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DEVELOPMENT OF A DESIGN HANDBOOK ON STRESS-CORROSION CRACKING

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Ohio State University

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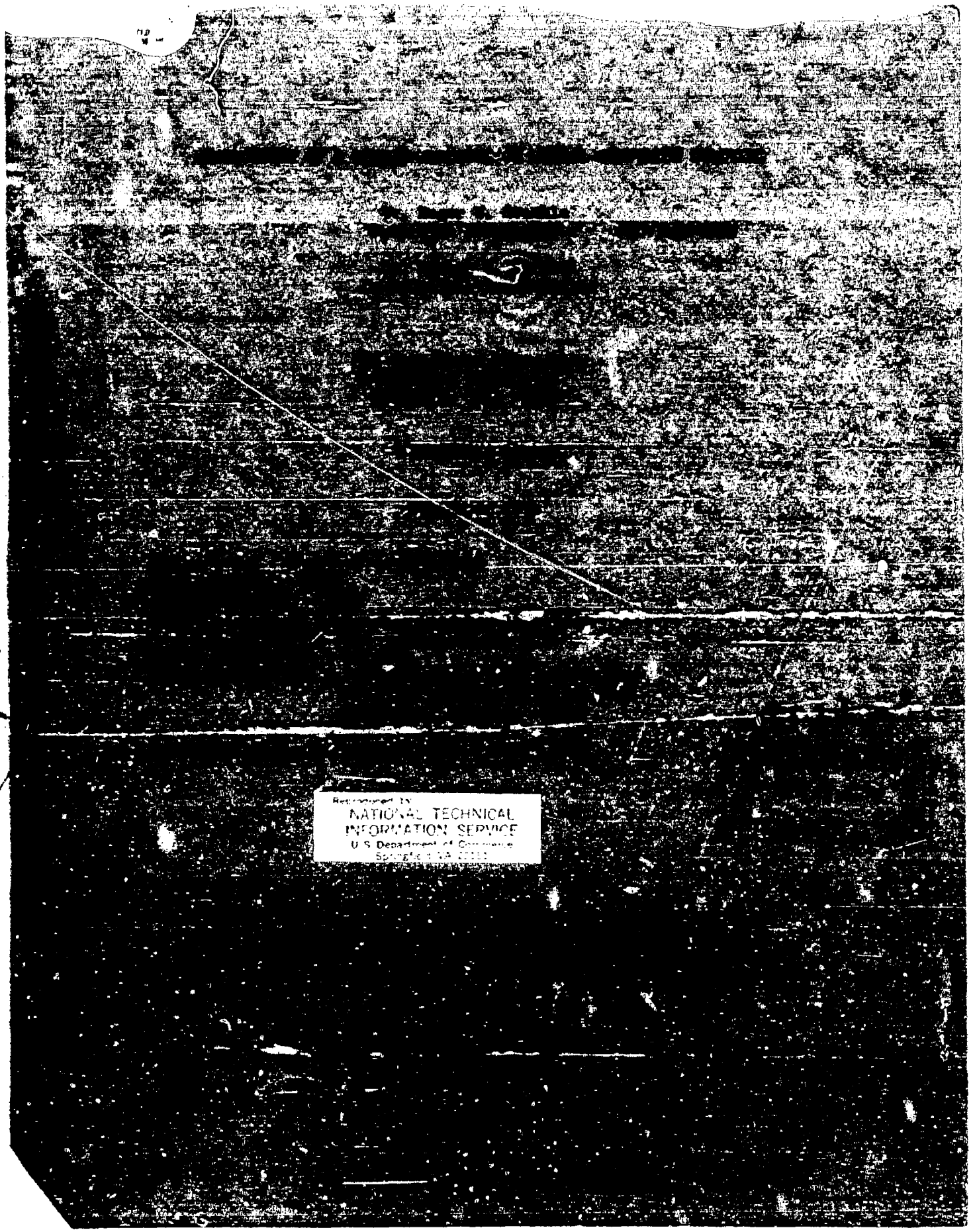

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Significant progress has been made in compiling the data base from which the contents of the handbook on stress corrosion cracking will be extracted.

In a first effort, extensive computerized literature searches were done. A second effort to collect available information on stress corrosion cracking was undertaken by contacting in writing more than two hundred recognized specialists active in this field. Early results of these efforts are presented.

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Development of a Design Handbook On Stress-Corrosion Cracking

I. Progress to date

a. Computerized literature search.

