



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

Project Number DP/IND/82/034/11-05/319B

APPROPRIATE AUTOMATION PROMOTION PROGRAMME

DP/IND/82/034

15607

INDIA

Technical Report

REVIEW OF THE APPROPRIATE AUTOMATION PROMOTION PROGRAMME
AND RELATED AUTOMATION DEVELOPMENT ACTIVITIES IN INDIA

Prepared by
Theodore J. Williams
Consultant, UNIDO

Based on a Visit to India
January 27 - February 1, 1986

SUMMARY

The author visited India on January 27 - February 1, 1986 at the invitation of the management of the Steel Authority of India, Ltd., (with the concurrence and support of the UNDP Staff in New Delhi and UNIDO) to assist SAIL in its evaluations of bids received from candidate engineering management companies around the world to manage the Integrated Control System for Steel Plants (INCOS) Project.

Three proposals had been received from the ten requests for proposals sent to the leading companies in this field around the world. The three applicants were: (1) United States Steel Engineers and Consultants, Inc. (UEC); (2) The British Steel Corporation, and (3) a French Consortium based on Solmer, the French steel company.

It soon became evident that the three applicant companies did not have equivalent knowledge of the facilities and conditions of the Bhilai Plant or of SAIL's desires for the INCOS Project. It was therefore decided to give the applicants until March 10, 1986 to visit the Bhilai Plant again, if desired, to restudy the project requirements and to submit a new proposal if it was deemed advisable.

OBJECTIVE

The purpose of the visit to India of January 27 - February 1, 1986 was to assist Steel Authority of India, Ltd. (SAIL) management and engineering personnel in making a

selection of the Engineering Management Contractor for the Integrated Control System for Steel Plants (INCOS) Project from among the three applicant companies who had submitted proposals. This visit was made under the auspices of the UNIDO and UNDP (India) organizations in view of their interest in INCOS as a primary mission for the introduction of automation in Indian industry and its development from the work of the Appropriate Automation Promotion Programme (AAPP) of the Department of Electronics of the Government of India which is sponsored by UNIDO and UNDP (India). (References 1 and 2).

FINDINGS AND CONCLUSIONS

Presentations by the three candidate companies soon uncovered that each individual company had widely different information concerning the present condition and status of current automation in the Bhilai Steel Plant as well as a widely divergent view of the aims and expectations of the Steel Authority of India, Ltd., (SAIL) from the Integrated Control System for Steel Plants (INCOS) Project.

This was due to a large extent to the short time period for response allowed by SAIL for responding to their request for quotations for the engineering management task for the automation of the Bhilai Steel Plant. Accordingly the SAIL Management Group in charge of the bid evaluation recessed the contractor selection and called for new or revised bids by March 10, 1986.

In the meantime the engineering review groups on the Selection Board for SAIL (mainly members of the Systems Engineering Group of the Project at the Bhilai Steel Plant) were made available to the potential bidders to assure that they received all data requested.

As a result, the project at Purdue University to produce the document to be entitled, Tasks and Functional Specifications of the Bhilai Steel Plant Integrated Control System, was postponed until the period March 9-April 8, 1986.

Since these latter individuals were also to be involved in the final vendor selection, this final selection of the Engineering Management Contractor would have to be postponed until after the return of the engineering group from the United States to India in mid-April. This final selection had not yet been made as of the date of preparation of this report (May 15, 1986).

RECOMMENDATIONS

Since this visit to India, at the request of the Steel Authority of India, Ltd. (SAIL) and UNIDO and UNDP (India), was made to aid SAIL in the vendor selection process no new recommendations concerning the Appropriate Automation Promotion Program (AAPP) or the Integrated Control System for Steel Plants (INCOS) Project developed from it. The major recommendations of past reports of this project should be repeated for emphasis.

1. UNIDO and UNDP (India) should continue to support INCOS as the major element of the AAPP Program.
2. UNIDO and the UNDP should encourage the use of the available AAPP foreign experts funds to bring knowledgeable industrial control engineers to India to help further the INCOS project. There is a massive training program required for INCOS which cannot be fulfilled from Indian sources alone.
3. It is felt by the author that the project magnitude, political visibility, and potential massive project payout of the INCOS Project dwarfs anything possible from the rest of the AAPP Programme. Thus pursuit and success of INCOS should be pursued by SAIL and the Department of Electronics (DOE) personnel even at the potential expense of other projects under AAPP.

