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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

FIRST REGIONAL WORKSHOP ON UNIDO MODEL FORMS OF CONTRACTS FOR THE CONSTRUCTION OF A FERTILIZER PLANT

Lahore, Pakistan, 27-31 October, 1986

REPORT

1/2

Distr.
LIMITED

IPCT. 12
6 January 1987

ENGLISH

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

First Regional Workshop on
UNIDO Model Forms of Contract
for the Construction of a Fertilizer Plant*
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* Organized by the UNIDO Secretariat in co-operation with the National Fertilizer Corporation of Pakistan Limited (NFC).

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A. Introduction :

1. At the First Consultation on the Fertilizer Industry held in January 1977, a number of developing countries indicated that their experience in building fertilizer plants from the 1960s onwards had clearly demonstrated that many plants were set up at high cost but subsequent low capacity utilization. Interestingly, in all those cases of low performance the contractors had strictly fulfilled all the contractual obligations.

2. The Consultation therefore recommended UNIDO to examine contract procedures intended to ensure the successful construction and operation of fertilizer plants. In November 1977 UNIDO convened a technical seminar on the subject, which concluded that existing forms of contracts were not entirely suitable for use by developing countries. In order to protect the interests of both purchaser and contractor in entering into a contract, it was necessary that certain fundamental technical, legal and contractual safeguards be maintained. The seminar therefore, proposed that UNIDO should elaborate new model forms of contract, since those used in the past in developing countries contain serious weaknesses in contractual and legal provisions which have ultimately worked to the detriment of both parties.

3. Based on the experience of several developing countries, it was felt that four types of model contracts would cover the practical range of plant construction possibilities. They are :

(i) a turn-key lump-sum contract, covering the complete supply and erection of the plant by the contractor ;

(ii) a semi-turn-key contract, where the contractor supplies detailed engineering, machinery and the equipment whereas purchaser undertakes civil work and plant erection at site ;

(iii) a cost reimbursable contract, where the contractor supplies know-how, engineering and supervisory services charged on a reimbursable basis, the machinery and equipment to be purchased at actual cost in the name of and, in some cases, by the purchaser, who also undertakes civil work and plant erection at site ;

(iv) a licensing agreement, covering the supply of licenses, process know-how, basic engineering and some other procurement/supervisory services by the licensor, while the purchaser carries out detailed engineering, procurement, civl works and erection at site.

4. The UNIDO model contracts, as finalized by international groups of experts, represent the agreement reached by contractors and purchasers after extensive negotiations, with the areas of disagreement presented as two schools of thought. These documents are judged to reflect a fairer and more realistic balance between the interests of both parties. These are expected to educate purchasers and contractors alike, to shorten their negotiation period for reaching a satisfactory outcome, and to facilitate a smooth and timely completion of the plant construction programme.

B. Objectives of the Workshop

5. The following objectives were set for the Workshop :

(i) Promote the exchange of experience in negotiating contractual arrangements with foreign partners among countries within the region ;

(ii) Assist government officials and industry managers to negotiate on an equal footing with the experienced technology suppliers and international contractors ;

(iii) Upgrade industrial contract drafting abilities by exposure to the current international practices ;

(iv) Establish regional links among government and industry representatives within the fertilizer sector for further co-operation ;

(v) Assess the practical feasibility of the model contracts prepared by UNIDO for the construction of fertilizer plants in developing countries and to exchange experience between fertilizer project managers and industrial authorities in the developing countries regarding the construction of processing plants ;

(vi) Formulate certain mechanisms for the use of these model contracts in assisting developing countries in their negotiation with fertilizer plant contractors and technology holders ;

(vii) Provide advice to entreprenures and government officials at present negotiating the licensing of the technology and the contracting of plant construction ;

(viii) Examine the possibility of insurance coverage for consequential losses arising from faults in design and construction as well as from equipment failures ;

(ix) Advise UNIDO on further work if needed on the model contracts.

C. Summary of Inaugural Addresses :

6. The Chairman of NFC, Mr. Zahur Ahmad Khan welcomed the participants of the Workshop. In his welcome address he underlined the importance and the timeliness of convening such a workshop by reminding the participants of the following :

7. The high cost and low capacity utilization of new fertilizer plants built in developing countries in the past ten years were identified as pressing problems deserving full attention of the international community. UNIDO thereafter was suggested to examine procedures for drawing up model contracts with a view to designing the best conditions for the successful construction and operation of such fertilizer plants. The subject was given high priority because of the large investments involved, the negative impact of delays in meeting the performance specifications of the plant supplied and low capacity at which such plant would operate.