Significant progress has been made in compiling the data base from which the contents of the handbook will be extracted. Mostly in cooperation with the Battelle Columbus Laboratories computerized literature searches were made with the following data bases:

1. DDC (Defence Documentation Center)
2. MCIC (Metals and Ceramic Information Center)
3. AEC (Atomic Energy Commission)
4. CDA (Copper Development Association)
5. NASA (National Aeronautics and Space Administration)
6. Lockheed Information Retrieval Service
7. MIC (Mechanized Information Center - OSU Libraries)

These literature searches all yielded several hundred (some more than a thousand) hits on papers and documents concerning stress corrosion cracking, corrosion fatigue, hydrogen embrittlement, and liquid metal embrittlement. The most relevant papers and documents were selected and ordered. More than 50 percent of the publications so identified are already assembled at O.S.U.

b. Letters to stress corrosion specialists.

A second effort to collect available information on stress corrosion cracking and corrosion fatigue was undertaken by contacting in writing more than two hundred recognized specialists active in the fields of stress corrosion and corrosion fatigue. The letters that were sent to these specialists outlined the project, asked for the contribution of information, both published and unpublished, and contained a questionnaire for convenient return. A specimen

of the letters that were sent out is attached as Appendix I. To date, about 50 questionnaires have been returned, with more than 90% of them pledging information in the form of papers, reports, failure statistics, and failure analysis concerned with stress corrosion and corrosion fatigue. Already, over one thousand recent reports and papers on stress corrosion and corrosion fatigue have been compiled. The names of those specialists contacted so far are given in Appendix II. The letters sent out had two purposes:

1. solicit contributions to the handbook
2. generate publicity for the handbook

The very high percentage of pledges to contribute information to the handbook on the returned questionnaires gives us confidence that we will be successful on the first account.

The second objective was to generate publicity. We have achieved this objective and acclaim as well. Many specialists contacted have not only returned their questionnaires with promises to contribute but have also sent letters and remarks indicating what they thought of the ARPA handbook project on stress corrosion cracking. Appendix III gives a collection of such remarks.

II. Work Scheduled for Next Reporting Period

The major effort will consist in organizing and studying the information which was compiled, and extracting data from it for the handbook sections on individual alloy systems.

Parallel to the digestion of the information already received, we will keep up our effort to obtain further relevant reports on stress corrosion and corrosion fatigue. This will mainly be done by following up on the returned questionnaires. In a small number of cases, personal visits to laboratories generating stress corrosion and corrosion fatigue data will be necessary.

Appendix I. Letter sent to stress corrosion specialists

THE OHIO STATE UNIVERSITY

Subject: Handbook of Stress Corrosion Cracking and Corrosion Fatigue of Metallic Materials

Dear

We are preparing a comprehensive handbook on stress corrosion cracking and corrosion fatigue of metallic materials. We are soliciting your cooperation in this endeavor specifically in:

1. Reviewing draft chapters as they are prepared

2. Helping us to assure that our treatment is as thorough as possible with respect to including previously unpublished information from your organization

This handbook is a major cooperative effort among government agencies, universities, and industries. The Advanced Research Projects Agency (ARPA) is sponsoring this program at Ohio State with the objective of focusing and synthesizing the widely scattered literature so that it can be used effectively and reliably by the design and materials communities. The program is for three years and has sufficient funding to permit a proper analysis and presentation of the data. We have already received commitments from some major alloy producers and users to contribute their research results and experience with failed components.

In order to assure the usefulness and quality of the handbook the following specific associated programs are underway:

1. A steering committee headed by H. W. Paxton, Director of Research at Carnegie-Mellon University, has been formed to provide guidance in the preparation and publication of the final volume. The members of this committee are primarily designers who represent the major segments of industry.

2. At Battelle Memorial Institute the Corrosion Division, under the direction of W. K. Boyd, is acquiring and evaluating published literature.

3. A separate "missionary" volume of about 250 pages is being prepared by Dr. B. F. Brown of American University. The purpose of this volume is to describe the essence of the problem in a readily accessible and digestible form.

We intend to make this handbook as comprehensive as possible. We plan to collect and analyze all the presently available information concerning stress corrosion (including hydrogen embrittlement) and corrosion fatigue of the technologically important alloy systems. The results of this effort will be presented in a way which is readily understood by the design engineer. The emphasis is on presentation of data rather than theories. Specifically, the handbook will include information of the following kind contained in the full range of important environments:

- Threshold stresses, survival tests, and time to failure by SCC in smooth and precracked specimens in all important environments
- Stress corrosion crack growth rates and stress intensity thresholds
- S-N curves, Goodman diagrams, and da/dN for fatigue tests
- Other information concerning the effects of environments on mechanical (design) properties of metallic materials, e.g. low cycle fatigue, creep, etc.

