

Industrial Irradiation Processing

1975 - 2005

A Thirty Year Perspective

Tony Berejka

Ionicorp⁺ – USA

Caswell Award – 2004

Societal Benefits of Irradiation Processing

Anthony Berejka

IONICORP⁺

Huntington, NY 11743

Phone/fax: 631-549-8517

E-mail: berejka@msn.com

Industrial Perspective

Background:

Exxon Chemical Company ('66-'74)

Raychem Corporation ('74-'78)

Radiation Dynamics, Inc. ('78-'81)

Consultant since 1981

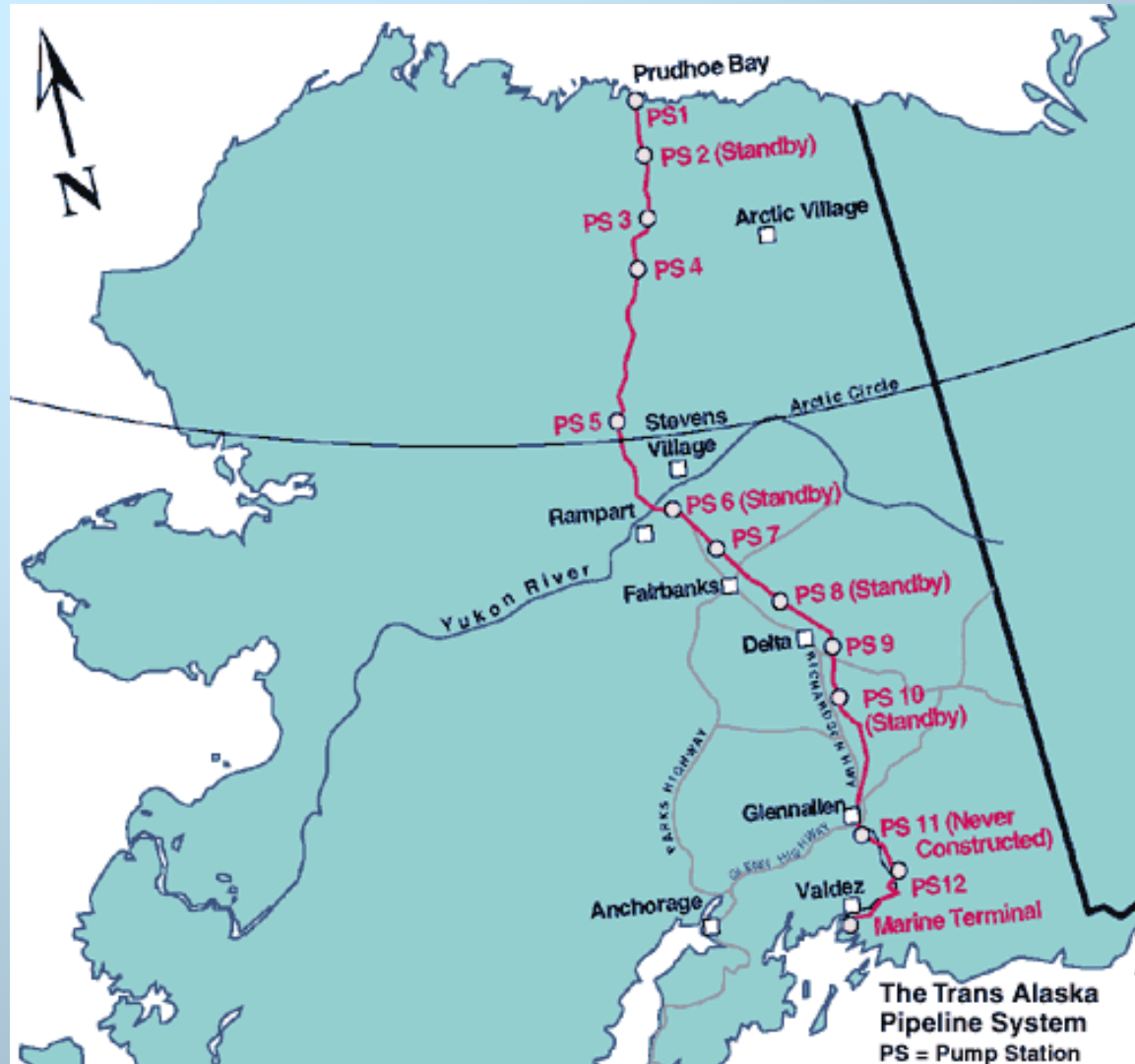
Co-Founder/Past-President:

