

ORNL/FTR--3838

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ORNL
FOREIGN TRIP REPORT
ORNL/FTR-3838

DATE: December 17, 1990

SUBJECT: Report of Foreign Travel of James D. White, ORNL Program Manager,
Advanced Controls Program, Instrumentation and Controls (I&C) Division

TO: A. W. Trivelpiece

FROM: J. D. White

PURPOSE: To discuss operational safety of French, German, and Russian reactors and the
impact of I&C on safety.

SITES

VISITED:	11/26/90	Framatome La Defense Paris, France	Mr. Philippe Namy
	11/27/90	CEGELEC Perret CEDEX Paris, France	Mr. Hendrik Cappon
	11/27/90	Commissariat a L'Energie Atomique Fontenay-aux-Rose CEDEX Paris, France	Mr. Jean Y. Henry
	11/28/90	Electricite de France Chatou Research Center Chatou, France	Mr. M. Combe
	11/29/90	KWU Siemens Offenbach, Germany	Mr. Dieter Ewers

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11/30/90	Gesellschaft für Reaktor Seikereit Garching, Germany	Dr. W. Bastl
11/30/90	ISAR-II Nuclear Power Plant Garching, Germany	Mr. Werner Aleite
12/3-5/90	Kurchatov Institute Moscow, U.S.S.R.	Prof. Semion Malkin

ABSTRACT

While on vacation, the traveler participated as a co-chairman of a panel of instrumentation and controls specialists visiting nuclear establishments in Europe. The purpose of the visit was to assess the status of instrumentation and controls technology for nuclear power in Europe. A list of the sites visited and the personnel contacted is included in this trip report. The visit was sponsored by Loyola College working under contract to the National Science Foundation. All costs were paid by Loyola College, for whom the traveler was a consultant. This was an outside activity approved by DOE.

The traveler was surprised by the high level of automation present in the German Konvoi nuclear power plants built by Siemens AG KWU. The claim was that this was done to improve the safety of the plant by "keeping the operator out of the loop" for the first 30 minutes of some transients or accidents. The traveler was also surprised by the high level of man-machine interface R&D in the U.S.S.R.

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REPORT ON TRIP TO VISIT EUROPEAN COUNTRIES TO ASSESS THE STATE OF THE ART OF INSTRUMENTATION AND CONTROLS SYSTEMS FOR NUCLEAR POWER PLANTS

The traveler is a consultant to Loyola College, serving as co-chairman of a panel to assess the state of the art in the controls and instrumentation technology in the European nuclear community. This study is being conducted by Loyola College under subcontract to the National Science Foundation. While on vacation, the traveler led a panel of six other instrumentation and controls specialists to several nuclear establishments in Europe. The traveler visited the sites listed in this trip report and discussed the current I&C technology existing there. From this information and that gathered by other team members, an assessment of the technology will be made.

This is an outside activity for the traveler approved by DOE. The traveler conducted no business for DOE or Martin Marietta Energy Systems, Inc., during this period. There was no cost to DOE; all expenses were paid by Loyola College.

The product of the assessment will be an oral presentation by each member of the team. The presentation will be in Washington, D.C., on January 31, 1991, at the National Science Foundation. A written report of the findings will also be published sometime in 1991. This report will be a team effort and will be available to anyone desiring information on the findings of the visits.

Recommendations

The traveler was surprised by the high level of automation present in the German Konvoi nuclear power plants. The claim was that this was done to improve the safety of the plant by "keeping the operator out of the loop" for the first 30 minutes of some transients or accidents. This is contrary to the design goal of some nuclear plant concepts to get the operator intimately involved in the first part of any transient, giving him a myriad of information aids to ensure that he follows procedures. The traveler recommends that DOE programs associated with nuclear reactor design, operation, or analysis look further into the Siemens approach.

The traveler was also surprised by the high level of activity in man-machine interface R&D in the U.S.S.R. This R&D obviously is targeted toward ensuring another Chernobyl does not happen. But there has been a lot of previous R&D in this area, some of which seems to have a considerable amount of experimental data. Furthermore, Professor Venda of the Kurchatov Institute indicated that he has developed a mathematical model of operator cognitive functions. The traveler recommends that further discussion with Prof. Venda take place to determine the details of his model and the supporting experimental data from the U.S.S.R.

APPENDIX A

Itinerary

1990

November 21	Travel from Knoxville, Tennessee, to Paris, France
November 22	Arrive Paris, France
November 28	Travel from Paris, France, to Frankfurt, Germany
	Arrive Frankfurt, Germany
	Travel from Frankfurt, Germany, to Aschaffenburg, Germany
	Arrive Aschaffenburg, Germany
November 29	Travel from Aschaffenburg, Germany, to Garching, Germany
	Arrive Garching, Germany
December 2	Travel from Garching, Germany, to Moscow, U.S.S.R.
December 6	Travel from Moscow, U.S.S.R., to Knoxville, Tennessee, U.S.A.
	Arrive Knoxville, Tennessee

APPENDIX B

Persons Contacted

The following persons were contacted by the traveler during the visit:

FRANCE

Framatome - La Defense

Mr. Philippe Namy
Mr. Alain Billet
Mr. Alain Parry

CEGELEC

Mr. Hendrik Cappon

CEN/Fontenay-aux-Rose

Mr. Jean Y. Henry
Mr. J. Peltier
Mr. J. F. Calmet

EDF/Chatou

Mr. M. Combe
Mr. J. F. Hamelin
Mr. J. Ancelin
Mr. R. Montmayeul
Mr. D. Galara

GERMANY

Siemens - Offenbach

Mr. Dieter Ewers
Mr. Michl Stimler
Mr. Werner Aleite

GRS - Garching

Dr. W. Bastl
Dr. Dieter Wach
Dr. Herbert Schuller
Mr. Manfred Kersken
Mr. Lothar Felkel
Dr. Dieter Wach

RUSSIA

Kurchatov Institute, Moscow, U.S.S.R.

Prof. Semion Malkin
Acad. N. N. Ponomaev-Stepnoj

APPENDIX C

Documents Received

The documents received will be published in the panel's written report.

APPENDIX D

Members of the Panel were:

Co-Chairman

James D. White, Program Director
Advanced Controls Program
Oak Ridge National Laboratory

Co-Chairman

Professor David D. Lanning
Massachusetts Institute of Technology
Department of Nuclear Engineering

Leo Beltracchi

U.S. Nuclear Regulatory Commission
Human Factors Branch

Dr. Frederick R. Best

Associate Professor of Nuclear Engineering
Nuclear Engineering Department
Texas A&M University

James R. Easter

Westinghouse Electric Corporation

Lester C. Oakes

Senior Technical Advisor
Oak Ridge National Laboratory

A. L. Sudduth

Duke Power Company

END

DATE FILMED

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