The handbook will contain chapters incorporating the above for the following alloy systems:

- carbon steels
- low alloy steels
- martensitic stainless steels
- ferritic stainless steels
- duplex stainless steels
- austenitic stainless steels
- nickel base alloys
- titanium alloys
- zirconium alloys
- magnesium alloys
- copper alloys
- aluminum alloys
- other alloy systems (less common metals, refractory metals, cast iron, etc.)

Moreover, it is planned to include sections concerned with:

- environmental cross reference
- testing techniques
- failure analysis and failure prevention
- procedures for interpreting and utilizing the data

Since your laboratories have contributed significantly to these topics, we are asking that you consider contributing such technical information to the handbook on stress corrosion and corrosion fatigue. To facilitate this, we could either keep your contribution confidential (i.e. without reference) or give you full credit for it in whatever form you desire. Your contribution would be a significant step toward the design of more reliable structures for the increasingly complex and aggressive environments of today's technology.

Your contribution could consist of laboratory or field reports concerning the occurrence of stress corrosion or corrosion fatigue. We are looking for both raw data and analysis of conditions under which these processes can occur. As illustrations and for educational purposes, we are interested in both failure reports, analysis, and statistics of failures of various types.

We intend to use and present your information on stress corrosion cracking and corrosion fatigue in a constructive manner, pointing out not only where there is danger of cracking in certain material-environment combinations, but also where alloys and environments can be expected to give satisfactory service behavior.

We plan to prepare rough drafts of all the sections on the alloy systems mentioned above. If you agree, we will send these sections to you as they become available for review by you or your specialists. This is to provide you with an early overview of the present state of the art, and we would give you an opportunity to criticize, amend, and/or fill in gaps in the material covered.

We are looking forward to hearing from you concerning your possible contribution to the handbook on stress corrosion cracking and corrosion fatigue.

Please return the attached form at your earliest convenience. Following this we will arrange direct contact and further discussion of the data.

Sincerely yours,

R. W. Staehle
International Nickel Professor of
Corrosion Science and Engineering

Markus O. Speidel
Visiting Research Professor

RWS/MOS:cgw

Enclosure

Name of organization replying

Name of person submitting information

PARTICIPATION IN THE
ARPA HANDBOOK PROJECT IN
STRESS CORROSION CRACKING AND CORROSION FATIGUE

1. We (will/are not able to) participate in the Handbook Project.

2. The proper person in our organization to contact for reading the draft chapters and furnishing information is:

   Name: _____

   Address: _____

   _____

   Telephone: _____

   Other person in our organization who could furnish information on stress corrosion cracking, hydrogen embrittlement, and corrosion fatigue are:

   Name: _____

   Address: _____

   _____

   Telephone: _____

   Name: _____

   Address: _____

   _____

   Telephone: _____

3. We have the following kinds of information available which might possibly be used:

	(Check or fill in blanks)	
	yes	no
(a) Laboratory data		
(1) Alloy Types		

(2) Environments

(b) Failure analyses or descriptions relating to stress corrosion cracking or corrosion fatigue

yes no

Types

(c) Failure Statistics relating to stress corrosion cracking or corrosion fatigue

yes no

(d) Reprints and/or reports relating to stress corrosion cracking, corrosion fatigue, hydrogen embrittlement

yes no

( ) We have other pertinent information as follows:

Please return to:

Dr. M. O. Speidel
Visiting Research Professor
Department of Metallurgical Engineering
The Ohio State University
116 West 19th Avenue
Columbus, Ohio 43210

Appendix II. Stress corrosion specialists whose contribution of information to the handbook was solicited

ADLER, Dr. P.N., Grumman Aerospace Corporation, Bethpage, New York

AHMADIEH, Dr. Aziz, Pahlavi University, Shiraz, Iran

ALTENPOHL, Dr. Dieter G., Schweizerische Aluminum AG, Zurich, Switzerland

ANDERSON, Dr. William E., Battelle Pacific Northwest Lab, Richland, Washington

ARGON, Professor A., Massachusetts Institute of Technology, Cambridge, Mass.