8. The model forms of contracts as drafted by UNIDO now include a number of provisions based on the needs and the industrial reality of developing countries and also respect established commercial practices in the field. The model forms prepared also reflect a balancing of the interests of both the purchaser and the contractor under the conidtions prevailing in developing countries. National Fertilizer Corporation of Pakistan therefore hosted a Technical Seminar on Contracting Methods and Insurance Schemes for Fertilizer and Chemical Process Inudstries, in Lahore, from 25-29 November, 1977. Since that date NFC has been actively participating in the proceedings of drafting the contract procedures. National Fertilizer Corporation has so far used the Cost Reimburseable Contract for two of its new projects. First this model form of contract was used for the Fertilizer Industry Rehabilitation Project of Pakarab Fertilizers Limited, Multan. The contract was modified wherever necessary to suit the requirements of the project and the parties concerned. The same type of model contracts now available with UNIDO cover to a large extent the types of contract that can be envisaged. However, any combination of the contracts are possible depending upon the circumstances.

9. He pointed out that, UNIDO deserved the gratitude of the fertilizer community for the hard work it had undertaken in preparing these four model types of contracts which cover almost all practicable range of fertilizer plant design and construction.

10. He concluded by stating that we are now gathered here to exchange our experience on these model forms within this region. I am sure, everybody has something to contribute in the Workshop. I also hope that this Workshop will establish stronger regional links among the industry and the representatives present here in this Workshop which will lead to increased further co-operation.

11. Mr. J. A. Ghani, UNIDO representative addressing the inaugural session of the meeting stated that the contribution of the fertilizer industry to agricultural productivity and therefore to economic well-being of great masses of people in the developing countries was increasingly apparent. A major study published by FAO recently on the prospects of solving the current food crises in Africa was emphatic on the need for concerted action to develop this sector if policy targets in agriculture were to be met in the next twenty-five years. It was in full recognition of the priority reserved for the fertilizer industry within UNIDO that it became the very first industrial sector to be covered by the System of Consultations.

12. The First Consultation on the Fertilizer Industry held in 1977 recommended that UNIDO examine contract procedures to ensure the successful construction and operation of fertilizer plants. To this effect a Technical Seminar was convened in November of the same year in this beautiful and historic city of Lahore on contracting methods and insurance schemes for fertilizer and chemical process industries. The seminar concluded that UNIDO should prepare four types of model contracts, to cater for the differing needs in developing countries, namely contracts based on :

(a) Turnkey-lump sum ;
(b) Semi-turnkey ;

(c) Cost reimbursable, and

(d) Licensing and basic engineering services.

13. He further stated that it should be recalled, at this juncture, that the originality and value of these model forms of contract, as conceived by UNIDO, as instrument for negotiation, is basically due to the fact that they embody the result of a negotiation process between experienced parties. However, it should equally be remembered that the model contracts do not replace the parties' judgement or contractual skills. Rather they provide a basis from which a fair balance between mutual obligations, liabilities and compensations could be achieved according to the requirements of most developing countries.

14. Therefore, in spite of the fact that these documents have all been negotiated and drafted by legal experts and professionals of the chemical and fertilizer industries representing purchasers and suppliers and represented to the Second, Third and Fourth Consultation meetings, they are entirely void of any mandatory or binding character on prospective negotiations.

15. The mandate of UNIDO was to make a contribution to the industrial development process in the Third World. Customarily the vehicle of this development involved the negotiations, review, drafting and performance of highly specialized agreements. Yet the developing countries have often had no alternative but to learn the "rules of the game" at the bargaining table because their negotiators have lacked the specialized legal skills and the pertinent information. He concluded his remarks by saying that the Workshop's deliberations on the UNIDO model forms of contract for the construction of a fertilizer plant will go a long way in achieving fair and mutually beneficial agreements between contracting parties for the construction of chemical and related processing plants.