RadTech International NA ('91-'92)

Council on Ionizing Radiation

Measurements and Standards ('96)

1975 Alyeska Pipeline Project



1975 Alyeska Pipeline Project

- + Discovery on north slope: March 1968**
- + Construction: March 1975 – May 1977**
- + 29 construction camps**
- + 28,072 workforce at peak**
- + \$8,000,000,000 total project cost**
- + 1,634,322 average bbl/day through-put
(over 20 year period 1978-1997)**

Alyeska Pipeline Demands

- + 1290 km (800 miles) total
 - 605 km (376 miles) below grade
- + O.D. 1.22 m (48 inches)
- + Operating temperature: 60°C
- + Below grade: corrosion protection
- + Below grade: soil anchored

Product Demands

- + To be able to be applied at -40**
- + To maintain soil anchorage at +60°C**
- + To provide long term corrosion protection at elevated temperatures (30+ years and still functional)**

Product Development

- + Arcticlاد I – made by two individuals on a Saturday afternoon in Raychem process lab**
- + Arcticlاد II – commercial product tailored for end use demands**

**Product development team:
chemist + 2 technicians with test
and process support personnel**

Arcticlاد Heat Shrink Backing Irradiation

Arcticlاد I = 150 kGy

Arcticlاد II = 50 kGy

Manufacturing control: M_{100} at 150 °C
(modulus at 100% elongation)

Dose – for discussion with:

- a) corporate accountants
- b) vendor

Arcticlاد II

Heat Shrink

Ingredient

Backing
(0.43 mm)

Adhesive
(0.84 mm)