ARUP, Dr. Hans, Korrosionscentralen, Copenhagen, Denmark

ARVIDSON, Mr. S., A.B. Bofors, Steel Laboratory, Bofors, Sweden

ASPEN, Dr. R.G., Westinghouse Electric Corporation, Pittsburgh, Pennsylvania

BARSOM, Dr. John, U.S. Steel Corporation, Monroeville, Pennsylvania

BECK, Dr. Theodore R., Flow Research Incorporated, Kent Washington

BEGLEY, Mr. Richard T., Westinghouse, Pittsburgh, Pennsylvania

BELO, M. Da Cunha, Coutre National de la Recherche Scientifique, France

BENSON, Dr. Ray B. Jr., North Carolina State University, Raleigh, North Carolina

BERG, Mr. O., Central Institute for Industrial Research, Blindern-Oslo, Norway

BERGE, M.J.P., Electricite de France, Chatou, France

BERGH, Director K.G., Jernkontoret, Stockholm, Sweden

BERNSTEIN, Professor I.M., Carnegie Mellon University, Pittsburgh, Pennsylvania

BIANCHI, Professor G., University of Milano, Italy

BIRNBAUM, Dr. H.K., University of Illinois, Urbana, Illinois 61801

BLACKBURN, Mr. Martin J., Pratt & Whitney Aircraft, East Hartford Connecticut

BLOM, Dr. Uno, Sandvik A.B., Sandviken, Sweden

BOCKRIS, Professor O'M, Flinders University of South Australia, Bedford Park, Australia

BOHNENKAMP, Dr. K., Max-Planck-Insitut für Eisenforschung, Dusseldorf, Germany

BOMFORD, Dr. Michael J., Henry Wiggin & Co.,Ltd., Hereford, England

BOMBARA, Dr. G., Centro Sperimentale Metallurgico, Roma, Italy

BOND, Dr. A.P., Climax Molybdenum Co., Ann Arbor, Michigan

BOYD, Mr. Walter, Battelle Memorial Institute, Columbus, Ohio

BRANDRY, Dr. Fatiyah Al, University College of Swansea, Glam, England

BRESSANELLI, Mr. Jerry, Crucible Materials Research Center, Pittsburgh, PA

BROWN, B.F., American University, Washington, D.C.

BRUNETAUD, Mr. M.R., S.N.E.C.M.A., Corbeil Essonnes, France

BRUNNER, Dr. Hans, Institut Dr. Straumann, Waldenburg, Switzerland

BRYANT, Mr. Robert E., Texaco, Inc., Port Arthur, Texas

BUCK, Mr. R.H., Kelsye Hayes Co., Philadelphia, Pennyslvania

BUNK, Dr. D.W., Institut fur Werkstofferschung, Porz-Wahn, Germany

BUSH, Dr. S. H., U.S. Atomic Energy Commission, Washington, D.C.

CARTER, Dr. Clive, The Boeing Company, Seattle, Washington

CASAD, Mr. B.M., Continental Oil Company, Ponca City, Oklahoma

CHANDLER, Dr. W., Rockwell International, Canoga Park, California

CHANGE, Prof. Frank C., Chem Kung University, Taiwan, Rep. of China

CHAWLA, Prof. Dr. K.K., Instituto Militar de Engenharia, Rio de Janeiro, Brazil

CHITTUM, Mr. Joseph K., Chevron Research Co., LaHabra, California

CIBA, Geigy AG, Klybeckstr, Switzerland

CLARK, Dr. W.G., Jr., Westinghouse, Pittsburgh, Pennsylvania

CLARKIN, Dr. P.C. Office of Naval Research, Arlington, Virginia

COCKCROFT, Dr. M.G., National Gas Turbine Establishment, Hants, United Kingdom

COFFIN, Dr. Louis, General Electric Co., Schenectady, New York

COHEN, Dr. Bennie, Aeronautical Systems Branch, Wright Patterson AFB, Ohio

COHEN, Dr. Morris, Massachusetts Inst. of Technology, Cambridge, Massachusetts

COLLINS, Mr. J.A., E.I. duPont de Nemours & Co., Wilmington, Delaware

CORDOVI, Dr. Marcel A., International Nickel Co. of Canada, Ltd., New York, New York

CORIOU, Dr. Henri, DCA/SECE, Fontenay aus Roses, France

CORTEN, Professor H., University of Illinois, Urbana, Illinois

COTTON, Dr. J.B., Scarborough, Yorkshire, England

COULTER, Mr. A.W., Dowell Division of Dow Chemical Co., Tulsa, Oklahoma

COUPER, Mr. A.S., American Oil Company, Whiting, Indiana

COUTSOURADIS, Mr. M.D., Centre de Recherches Metallurgiques, Liege, Belgium

COWAN, Dr. Robert L., General Electric Company, Pleasanton, California 94566

COX, Dr. Brian, Atomic Energy of Canada Ltd., Chalk River, Ontario, Canada

CRAIG, Dr. H. Lee, Division of Ocean Engineering Atmospheric Science, Miami, Florida

CROOKER, Mr. T.W., Naval Research Laboratory, Washington, D.C.

