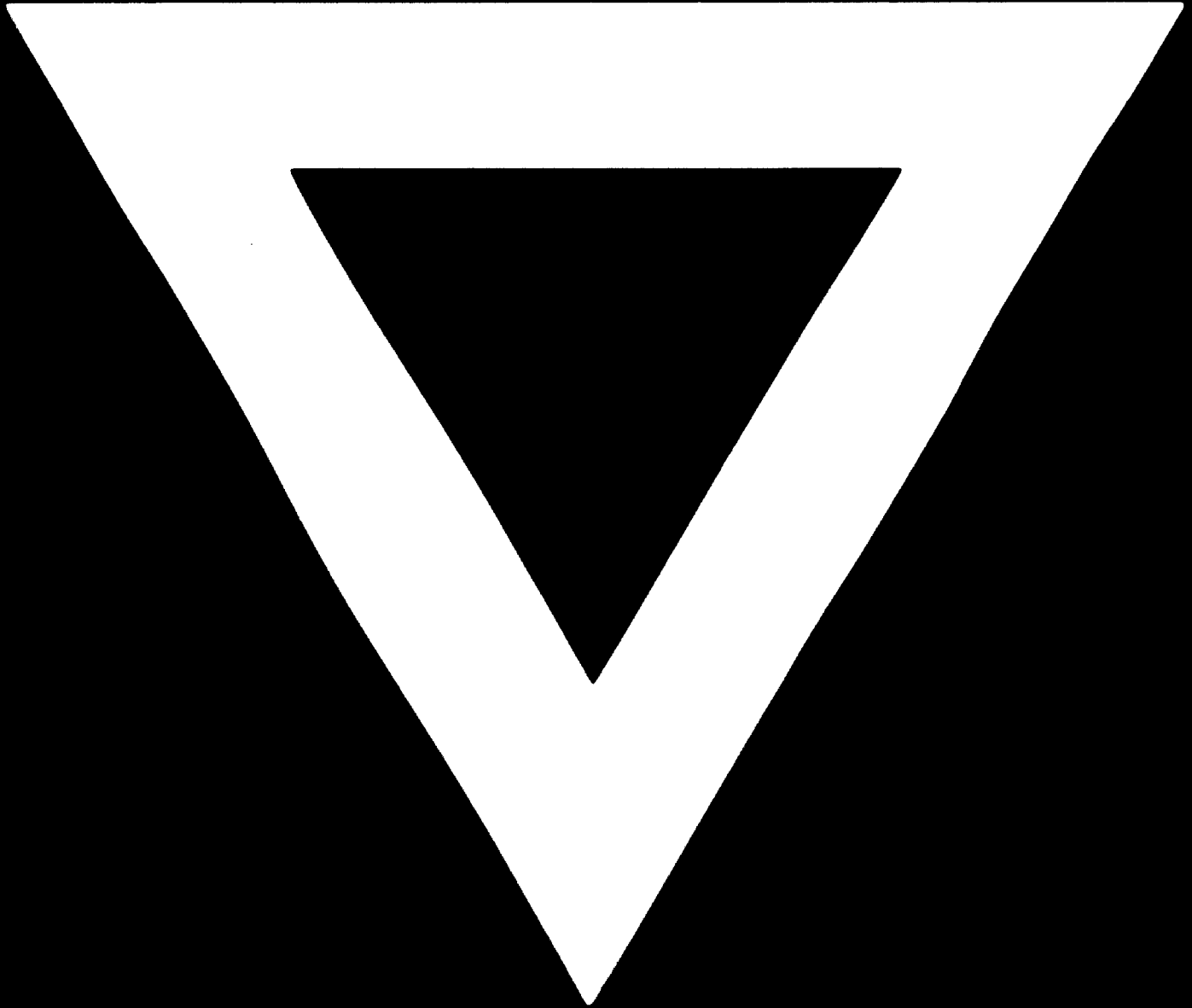
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