OAK RIDGE NATIONAL LABORATORY

ORNL

FOREIGN TRIP REPORT

ORNL/FTR-3038

DATE: September 22, 1988

SUBJECT: Report of Foreign Travel of V. R. R. Uppuluri, Research Staff,
Engineering Physics and Mathematics Division, ORNL

TO: Alexander Zucker

FROM: V. R. R. Uppuluri

PURPOSE: To participate in the International Symposium on the Analytic Hierarchy Process (ISAHP) at the Tianjin University, Tianjin, China.

SITES VISITED: 09/06-09/88   The International Symposium on the Analytic Hierarchy Process, Tianjin University, Tianjin, China

ABSTRACT: The Analytic Hierarchy Process (AHP) is a methodology proposed by T. L. Saaty, U.S.A., in 1977, in finding solutions to unstructured decision problems. This first International Symposium was sponsored by the Systems Engineering Society of China, the Operations Research Society of China, the Operations Research Society of Japan, and the National Science Foundation of the U.S.A. This symposium was held at Tianjin University, Tianjin, China, during September 6-9, 1988. There were more than 160 participants, with about 15 from the United States, 7 from Japan, one from USSR, one from Finland, and one from Canada. During the last three years, this methodology was used extensively in the People's Republic of China by decision makers, and books are published on this topic along with the development of computer software. More than 200 papers seem to be in print. The Program Committee, of which I am a member, recommended to hold the Second International Conference on AHP in 1991 at Pittsburgh, Pennsylvania, U.S.A. The latest developments summarized by computer software experts are relevant to the CO_2 Project and CASE Tools Project at Oak Ridge.

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I. A Summary Evaluation of the Trip.

The Analytic Hierarchy Process (AHP) is a methodology that is being proposed for use in the CO_2 Project at ORNL and the CASE Tool Project at Oak Ridge. This symposium has given me an opportunity to discuss the AHP with Professor T. L. Saaty, the inventor of this methodology. I also talked to Professor E. Foreman, George Washington University, about the latest developments in AHP computer software that are relevant to our projects. The breadth of applications of AHP to several problem areas by the Chinese reinforced the usefulness of this methodology. Since this is the First International Symposium on AHP, the keynote address by Saaty and the lectures in the plenary session brought us up to date with current research which is of value to the projects at the Oak Ridge National Laboratory. There were a couple of papers on comparing AHP methodology with other procedures which are also of interest to the investigators at Oak Ridge.

II. Comprehensive Report.

The Analytic Hierarchy Process (AHP) is a methodology proposed by Thomas L. Saaty in 1977 to find solutions to unstructured decision problems. During the past twelve years, the AHP methodology has found numerous applications especially as a tool in choosing priorities among a class of alternatives. At Oak Ridge, the methodology was extended to stochastic comparisons and applied to some practical problems.

AHP methodology was introduced to the People's Republic of China in 1982 and, because of its simplicity and applicability, was adopted by the decision makers immediately. The books by Saaty were translated into Chinese, and new books were published in Chinese on this topic. The First National Conference on AHP was held in China and more than 200 technical papers were published in Chinese indicating the theory and applications. With this background, Tianjin University decided to hold this International Symposium on Analytical Hierarchy Process during September 6-9, 1988, because of the great potential of interest in this topic. The co-sponsors are the Systems Engineering Society of China, the Operations Research Society of China, Association of Asian-Pacific Operational Research Societies within the IFORS, the Operations Research Society of Japan, and the U.S. National Sciences Foundation.

The symposium was held at Tianjin University, Tianjin, People's Republic of China, during September 6-9, 1988. There were more than 160 participants. There were about 15 participants from the U.S.A., 7 from Japan, 1 from the U.S.S.R., 1 from Finland, and 1 from Canada. The rest were from China.

The meeting was inaugurated by the Vice-President of Tianjin University and was followed by the key-note address by T. L. Saaty. The Plenary Session followed with the following talks:

1. AHP in China (by B. Liu)

2. Overview of Researches and Applications of AHP in Japan (by R. Manabe)

3. On Setting Goal-Programming Weights Using the AHP (by S. L. Gass)

Two technical sessions covering theory and applications were held in parallel sessions in separate rooms. The talks were presented in English, and a book of 653 pages with reprints of the 87 articles was distributed in advance. This covers the theory and applications of AHP currently carried out in the People's Republic of China.

The Program Committee, of which I am a member, recommended that the Second International Symposium on Analytic Hierarchy Process be held in Pittsburgh, Pennsylvania, U.S.A., in 1991.

APPENDIX

A. Itinerary

9/02-04/88	Travel from Oak Ridge, Tennessee to Beijing, China.
9/05/88	Travel from Beijing, China, to Tianjin, China
9/06-9/88	International Symposium on the Analytic Hierarchy Process, Tianjin University, Tianjin, China
9/10-11/88	Travel from Tianjin, China, to Oak Ridge, Tennessee

B. Persons Contacted

Dr. Shubo Xu, Tianjin University, China.

Dr. Liu Bao, Dean, College of Management, Tianjin University, China.

Dr. Thomas L. Saaty, University of Pittsburgh, U.S.A.

Dr. Kyntaro Manabe, Bunkyo University, Japan.

Dr. L. Vargas, University of Pittsburgh, U.S.A.

Dr. J. M. Alexander, Immaculata College, U.S.A.

Dr. E. Foreman, George Washington University, U.S.A.

Dr. H. G. Nehzad, Moorehead State University, U.S.A.

Dr. Kaoru Tone, Saitama University, Japan.

Dr. S. L. Gass, University of Maryland, U.S.A.

Dr. R. G. Vachnadze, Institute of Computer Mathematics, Georgian SSR Academy of Sciences, Tbilisi, U.S.S.R.

Dr. R. P. Hamalainen, Systems Analysis Laboratory, Helsinki, Finland.

C. Literature Acquired

1. A Book of Reprints of International Symposium on the Analytic Hierarchy Process, Tianjin University, Tianjin, China, September 6-9, 1988 (87 articles, 653 pages).

2. Liu Bao (1988), "The Institute of Systems Engineering, Tianjin University--A Prospectus."

3. R. G. Vachnadze and N. I. Markozashvili (1987), "Some Applications of the Analytic Hierarchy Process," *Mathematical Modeling*, 9, 185-191.

4. R. G. Vachnadze (1988), "Some General Comments on the Analytic Hierarchy Process" (manuscript).

5. R. G. Vachnadze and K. A. Blagidze (1988), "Software Program Realizing the Analytic Hierarchy Process" (manuscript).

6. J. M. Alexander (1988), "The Analytic Hierarchy Process and Conflict Analysis: Northern Ireland Case Study (An Update)" (manuscript).