CUNNINGHAM, J.E., Oak Ridge National Laboratory, Oak Ridge, Tennessee

DANKO, Dr. J.C., General Electric Company, San Jose, California

DAOTRONG, Dr. T., Division Production d'Energie, Le Bourget, France

DAS, Mr. K.B., The Boeing Company, Seattle, Washington

DAVIES, Prof. E., University College of Swansea, Glam, England

DAVIS, Dr. H.M., U.S. Army Research Office-Durham, Durham, North Carolina

DAVIS, Dr. Mark J, Sandia Laboratories, Albuquerque, New Mexico

DECKER, Dr. Raymond, International Nickel Company, New York, New York

DE BRAY, Dr. Werner, Siemens AG, Erlangen, Germany

DE LUCCIA, Naval Air Development Center, Warminster, Pennsylvania

DESESTRETE, Dr. Angre, Societe Creusot-Loire, Firminy, France

DETERT, Prof. Dr. Ing Klaus, AEC, Frankfurt, Germany

DEUTSCH, Dr. G., NASA, Washington, D.C.

DE VAN, Mr. Jack H., Oak Ridge National Laboratory, Oak Ridge, Tennessee

DEVEREUX, Professor O., University of Connecticut, Storrs, Connecticut

DILLON, Dr. R.L., Battelle Pacific Northwest Laboratories, Richland, Washington

DOLAN, Prof. Tom J., University of Illinois, Urbana, Illinois

DONATI, Dr. J.R., Electricite de France, Moret-sur-Loing, France

DORUK, Dr. M., Middle East Technology University, Ankara, Turkey

DRALEY, Dr. Joe, Argonne National Laboratories, Argonne, Illinois 60439

VAN DROFFELAAR, Dr. H., DuPont of Canada, Ltd., Maitland, Ontario, Canada

DUQUETTE, Dr. David J., Rensselaer Polytechnic Institute, Troy, New York

EKBOM, Mr. Ragnar, Stal-Laval Turbin AB, Finspang, Sweden

EFFERTZ, Dr. P.H., Allianz-Zentrum F. Technik GmbH, Ismaning, Germany

ENGELL, Professor H.J., Max-Planck-Institut fur Eisenforschung, Dusseldorf, Germany

JESNITZER, Professor Erdmann, Technische Universitat, Hannover, Germany

ESSLINGER, Dr. P., Motoren-und Turbinen Union, Munchen-Allach, Germany

EVANS, Mr. G.B., Hawker Siddeley Aviation Ltd., Herts, United Kingdom

EVANS, Dr. U.R., Cambridge, Great Britain

FELTNER, Dr. Charles, Ford Motor Company, Dearborn, Michigan

FERRO, ENG. A.J.G. de Almeida, Centro de Investigacao, Sacavem, Portugal

FICHTER, Prof., Dr., EMPA, Dubendorf, Switzerland

FIDELLE, Dr. Jean-Pierre, C.E.A., Bruyeres-Le-Chatel, France

FISCHMEISTER, Prof. H., Chalmer Teknisk Hosgkola, Goteborg, Sweden

FORSYTH, Mr. P.J.E., Royal Aircraft Establishment, Hampshire, England

FORTY, Dr. A.J., University of Warwick, Coventry Warwickshire, England

FOURIE, Dr. J.T., National Physical Research Laboratory, Pretoria, South Africa

GALLAGHER, Dr. J.P., University of Illinois, Urbana, Illinois

GAMAL, M.El, O.N.E.R.A., Chatillon, France

GALVELE, Dr. Jose, Comision Nacional de Energia Atomica, Buenos Aires, Argentina

GARLICK, Mr. A., Reactor Development Lab, Windscale, United Kingdom

GEADA, Prof. S.M., Instituto Nacional de Investigacao Industrial, Lisboal, Portugal