Polyethylene

LDPE

EVA

$T_m \sim 115^\circ\text{C}$

$T_m \sim 70^\circ\text{C}$

EPDM

semi-crystalline

amorphous

Tackifier

innovative

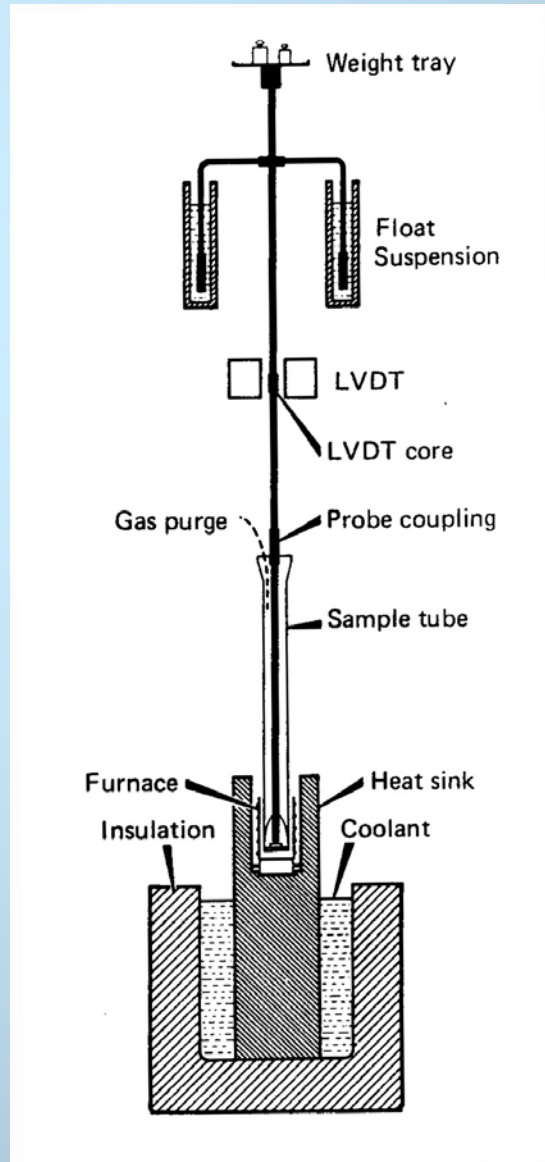
Carbon black

small per cent

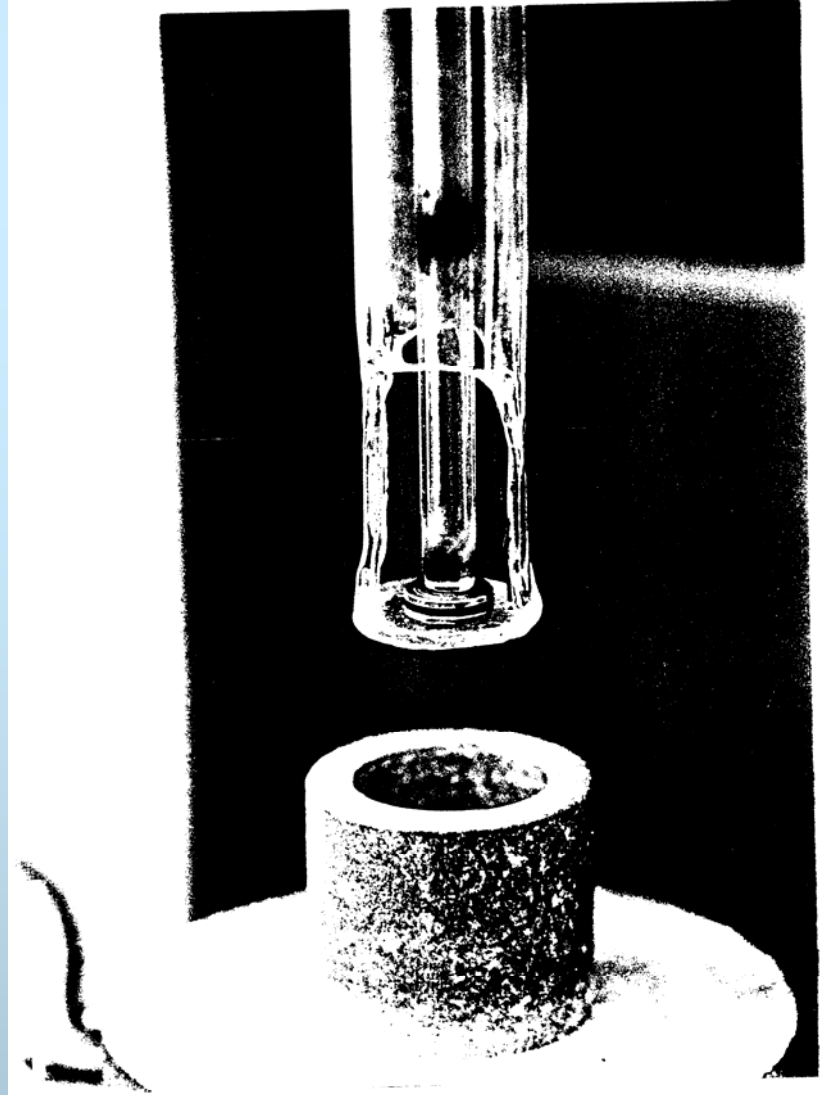
Antioxidant

small per cent