16. Mr. Riyaz Hussain Bokhari, Auditor General of Pakistan delivered the speech whose highlights are summarized below, before declaring the Workshop open. UNIDO and NFC are to be congratulated on the commendable job done by them in arranging this Workshop on a subject which is of particular interest to the leaders of fertilizer industry in the developing countries. Since the licensors, designers and engineers of plants, equipment & machinery for the fertilizer industries in developed world are naturally interested in the growth of this industry in the developing world, it will not be incorrect to say that the subject matter of discussion carries world-wide interest. I am sure, that after their in-depth discussions and deliberations, the recommendations drawn by the experts and specialists in the relevant fields will effectively assist all concerned in establishing and operating their fertilizer plants on the most profitable lines.

17. One of the most ticklish problems of planned socio-economic development is that the resources or savings which can be set aside for investments are always short of requirements if worth-while and tangible improvements in standards of living are to be achieved within a reasonable time. This is further compounded by the fact that most of the schemes for a lasting impact on a developing economy usually have long gestation periods. One had

to watch that the scarce resources are not wasted. The dilemma presented by the constraints is multi-dimensional. How should a balance be sought between the benefits of a coordinated development in different sectors of economy or regions of a country and the disadvantages arising out of delays in completion of various projects because of inadequate allocation of funds because of their diversion elsewhere ?

18. The most urgent need of the developing countries was to increase their food output to the maximum so that their large and continually expanding populations can be adequately fed and dependence on imports reduced. The best and most practical method of achieving these objectives was to improve agricultural yield per unit of land, which is now possible through the use of chemical fertilizers as an important part of the improved agricultural technology package. To continue to depend on imports of this essential input is not a good strategy and it is of prime importance for the developing countries to develop and expand their own fertilizer industry without loss of time. It is in this context that the availability of wide range of technological choices in terms of processes, products and the mode of project implementation assumed great importance. The model forms of contract for the construction of a fertilizer plant can play a very vital role in this context and the contribution made by UNIDO in the form of four model forms of contract, will be found to be of great use in many situations in developing countries. He concluded by stating that at the very least they would help in a fuller exploitation of resources in fertilizer industry.

D. Summary of the Discussion

Experience with UNIDO Model Contracts :

19. A total of twelve position papers were presented to the Workshop on related topics of contractual arrangements followed by extensive discussions. The summary minutes of these deliberations are reflected under the individual headings covering the main articles of the model forms of contract. Several countries also gave details of their experience in the use of UNIDO model contracts, or similar contracts incorporating the concepts imbedded in UNIDO documents.

20. The participant from Bangladesh gave details of a 1000 tons Ammonia/1700 tons per day Urea Plant being constructed with a Japanese Contractor. The contract is based on the UNIDO model contract and is now well on the way to completion. The contract used was the cost reimbursable model form with an estimated target price. The contract was proceeding within project costs, except for the effect of fluctuations in the exchange rates, and within the time schedule. The guarantees obtained follow the provisions made for in the UNIDO model contracts.

21. Participants from Pakistan indicated that two recent fertilizer plants used the UNIDO model contracts. One of these was for a urea plant along with modifications to an existing ammonia plant and nitric acid plant. The contract was awarded in 1983 and completed in time. It was a cost reimbursable contract with a target price incorporating

penalties and bonuses. The fixed target price was based on international competitive bidding and yet the saving had been as high as 25%. The guarantees were similar to the UNIDO model contract but the penalties as percentage of the fixed fees were very high – as much as 20.8% for the urea plant.

22. In Pakistan, other UNIDO model contracts particularly the semi turn-key contract had also been extensively used in three cement plants. No basic difficulties had been encountered in converting the semi turn-key contract for use in the cement industry. While the cement industry was not used to the ideas of absolute guarantees and long test runs, they had accepted these UNIDO provisions. Two smaller chemical plants had been recently negotiated using the semi turn-key contract.

23. In India, the contracts used in petrochemical and fertilizer industries were similar to the UNIDO model contracts but it was pointed out that in a recent ammonia/urea plant the guarantee test was run for seven days at 100% after 90 days at more than 85% capacity.

24. The concept of absolute guarantees have led to a situation in India that when a new technology DAP plant supplied by a contractor did not work satisfactorily, was subsequently replaced with a completely new DAP plant using the old well-tried technology. Similarly in Pakistan, a contractor spent much more than his total fees putting right a nitrophosphate plant, though using a cost reimbursable contract. In both cases this was beyond their contractual obligations.