GEGEL, Dr. H.L., Wright-Patterson AFB, Dayton, Ohio

GEIGER, Dr. T., Gebruder Sulzer, AG, Winterthur, Switzerland

GERBERICH, Mr. William W., University of Minnesota, Minneapolis, Minnesota

GJOSTEIN, Dr. Norman, Ford Motor Company, Dearborn, Michigan

GLENNY, Dr. R.J.E., Royal Aircraft Establishment, Hants, United Kingdom

GODARD, Mr. Hugh P., Ontario, Canada

GORDON, Mr. Gerald M., General Electric Company, Pleasanton, California

GRAF, Dr. L., Wilhelmsplatx, Marback, Germany

GREENFIELD, Dr. P., G.E.G. Turbine Generators, Ltd., Leicester, England

GREER, Dr. James B., Esso Research Co., Houston, Texas

GRIMM, Mr. T.C., McDonnell Aircraft Company, St. Louis, Missouri

GOULD, Mr. George, General Electric Company, Schenectady, New York

GRUHL, Prof. Dr. Ing. W., Leichtmetall Forschungsinstitut, Bonn, W.Germany

GUNNARSON, Director Sten, Oxelosunds Jarnverk, Oxelosund Sweden

HAHN, Dr. George, Battelle Columbus Laboratories, Columbus, Ohio

HARRISON, Dr. J.T., Gas Council Engr. Res. Station, Newcastle, England

HARTWIG, Dr. Ing. J., Krupp Forschungsinstitut, Essen, Germany

HAYCOCK, Mr. Ernie, Shell Development, Houston, Texas

HEADY, Mr. R.B., Shell Development Company, Houston, Texas

HEHEMANN, Dr. R.F., Case Western Reserve University, Cleveland, Ohio

HEINRICH, Mr., Friedr. Krupp GmbH, Essen, W. Germany

HEITZ, Dr. Ewald, Gundelhardtstrasse, Kelkheim, Germany

HELFRICH, Dr. Wayne J., Kaiser Aluminum & Chemical Co., Pleasanton, California

HEMTHORNE, Mr. M., The Carpenter Steel Co., Reading, Pennsylvania

HEUSLER, Prof. K.E., Univeritat Clausthal, Clausthal, Germany

HIMMEL, Alusuisse, Neuhausen, Switzerland

HOAR, Dr. T.P., Cambridge, England

HOCHMAN, Dr. Robert F., Georgia Institute of Technology, Atlanta, Georgia

HOEPPNER, Dr. David, University of Missouri, Columbia, Missouri

HOFF, Mr. G., Dornier System GmbH, Friedrichshafen, W. Germany

HOFFMAN-La Roche & Co. AG, Basel, Switzerland

HOLTAN, Prof., Dr. H, University of Trondheim, Trondheim, Norway

HOPKINS, Mr. B.E., National Physical Laboratory, Middlesex, England

HUBER, Dr. Walter, AB Atomenergi, Studsvik, Nykoping, Sweden

HUDDLE, Mr. R.A.U., OECK, Winfrith, United Kingdom

HYATT, Dr. Michael V., The Boeing Company, Seattle, Washington

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KOWAKA, Dr. Masamichi, Sumitomo Metal Industries, Amagasaki, Japan

KRAFT, Dr. Joseph, Naval Research Laboratory, Washington, D.C.

KRAINER, Dr. E., Gebr. Bohler & Co. AG, Kapfenberg, Austria

KRUGER, Dr. Jerome, National Bureau of Standards, Washington, D.C.

LACOMBE, Dr. Paul, Universite Paris Sud, Orsay, France

LAIRD, Dr. Campbell, University of Pennsylvania, Philadelphia, Pennsylvania

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LANDOLT, Prof. Dr. Dieter, Ecole Polytehcnique Federale, Lausanne, Switzerland

LANGER, Dr. G.F., Westinghouse Electric Corporation, Pittsburgh, Pennsylvania

LATANISION, Dr. Ron, Max-Planck-Institut fur Eisenforschung, Dusseldorf, Germany

LEACH, Dr. James, University of Nottingham, Nottingham, England

LECKIE, Dr. Harry P., Inland Steel Co., East Chicago, Indiana

VAN LEEUWEN, Dr. H.P., National Aerospace Lab. NLR, Amsterdam, Netherlands

LEVY, Dr. Sandor S., Reynolds Aluminum, Richmond, Virginia

LINDSTRAND, Mr. Erik, Granges Essem, Finspang, Sweden

LIPSITT, Dr. Harvy S., Wright-Patterson Air Force Base, Ohio

LITTMANN, Dr. Walter E., The Timken Company, Canton, Ohio

LORENZ, Mr. Roy, Combustion Engineering Co., Chattanooga, Tennessee

LOUTHAN, Dr. M.R., DuPont Company, Aiken, South Carolina

LOVELACE, Dr.A.M., Wright-Patterson AFB, Ohio

LOW, Dr. J.R., Carnegie Mellon University, Pittsburgh, PA

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MANSFIELD, Dr. F., Rockwell Internation, Thousand Oaks, Calif 91360