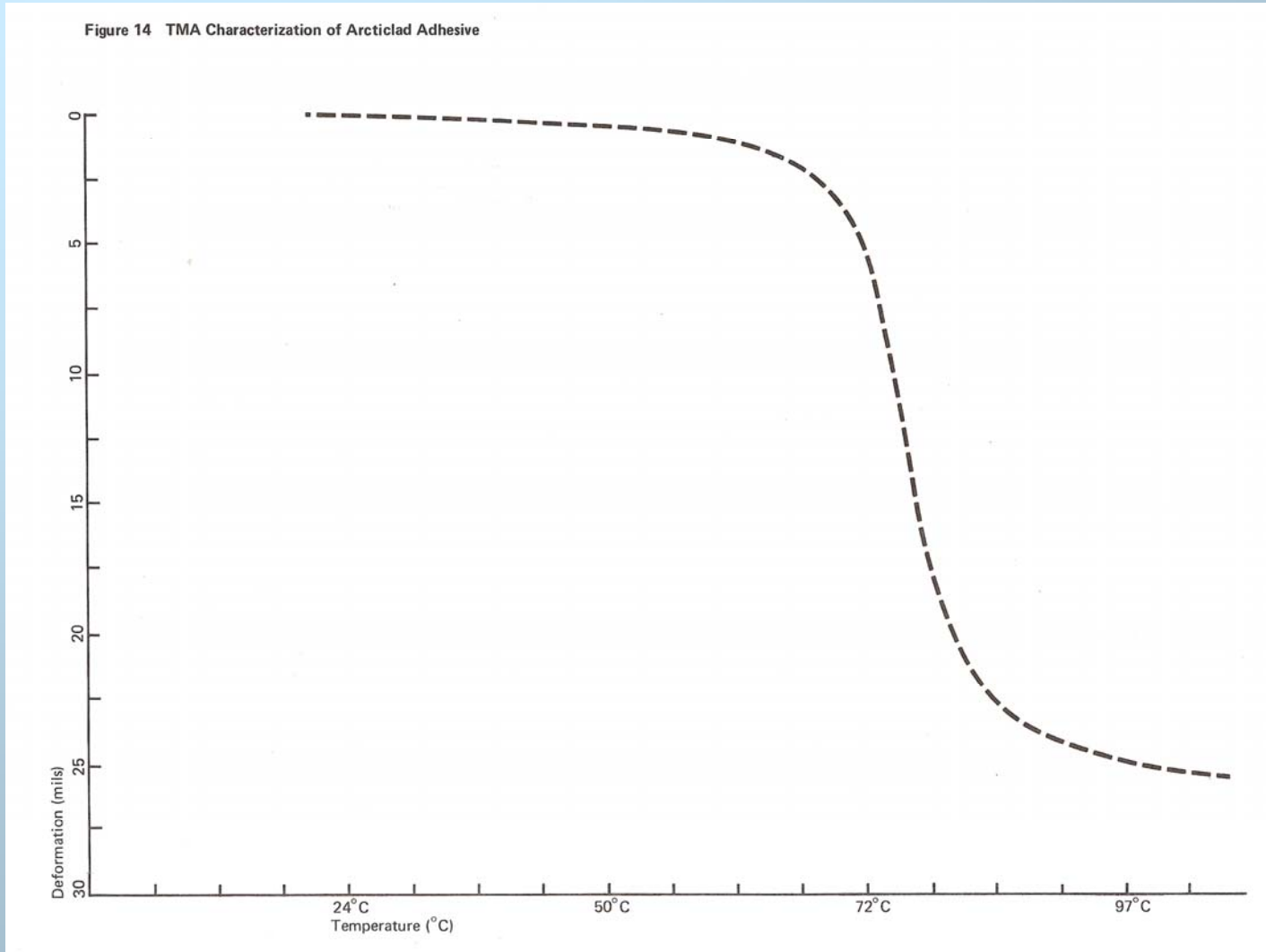
Arcticlad II – TMA Studies



Arcticlاد II – TMA Studies

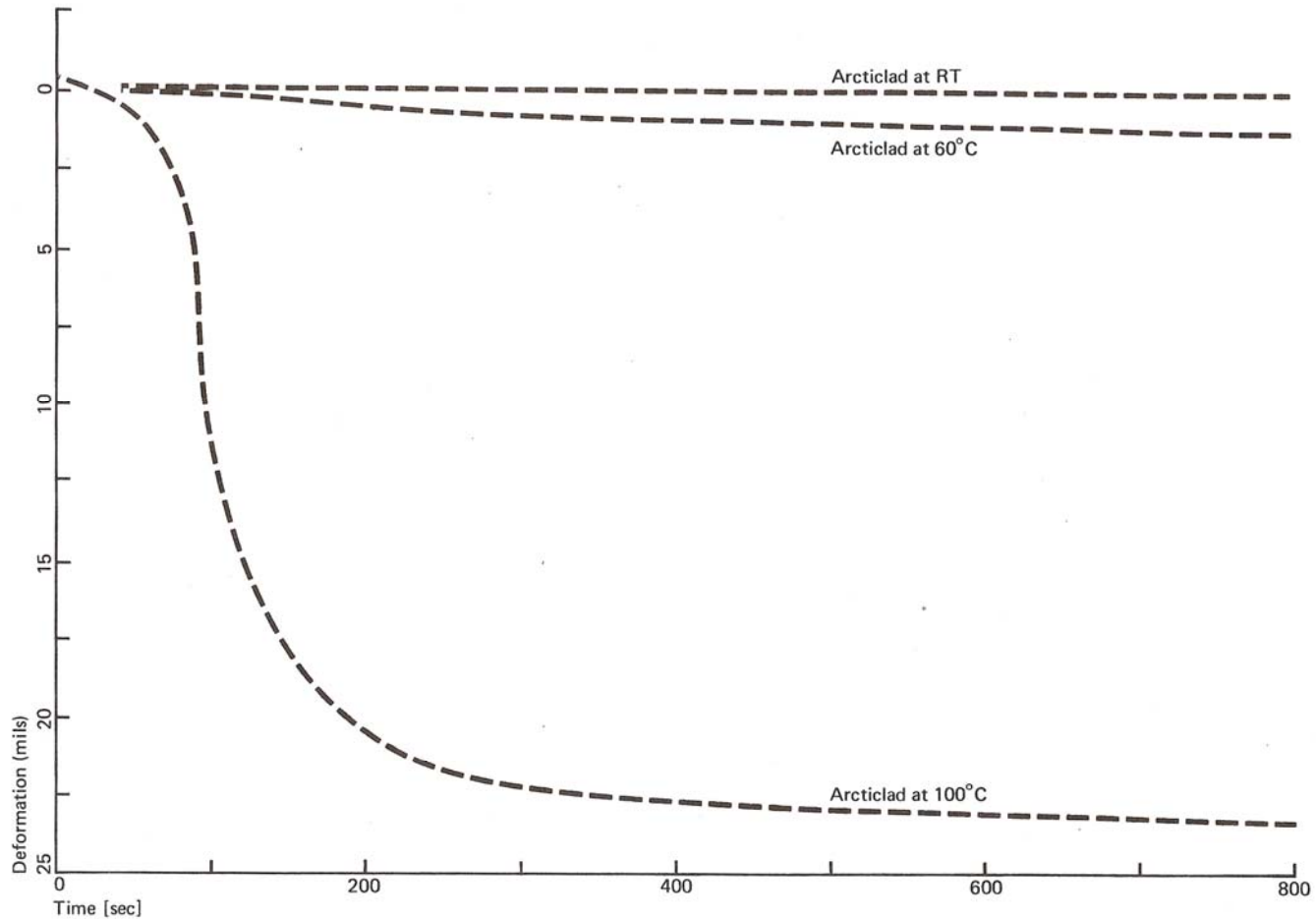


Arcticlاد II Adhesive – TMA