DISCUSSION AND DETAILS

As noted earlier, three companies responded to the tendered Request for Proposals for an Engineering Manager Company for the Integrated Control System for Steel Plant (INCOS) Project to be used to automate the Bhilai Steel Plant of the Steel Authority of India, Ltd. (SAIL). The three companies were as follows:

1. United States Steel Engineers and Consultants, Inc.,
a Division of the United States Steel Corporation
based in Pittsburgh, Pennsylvania, USA.

2. British Steel Corporation (Overseas Services) Ltd.,
a Division of the British Steel Corporation based
in London, England.

3. The French Consulting Group for Bhilai Steel Plant
composed of representatives of four companies:
SGN
ESIA
SOLMER, and
TRANSTEC
and based at Saint-Quention-Yvelines Cedex, France.

These companies had responded from ten companies world-wide which were solicited for the position of Engineering Manager for the INCOS Project. They had been given approximately one month to respond to the Request for Proposal.

Each company was given the chance to present their proposal before a management-engineering evaluation board of SAIL. It quickly became evident that each of the companies had widely different views of the details and status of the Bhilai Steel Plant and of the expectations which SAIL had for the INCOS Project.

As a result, it was decided that, because of the short response time that had been allowed and the resulting divergent information available to the companies, additional time should be given for a new response to the Request for Proposal if such should be desired. Accordingly, a new date for proposal submission of March 10, 1986 was established. The members of the Systems Engineering Group of the Bhilai Steel Plant were made available to the prospective bidders to supply any additional information they might require.

It is understood that all three made new proposals as of the March 10th date.

The requirement that the Systems Engineering Group members be available for consultation to the potential bidders did postpone for one month (until March 9th) the work on the preparation of the Project "Master Plan" to be entitled, Tasks and Functional Specifications of the Bhilai Steel Plant Integrated Control System. The latter document was completed as of April 8, 1986 upon which the engineering team returned to India to help complete the evaluations of the proposals submitted in March. As of the date of preparation of this report (May 15, 1986) this task had not yet been completed.

REFERENCES

1. Williams, T. J., Letter to Mr. M. Delos, Engineering Industries Branch, UNIDO (February 24, 1986).
2. Delos, M., Letter to T. J. Williams, Purdue University (April 10, 1986).

Project Number DP/IND/82/034/11-03/31.9.B

APPROPRIATE AUTOMATION PROMOTION PROGRAMME

DP/IND/82/034

INDIA

Technical Report

REVIEW OF THE APPROPRIATE AUTOMATION PROMOTION PROGRAMME
AND RELATED AUTOMATION DEVELOPMENT ACTIVITIES IN INDIA

Prepared by
Theodore J. Williams
Consultant, UNIDO

Based on a Visit to India

November 30 - December 18, 1985

SUMMARY

The author made a trip to India during the period of November 27 - December 18, 1985. Actual time in India was from November 30 - December 18, 1985. The trip was made under the auspices of UNIDO and was for the purpose of reviewing and aiding the Appropriate Automation Promotion Programme (AAPP) which is sponsored by UNIDO through the UNDP for India with the Department of Electronics of the Government of India.

The major recent efforts of the AAPP have been devoted to the Integrated Control System for Steel Plants (INCOS) Project of the Government of India with the Steel Authority of India, Ltd. (SAIL). The objectives of the trip were therefore to: (1), Review the status of the INCOS Project; (2), Organize a meeting between the officials of SAIL along with the working staff of the INCOS Project with representatives of a group of North American computer and control systems development companies who might be interested in cooperating in the INCOS Project; (3), Help advise the INCOS staff on the future activities for that project; (4) Discuss the development of training programs for INCOS personnel; and (5) Review other projects under the aegis of AAPP.

This report will discuss the work on each of these topics and the results achieved through them.