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MARANDET, M. Bernard, IRSID, St Germain en Laye, France

MARCUS, Dr. H. L.,Rockwell International, Thousand Oaks, Californai

MARTA, Dr. E. Santa, Laboratorio de Fisica e Engenharia Nucleares, Sacaven, Portugal

MATTSSON, Dr. E., Swedish Board for Technical Development, Stockholm, Sweden

MAYER, Mr. K.H., Maschinenfabri, Augsburg-Nurnberg, Nurnberg, Germany

MC CLINTOCK, Professor Dr. F., Massachusetts Institute of Technology, Cambridge, Mass

MC COY, Dr. Robert A., Naval Facilities Engineering Command, Washington, D.C.

MC Evily, Prof, Dr. A., University of Connecticut, Storrs, Connecticut

MC MARY, Dr. T.A., Babcock & Wilcox, Alliance, Ohio

MC NITT, Virginia Polytechnic Institute and State University, Blacksburgh, Virginia

MC MAHON, Prof. Dr. Charles, University of Pennsylvania, Philadelphia, Pennsylvania

MITSCHE, Prof. Dr. R., Institut f. Metallkunde, Leoben, Austria

MOON, Dr. David, Westinghouse Electric Corp, Pittsburgh, Pennsylvania

MONTUELLE, M. Jean, C.N.R.S., Vitry, France

MURATA, Dr. Tom, Nippon Steel Corporation, Kawasaki, Japan

NEILL, Mr. W.J. Jr., Humble Oil and Refining Co., Linden, New Jersey

NELSON, Mr Howard G., Ames Research Center, Moffett Field, Calif 94305

NICHOLSON, Dr. R. B., International Nickel Company, Birmingham, England

NIEDER, Mr. R., Arbeitsgemeinschaft Versuchsreaktor AVR GmbH, Dusseldorf, Germany

NIELSEN, Mr. N.A., DuPont Experimental Station, Wilmington, Delaware

NORGERG, Mr. L. A., Stal-Laval Turbin AB, Finspong, Sweden

NORDIN, Mr. S., Uddeholm Company, Hagfors, Sweden

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NOVOTNY, Prof. Dr. Hans, Universitat Wien, Wien, Austria

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OKKERSE, Dr. B., Technische Hoge School Delft, Delft, Netherlands

ORIANI, Dr. Richard, U.S. Steel Corporation, Monroeville, Pennsylvania

OSOZAWA, Nippon Yakin Kogyo Co. Ltd, Kawasaki,Japan

OSTBERG, Docent Gustav, AB Atomenergi, Nykoping, Sweden

PACKER, Dr. Kenneth F., Packer Engineering Associates Inc., Napervilie, Illinois

PANIC, Mr. Bozidar, Laboratorium fur Formfestigkeit, Winterthur, Switzerland

PARIKH, Dr. N., IIT Research Institute, Chicago, Illinois

PARKINS, Dr. R.N., University of Newcastle, United Kingdom

PATON, Dr. N.E., Rockwell International, Thousand Oaks, California 91360

PATTON, Prof.Dr. C.C., University of Oklahoma, Norman, Oklahoma

PAXTON, Dr. H.W., Carnegie-Mellon University, Pittsburgh, Pennsylvania

PELLOUX, Dr. Regis M., Mass Institute of Technology, Cambridge, Mass

PEMENT, Dr. Fred, Westinghouse Electric Corporation, Pittsburgh, Pennsylvania

PEMSLER, Dr. J.Paul, Kennecott Copper Corp. Lexington, Mass.

PHELPHS, Dr. E.H.,United States Steel Corporation, Monroeville, Pa

PICKERING, Dr. Howard W., Pennsylvania State University, University Park, Pennsylvania

PIPER, Dr. D. E., Lockheed Palo Alto Research Laboratory, Palo Alto, California

POCOCK, Mr. Fred, Babcock & Wilcox Company, Alliance, Ohio

POLMEAR, Prof. Jan I., Monash University, Clayton, Victoria

POPPELWELL, Dr. J., Olin Metals Division, New Haven, Connecticut

POURBAIX, Dr. Marcel, Cebelcor, Bruxelles, Belgium

POWELL, Dr. G.L., Oak Ridge Y-12 Plant, Oak Ridge, Tennessee

PROCTOR, Dr. R. University of Manchester, Manchester, England

PRYOR, Dr. M.H. Olin Metals Division, New Haven, Conn.