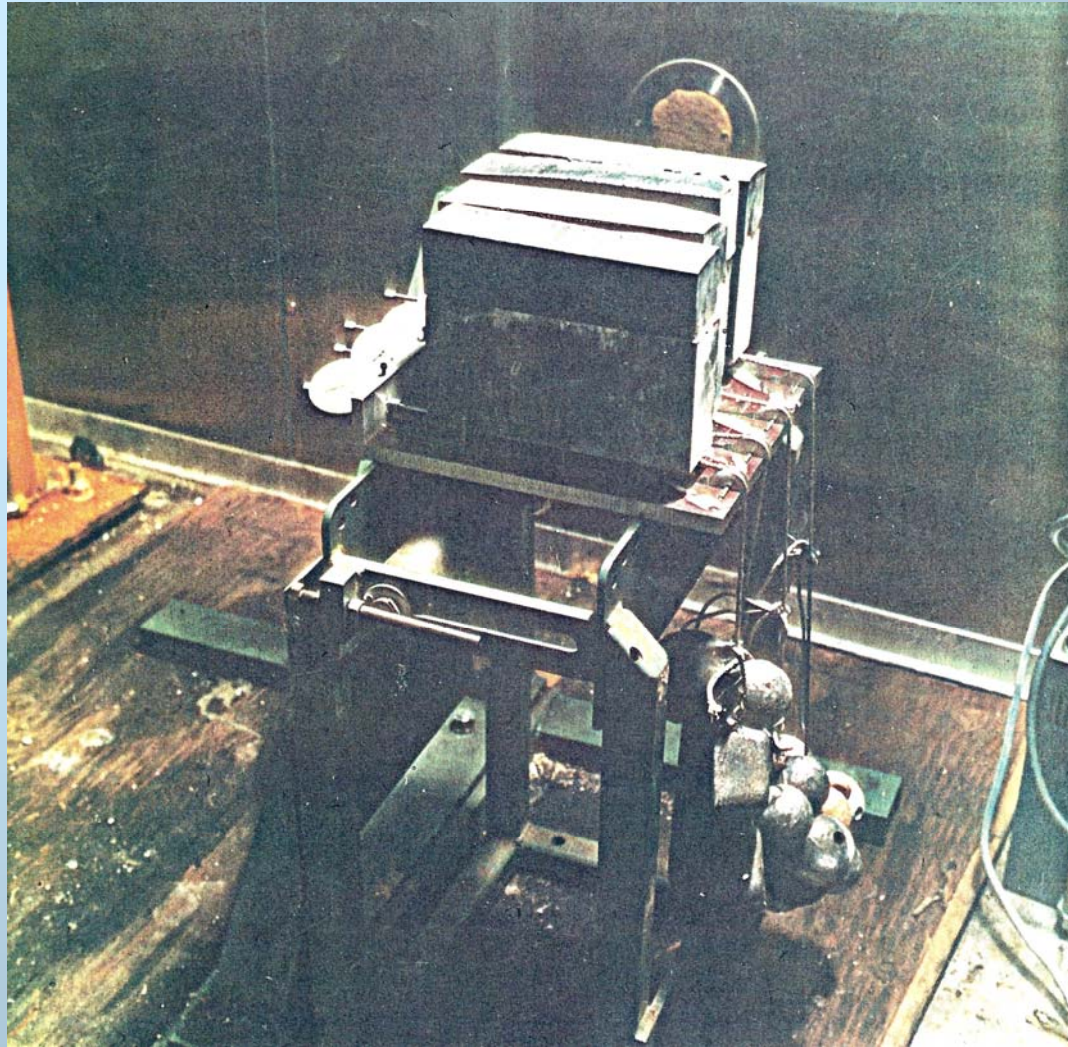


Arcticlاد II Adhesive – TMA

Figure 5 Deformation vs. Time Raychem Arcticlاد Adhesive (non-beamed)