OBJECTIVES

The objectives established for the visit of November 30 - December 18, 1985 by the author to India for UNIDO were as follows:

1. To review the current status of the Project on Integrated Control Systems for Steel Plants (INCOS) established between the Department of Electronics (DOE) and the Steel Authority of India (SAIL) under the Appropriate Automation Promotion Programme (AAPP). The INCOS Project had developed during 1985 directly from the Appropriate Automation Promotion Programme (AAPP) of the DOE and the authors' involvement in it during December 1984. See References 1-3. This project is now the major activity of the AAPP.
2. To organize a meeting between representatives of several major North American computer and control systems companies and SAIL Officials and INCOS Working Staff. Several such meetings were arranged for the mutual benefit of all parties.
3. To advise the INCOS Staff and SAIL Officials on the next steps to be taken in their pursuit of the INCOS Project.

4. Successful completion of the INCOS Project will require a massive training effort to assure sufficient numbers of knowledgeable staff to carry out the very large amount of work required. Increasing the size of the Indian National content of the Project Staff is an objective sought by all parties (Indian or foreign). Because of a lack of the appropriate knowledge in India at present, at least the early phases of such training must be carried out outside of India. The author's home University, Purdue University, West Lafayette, Indiana, USA, is a potential candidate site for this instruction. An objective therefore was to respond to an Indian request for such training at Purdue University.
5. To aid SAIL in the initiation of INCOS related projects at the other steel mill sites of SAIL, specifically that at Rourkela which is to follow Bhilai in SAIL's plans for industry modernization.
6. The AAPP Project as originally conceived had a wide ranging set of tasks. While the INCOS Project has become by far the largest of these, a review of other work was also undertaken during the visit.

FINDINGS AND CONCLUSIONS

The following Findings and Conclusions have been developed as a result of the visit to India by the author during the period November 30 - December 18, 1985.

1. The Systems Engineering Group at the Bhilai Steel Plant of the Steel Authority of India (SAIL) has developed a Preliminary Feasibility Report for the Integrated Control System for Steel Mills (INCOS) Project. This report continues to be refined. It will form the basis for a "Master Plan" for the execution of the project. This Master Plan will be developed at Purdue University during February 1986 in a joint effort between the author's organization, the Purdue Laboratory for Applied Industrial Control of Purdue University, and the Systems Engineering Group of the Bhilai Steel Plant of SAIL. Other activities of the INCOS Project are also proceeding well at this point.
2. A group of meetings both at the New Delhi main office of SAIL and at the Bhilai Steel Plant were organized to acquaint North American computer and control system development companies with the needs of the INCOS Project and to give the latter

personnel an insight into the types of assistance they could expect from such companies in their further development and pursuit of the INCOS Project. These meetings proved to be most informative for both parties.

3. SAIL has made a world-wide tender for proposals from interested companies desiring to serve as Engineering Managers for the INCOS Project. It was required that these companies should respond with any proposals they desired to make by late January 1986. The winning candidate company should be chosen early in 1986 with work on a Detailed Project Report (DPR) to be completed by the end of 1986. The latter will provide the basis for all further work on the project and for the specifications of all computer and control equipment to be purchased for it.

4. A proposal has been made by Purdue University for a three month, graduate level training program in Hierarchy Control Systems for Steel Mills to be presented during the summer of 1986. This proposal has received preliminary approval of SAIL and negotiations are being made with the Government of

India for its final approval. A group of 25 engineers from SAIL and the DOE will be trained. The program will probably be repeated in succeeding summers.

5. The author took part in a major series of lectures at the Rourkela Steel Plant of SAIL to introduce the INCOS Project to personnel at that site. Rourkela is to follow Bhilai in the modernization of its control system by a time period of one and one-half to two years. All personnel contacted were very enthusiastic that computer-based automation be installed at Rourkela.
6. Despite the fact that the INCOS Project drains a major part of the facilities and capabilities of the AAPP Project, particularly those of the Northern Regional Center at New Delhi, as originally planned other work carried out by the Eastern, Western and Southern Regional Centers of AAPP continues to progress well.

RECOMMENDATIONS

The following Recommendations are submitted for consideration by UNIDO and the UNDP.