25. In Egypt, the UNIDO model contract had been used as a basis, but with some modifications for a new 1000 tons per day ammonia/ammonium nitrate plant on a turn-key basis. Among modifications made were strengthening of the training and technical assistance articles.

26. In Iran, the participants advised that their attention had only been recently drawn to the model contracts and they had not had the opportunity to use them in the fertilizer industry, but the semi-turnkey model contract was applied in negotiations of a DMT plant contract.

27. In Abu Dhabi while the UNIDO model contracts had not been used as such currently similar turn-key contracts were being negotiated for fertilizer plants and one ordered for a 1000 tons ammonia/1500 tons urea plant had been built costing $. 210 million at completion.

28. In Jordan, the UNIDO model contracts had not yet been used, but for a new plant to be constructed either the turnkey or semi-turnkey UNIDO model was expected to form the basis for negotiations.

29. In Kuwait, a 1000 tons/day ammonia plant using a contract similar to the UNIDO turn-key model contract had been successfully commissioned in 1985 and has now been operating for more than one year at 110% capacity.

Project Cost and Time Schedule :

30. The delegates emphasised the importance of adhering to the time schedule so as to meet project costs. It was agreed that the project cost could generally be maintained in the semi-turnkey and turnkey contracts without too many difficulties. With the cost reimbursable contract the participants from Pakistan, who had used this contract indicated that they were able to keep to the project costs by the virtue of a target price including bonuses and penalties.

31. Project costs were influenced greatly by factors outside normal contracts, such as the exchange rate fluctuations. However, these were outside the control of the purchaser and the contractor and could only be covered by forward buying of foreign exchange, if permitted by the government concerned.

32. The participant from Italy pointed out a discrepancy between Article 27.1 and Annexure-XV on the period at which guarantee test should be completed after mechanical completion. This was noted.

Payment Terms, Performance Bonds and Bank Guarantees :

33. It was suggested that the payment terms contained in Article 20 of the model contracts could easily be modified to cover requirements of financing agencies and an Annexure to that effect be added.

34. There was a detailed discussion on the performance bonds. It was pointed out that the UNIDO model contracts provided for two alternative performance bonds, a bank guarantee or a bond from a bonding company. A much higher percentage of the cost of the contractor's services could be obtained in the latter type of bond, as a performance guarantee.

35. The delegate from Canada pointed out that it was common to have a bond of the latter type covering 50% of the contract price and often could be much higher. In the United States the government required a 100% bond.

Contractor Services, Exclusions and Inclusions :

36. The UNIDO contracts' provisions on the contractor's services seemed to be adequate to most delegates except that inspection and the availability of consumables should be better defined.

37. Some of the participants were of the opinion that their experience of inspection by international inspection authorities was not satisfactorily. Thus Pakistan received some second-hand equipment after international inspection.

38. The participant from Abu Dhabi advised that the inspection of equipment overseas

should be undertaken by the purchaser's representatives and not left to the contractor, even in the cost reimbursable contract. The delegate from the developed countries pointed out that this was normal even for developed countries.

39. Formal inspection after erection by the contractors or vendors was also desirable.

40. It was suggested that the guidelines to Annexure-XI should be strengthened by defining the quality and quantity in stock levels of consumables to be maintained in the plant.

Safety Aspects and Hazardous Materials :

41. One of the participants pointed out that the UNIDO model contracts did not stipulate sufficient protection against hazardous materials handled within battery limits.

42. While under Annexure-XV, the contractor had to give full information on hazardous materials and their handling requirements in accordance with the API safety code for harzardous areas, the overall safety aspects in the plant environment were insufficiently covered.

43. It was noted with interest that India now required a safety audit of all chemical plants. The delegates recommended that after recent events in Bhopal, UNIDO should draw up a separate document on hazardous materials for use in the context of all model contracts.

44. Some of the participants also queried about effluents from plants, but these are judged adequately covered in the model contracts through absolute guarantees for emissions from the plant.

Guarantees and Performance Test Periods :

45. By and large the UNIDO model contracts guarantee provisions, particularly those for absolute guarantees were found satisfactory. The UNIDO guarantee period of 20 days at 90% capacity and 10 days at 100% capacity were considered reasonable by the participants.