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Appendix III. Some remarks that reached us with the returned questionnaires.

"...our laboratory scientists will participate in a major way..." C.R. Isleib, INCO, New York.

"The Handbook of Stress Corrosion Cracking and Corrosion Fatigue of Metallic Materials, looks like a very ambitious undertaking and one that will be very worthwhile to the metallurgical community." Monroe S. Wechsler; Chairman, Dept. of Metallurgy; and Chief, Metallurgy Division Ames Laboratory, USAEC.

"I will be happy to contribute in whatever way I can to this project, which sounds to be an effort which could be of great benefit to everyone interested in this problem area." B. Cox; Head, Materials Science Branch; Chalk River Nuclear Laboratories; Atomic Energy Commission.

"Packer Engineering would be happy to assist in the preparation of the handbook." Kenneth F. Packer, President, Packer Engineering Associates.

"...our group at Georgia Tech would be happy to assist in whatever way we can either through contributions and information, reviewing draft chapter, or providing editorial comments." Robert F. Hochmann; Associate Director for Metallurgy; Georgia Institute of Technology; Atlanta, Georgia.

"Roger: It must be very stimulating to be working with Mark Speidel, Harry Paxton, Walt Boyd, and Floyd Brown on this important project. We would be pleased to cooperate in reviewing draft chapters and in any other way which seems appropriate. We also would be pleased to add information from our work. ." Ellis D. Verink; Chairman, Dept of Materials Science and Engineering; University of Florida; Gainesville.

"...the handbook on stress corrosion cracking is an excellent idea and Dr. Troiano and I would be happy to contribute in any way possible..." R. F. Hehemann; Professor of Physical Metallurgy; Case Western Reserve University; Cleveland, Ohio.

"I will participate in the ARPA Handbook Project. I will be glad to supply reports we have written and will review the draft chapther..." Joseph R. Stephens, Materials Development Section, Lewis Research Center, NASA.

"...sounds like an ambitious—most worthwhile project." J. Krafft; Naval Research Laboratory; Washington, D.C.

"Glad to see you have a good project" George F. Kappelt, Bell Aerospace Company.

"The handbook project is certainly most useful and valuable" Per Kofstad; Central Institute for Industrial Research; Oslo, Norway.

"We are very glad to cooperate...copies of papers are air mailed to you today" M. Kowaka; Senior Research Engineer; Central Research Laboratories; Sumitomo Metals Industries; Amagasaka, Japan.

"...nous acceptons de participer à votre project The Handbook...nous nous tenons à votre disposition pour tous renseignements complémentaires." M. El Gammal; Le Directeur Scientifique Office National d'Etudes et de Recherches Aerospatiales (ONERA); Chatillion, France.

"...we particpate in collaborative Swedish investigations into stress corrosion crack propagation as well as initiation of corrosion fatigue and we should be delighted to discuss this with you..." Bertil Aarenson; Manager, Uddeholm Steel Research; Hegfors, Sweden.

"It is a pleasure to participate in the Handbook Project in SCC and CF." Norio Sato; Professor of Electrochemistry; Faculty of Engineering; Hokkaido University; Sapporo, Japan.

"...your project of collecting and presenting available SCC data is extremely useful..." Dieter Landolt, Professor of Chemical Metallurgy, Ecole Polytechnique Federale De Lausanne, Switzerland.

"...I will pleasantly contribute to the handbook..." Prof. Dr. Th. Skoulikidis; Director, Laboratory of Physical Chemistry and Applied Electrochemistry; National Technical University of Athens; Greece.

"...very interesting and comprehensive proposals..." R.B. Nicholson; Director of Research and Technical Development; International Nickel Limited; Birmingham, England.

"Wir halten Thr Vorhaben für ausserordentlich wertvoll, so dass wir Ihre Pläne gern unterstützen wollen..." A. Rahmel, DECHEMA, Frankfurt, Germany.

"I think your ARPA project is a noble, if ambitious, one. I will of course be honored to assist in this project in any way that I can..." E.J. Wheelahan, Ch., Materials Function, G.E. and M. Dir. U.S. Army Missile RD & E Lab, Redstone Arsenal, Alabama.