1. As noted in the author's letter of February 24, 1986 to Mr. M. Delos (Reference 4):

a) The UNIDO and UNDP should consider INCOS as a development of the AAPP and thus a legitimate vehicle for their support in furthering the automation of Indian industry.

b) INCOS will be a severe drain on any other potential major automation projects in India in the near future. Despite this INCOS should be supported because of its major economic size, political and cultural visibility, and importance in developing techniques applicable to other industries. Thus no other major projects should be promoted in competition with it because of the lack of trained personnel in India and for the reasons just given above.

2. For similar reasons, UNIDO funds to AAPP for the support of visits of foreign experts to India should be concentrated in those engineering and scientific specialities which will help promote the progress of INCOS. Lectures made by these individuals should be presented in locations readily accessible to INCOS personnel.

3. UNIDO could provide considerable help to the Government of India, SAIL, and to DOE by helping to uncover and develop potential training courses for INCOS personnel of the type being presented to SAIL personnel at Purdue University in the summer of 1986. There are many more personnel to be trained than Purdue University or any other single university can accommodate. Thus the need to develop further training sources.

DISCUSSION AND DETAILS

As noted in the section on Objectives, a major purpose of the trip to India in November-December 1985 was to acquaint a group of potential computer and control system vendor companies with the Integrated Control System for Steel Plants (INCOS) Project and to inform INCOS personnel of the services and equipment they could expect from such companies in furthering their pursuit of the INCOS Project. A list of the individuals who visited India and their company affiliations is presented in Table I. This group had discussions at Steel Authority of India, Ltd (SAIL) Headquarters in New Delhi on Monday, December 9th and on Monday and Tuesday, December 16-17th. They also visited the Bhilai Steel Plant on December 10-13th and talked with the System Engineering Group and others there.

The author had also traveled with Mr. G. S. Varadan, Chief Coordinator of the Appropriate Automation Promotion Programme (AAPP) and Dr. S. C. Mehta, Chief Expert, Automation and Computerization, SAIL, to Bhilai to review the progress of the INCOS Systems Engineering Group prior to the arrival of the North American Delegation. A review of the Preliminary Feasibility Report was made and several suggestions were made for its improvement for incorporation into the "Master Plan" for the project. As noted this latter text was scheduled to be developed in a project carried out at Purdue University in February 1986. At the completion of this review Messrs Mehta, Varadan and Williams proceeded to Rourkela to present a discussion of the INCOS Project to the engineering staff of the Rourkela Steel Plant on December 6-7, 1985. Table II presents a copy of the program of these presentations which were attended by 64 engineers from the Rourkela plant and associated organizations.

Rourkela has been designated as the second target plant for the INCOS Project following the Bhilai Plant. Thus a major objective of the visit was to present the above discussion of INCOS to the Rourkela Plant personnel. The seminar was enthusiastically received by them.

As noted earlier the next major task of the INCOS Project is to choose an Engineering Consultant Company to manage at least the early phases of the project since such management capabilities do not yet exist in India.

Accordingly, during this visit, SAIL dispatched requests for proposals to ten such companies around the world (United

States, Japan, Russia, France, Great Britian, The Netherlands and Germany (West)). If interested the companies were requested to make their proposals by late January and to be prepared to discuss them in New Delhi at the end of January 1986.

During the time in New Delhi the author also reviewed the status of the remainder of the AAPP Programme with Mr. G. S. Varadan, Chief Coordinator, and his associates. As noted above the Northern Centre at New Delhi is almost completely occupied with INCOS matters. However, the other three Centres of the Project are making good progress in their individual missions.

It must be noted again, however, that INCOS is a massive project and its full prosecution will severly drain the available manpower in India capable of carrying out AAPP type projects. This author would recommend that INCOS be given the highest priority, even at the expense of other AAPP Projects, because of its vital importance to the future of all Indian industry, not just the steel industry.

TABLE I

DELEGATION OF NORTH AMERICAN COMPANIES TO DISCUSS
THE INCOS PROJECT WITH SAIL PERSONNEL

December 9-17, 1985

U.S. Steel Engineers and Consultants, Inc.