46. Some of the participants felt that the guarantee test performance usually yielded better results when the plant was new than subsequent operation of the plant. Perhaps the contracts should also contain "normal operation" figures so that in later years the purchasers can see if their plants are meeting operational standards and unacceptable levels of corrosion had not occured.

47. One of the participants from India pointed out that in his country minor problems with guarantee tests were corrected by the purchasers, as keeping the contractors or vendors representatives at site for minor modifications was unduely expensive.

Warranties and Liquidated Damages :

48. One of the participants felt that 12 months warranties were insufficient. They had a

major breakdown in the 13th month resulting in a 6 month shutdown of the plant.

49. Several participants raised the point that warranties usually expire much earlier than the 24 months after shipment as provided in the UNIDO contracts.

50. It was pointed out that the warranty periods can be extended by an additional insurance cover and this should be considered where warranties are due to expire.

51. In many cases reputable vendors rectify or replace equipment which has major defects, even after the 12 months warranty period. This occured for a sulphuric acid blower in India. For this reason prequalification was essential.

Insurance Coverage :

52. The Canadian participant read a paper on the possibility of obtaining insurance for loss of profits against design defects. It was pointed out that the insurance market is currently not accomodative to innovative insurance schemes. However, this could be pursued further.

53. The general subject of insurance coverage was discussed and it was emphasised that insurances should not be taken out at the last minute, but in good time.

Transfer of Technology and Training :

54. The achievement of technological capabilities is an imperative need of the developing countries although it is recognized that this is a process achieved in stages. The articles of the model contracts have made provisions so as to foster this transfer process. It was the general consensus that in the fertilizer industry, national engineering companies were better suited to absorb technology as the owner companies were more concerned with operational economics. National engineering companies should develop their capabilities so that ultimately they could provide basic process design, preparation of equipment specifications, first issue of P & I diagrams and inspection services for control equipment.

55. The development of technological capability progressed from operating and maintenance know-how, construction experience, detailed engineering and finally basic engineering. Opinion was prevalent that while turnkey plants usually meet cost and time objectives, the transfer of technology was limited and not in accordance with national self-reliance strategies.

56. Training of national personnel was an urgent requirement and this should go beyond theoretical training and be combined with on-the-job experience, including in-plant start up operations. Training programmes should be co-ordinated so that there was continuity between the time when training was imparted, and utilized. The use of process simulators was suggested as a means of training personnel in highly computerized plants. Training involved not only technical competence but also job effectiveness through job analysis and attitudanal development in a corporate and business environment.

Other Articles of the Model Contracts :

57. Among other articles of the contracts discussed were the articles on secrecy and on the purchase of spare parts.

58. The secrecy provisions of the contracts were generally satisfactory but it was not clear whether extra amounts had to be paid if the plant capacity was increased by changes undertaken by the purchaser. It was generally agreed that where debottlenecking or retrofitting was concerned additional fees would be payable by the purchaser.

59. In the case of spare parts, participants related experiences indicating that spare parts when bought after the plant was operating were either too expensive or, in the case of instrumentation, were often out of stock.

60. It was suggested that the list of major spare parts along with individual prices should form part of the tender specifications for the equipment and machinery.

61. In the case of instruments, when spare parts are not available, the instrumentation itself may be obsolete. An examination for the progressive replacement of such instruments was in order.

62. Most of the other articles of the model contracts were standard articles and no particular comments were offered on them.

E. Agreed Conclusions and Recommendations :

63. The following conclusions and recommendations were reached :

1. It was agreed that the UNIDO model forms of contracts for the construction of a fertilizer plant have proven useful and many instances were given of their utilization in the fertilizer industry notably in Bangladesh, Pakistan, India, Egypt and Indonesia.

2. It was noted with interest that the concepts imbedded in the model contracts had been extended for use in the cement, petrochemical and chemicals sectors.

3. The participants expressed their appreciation of the fact that the UNIDO model forms of contract had reduced the time for negotiations and facilitated the conclusion of contracts between contractors and the purchasers.

4. It was recognized that the Workshop had been useful in clarifying various aspects of the model contracts and in providing feedback and exchange of experience. Further it was recommended that additional Regional Workshops should be held. Feedback on the model contracts was considered extremely important and such technical workshops enable this to be appraised after an interval of time.

5. It was recommended that all appropriate channels be explored with a view to the widest possible dissemination of the model contracts to all potentially interested parties by UNIDO.

6. It was recommended that the articles relating to training should be more explicit and detailed with particular emphasis on on-the-job-training. In this context training by operating companies should also be examined in conjunction with contract negotiations.

7. It was recommended that UNIDO should initiate work to review the different types of insurance coverages currently available for the construction and operation of large plants.

8. It was recommended that UNIDO should examine the safety aspects and handling of hazardous substances and effluents in the design and operation of plants, which have become increasingly important.

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Annex – II

AGENDA OF THE WORKSHOP

Monday	27 October 1986	Inaugural Session
	10.00 – 10.45	Address of Welcome by Chairman NFC. Address by Mr. J. A. Ghani, UNIDO Representative. Address by Chief Guest, Mr. Riyaz H. Bokhari, Auditor General of Pakistan.
	11.30 – 17.30	Presentation of Papers.....
Tuesday	28 October 1986	
	9.30 – 11.00	Experience on the use of UNIDO model forms of contracts.
	11.30 – 13.00	Discussion on articles dealing with project cost and time schedule.
	14.30 – 16.00	Discussion on articles dealing with payment terms and performance and other bonds.
	16.30 – 17.30	Discussion on articles dealing with contractor services, exclusions and inclusions.
Wednesday	29 October 1986	
	9.30 – 13.00	Discussion on articles dealing with the performance guarantees acceptance test, warranties and provisions for repair and replacement of defective equipment.
	14.30 – 16.00	Discussion on transfer of technology and training.
	16.30 – 17.30	Discussion on other articles of the model contracts.

Thursday	30 October 1986	
	10.30 – 13.00	Presentation and discussion on the draft report and conclusion of the workshop.
Friday	31 October 1986	Visit to PAK-China Fertilizers Ltd., Hairpur.*

* The visit was later cancelled because of poor response.

Annex - III

TITLES OF PAPERS AND AUTHORS

Training for Effective Operation, Doug White, ICI, AG Division, Billingham, England.

Factors Affecting Chemical Plant Design and Guarantee Tests, Dr. W.M. Butt, Chief Executive, Technology Management International, Lahore, Pakistan.

Availability of Consumables, Lubricants and Chemicals for Start-up and Initial Operation of Fertilizer Plants, Mogens Pedersen and Leif Chawes, Haldor Topsoe, Denmark.

A Successful Fertilizer Plant Consultation Model, C. V. Narayansawami, FACT Engineering and Design Organization Cochine, India.

Project Costs for Chemical Industry, Naveed Ahmad, Federal Chemical and Ceramics Corporation Limited, Karachi, Pakistan.

Experience in the Use of the UNIDO Model Contracts for the Fertilizer Industry and their Extension to other Industries, Dr. Ahmad Shah Nawaz, Chemical Consultants (Pakistan) Limited, 31-C/1, Gulberg - III, Lahore.

Model Forms of Contract for the Construction of a Fertilizer Plant and Bangladesh Experience, E. R. Chaudhry, Project Director, Chittagong Urea Fertilizer Limited, Bangladesh Chemical Industries Corporation, Bangladesh.

Time Schedule and Consequences in Case of Delay in the UNIDO Model Form of Turn-key Lump Sum Contract, Gianfranco Mantovani, Director of Contracts of Snamprogetti, SPA, Milan, Italy.

Arab Potash Project – Training Experience and Lessons for the Future, Issah Gammoh, Project Manager, Arab Potash Co., Jordan.

An Alternative Option for Project Execution in the Chemical Process Industry, J. F. Bond and M. P. Roberts, Agricultural Division, Technology Department, Imperial Chemical Industries, UK.

Examine the Possibility of Insurance Coverage for Consequential Losses Arising from Faults in Design and Construction as well as from Equipment Failure, A. James Edwards, Canada.

Some Views on Improvement of Transfer of Technology Process, B. Zokai and E. Karimzadegan, Ministry of Plan and Budget, Development Projects of Chemical Industry (DFCI), Tehran, Iran.

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