Mr. Monro Lanier
Vice President
USS Engineers and Consultants, Inc.
600 Grant Street
Pittsburgh, Pennsylvania 15230

Mr. Ralph F. Huth
Director, Computer Services
USS Engineers and Consultants, Inc.
600 Grant Street
Pittsburgh, Pennsylvania 15230

Mr. E. Fuller Pierpoint
Manager, Computer Services
USS Engineers and Consultants, Inc.
1050 Chatham Center
Pittsburgh, Pennsylvania 15230

Mr. Thomas W. Hunter, Jr.
Director, Technical Services
USS Engineers and Consultants, Inc.
600 Grant Street
Pittsburgh, Pennsylvania 15230

Mr. Theodore Kilyk
Manager, Sales
USS Engineers and Consultants, Inc.
600 Grant Street
Pittsburgh, Pennsylvania 15230

Mr. H. Dean Journeaux
Vice President and Managing Director
MET-CHEM/Canada
1140 Boulevard de Maisonneuve West
Montreal P.Q.
CANADA H3A 1M9

TABLE I (Cont.)

Combustion Engineering, Inc.

Mr. Joseph A. Marubbio
President
Utility Instrumentation and Control Division
Engineered Systems and Controls
225 Broad Hollow Road
Melville, New York 11747

Mr. Francis X. Alfonso
Technical Services Manager
Taylor Instruments-Canada
Toronto, Ontario
CANADA

Mr. Ashok Gupta
Research and Development Engineer
Taylor Instruments Division
95 Ames Street
Rochester, New York 14601

International Business Machines, Inc.

Mr. Colin Gilbert
Consultant Industry Specialist
IBM Australia Limited
168 Kent Street, Sydney 2000
AUSTRALIA

Mr. Bahman Marzbani
Indian Area Manager
IBM Australia Limited
100 Walker Street, North Sydney, NSW 2060
AUSTRALIA

Westinghouse Electric Corporation

Mr. Krishan S. Tarneja
Director, Technical Liaison
Industry Electronics Division
Westinghouse Electric Corporation
23 Ring Road, Lajpat Nagar-4
New Delhi 110024
INDIA

TABLE II (Cont.)

STEEL AUTHORITY OF INDIA LIMITED
ROURKELA STEEL PLANT
TRAINING & DEVELOPMENT CENTRE
ROURKELA

APPRECIATION PROGRAMME

ON

INTEGRATED CONTROL SYSTEM (MCP-335)

(Organised by INCOS group & Trg. & Development Centre)

Dates : 6th & 7th Dec. '85

Venue : ISPAT HOTEL
CONVENTION HALL

P R O G R A M M E

6-12-85

09.00 hrs. - - Inaugural Session
09.30 hrs.

09.45 hrs. - - Introduction to Automation
11.45 hrs.

11.30 hrs. - - Survey of Micro-Processors &
13.00 hrs. Computers.

L U N C H

14.15 hrs. - - Development of Sensors and
15.15 hrs. Digital Transmitters

15.30 hrs. - - System and Software Development
16.30 hrs.

16.30 hrs. - - Hierarchical Distributed Control
18.00 hrs. System - I

7-12-85

09.00 hrs. - - Hierarchical Distributed Control
10.30 hrs. System - II

10.45 hrs. - - Hierarchical Distributed Control
12.15 hrs.

12.15 hrs. - - Data Acquisitions Systems
13.00 hrs.

L U N C H

14.00 hrs. - - Discussions and Concluding
14.45 hrs. Session

Faculty :

Prof. T J Williams
Purdue University
U.S.A.

Shri G S Varadan
Shri Pradip Chopra
of Department of

Dr. S C Isha
Chief Experts
(IIT, D)

REFERENCES

1. Williams, T. J., Report on Visit to India of November 25-December 23, 1984, Report on Project DP/IND/82/034.
2. Williams, T. J., Report on Visit to India of June 22-29, 1985, Report on Project DP/IND/82/034.
3. Williams, T. J., Report on Visit to India of August 30-September 7, 1985, Report on Project DP/IND/82/034.