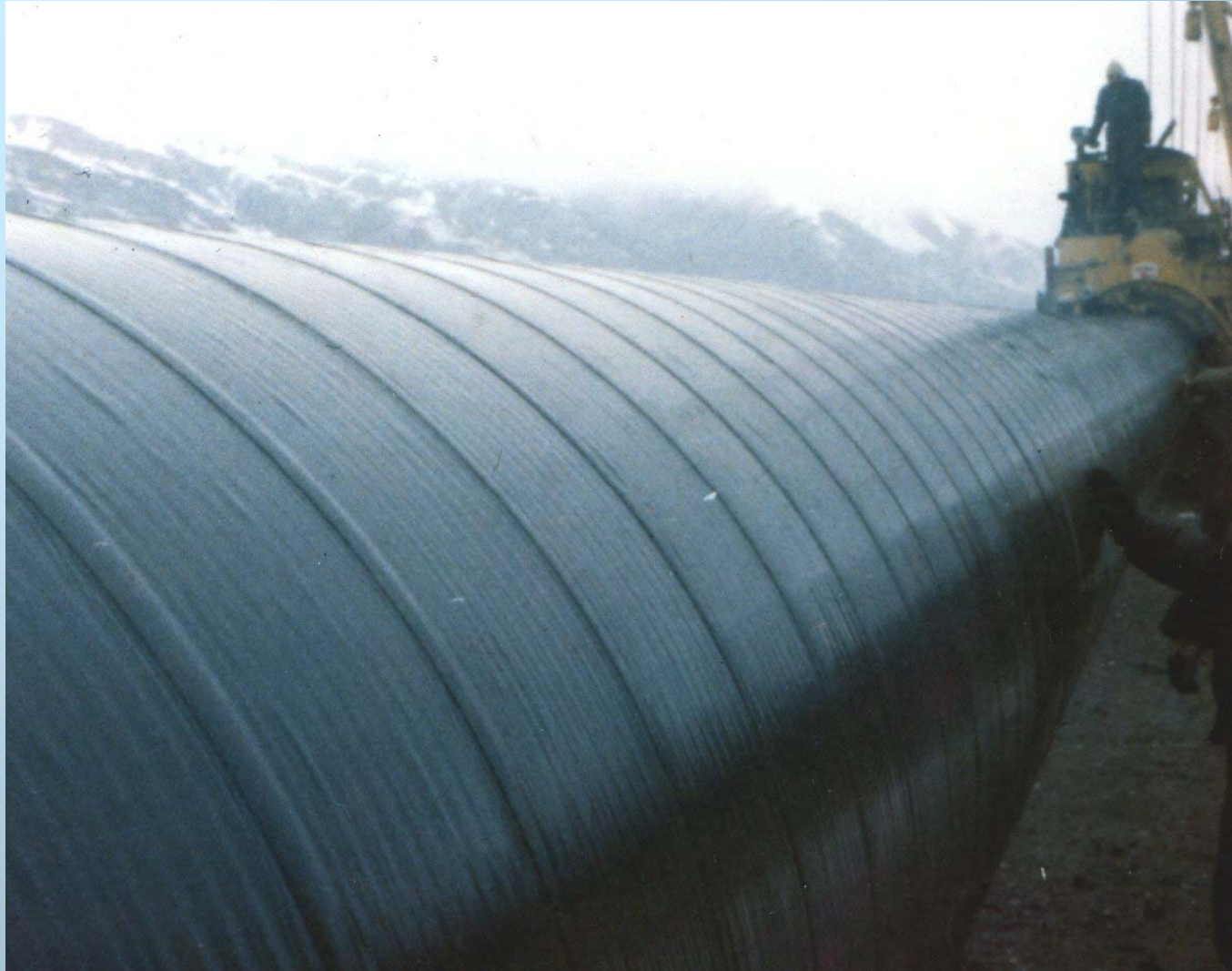


Dead Load Creep and Shear

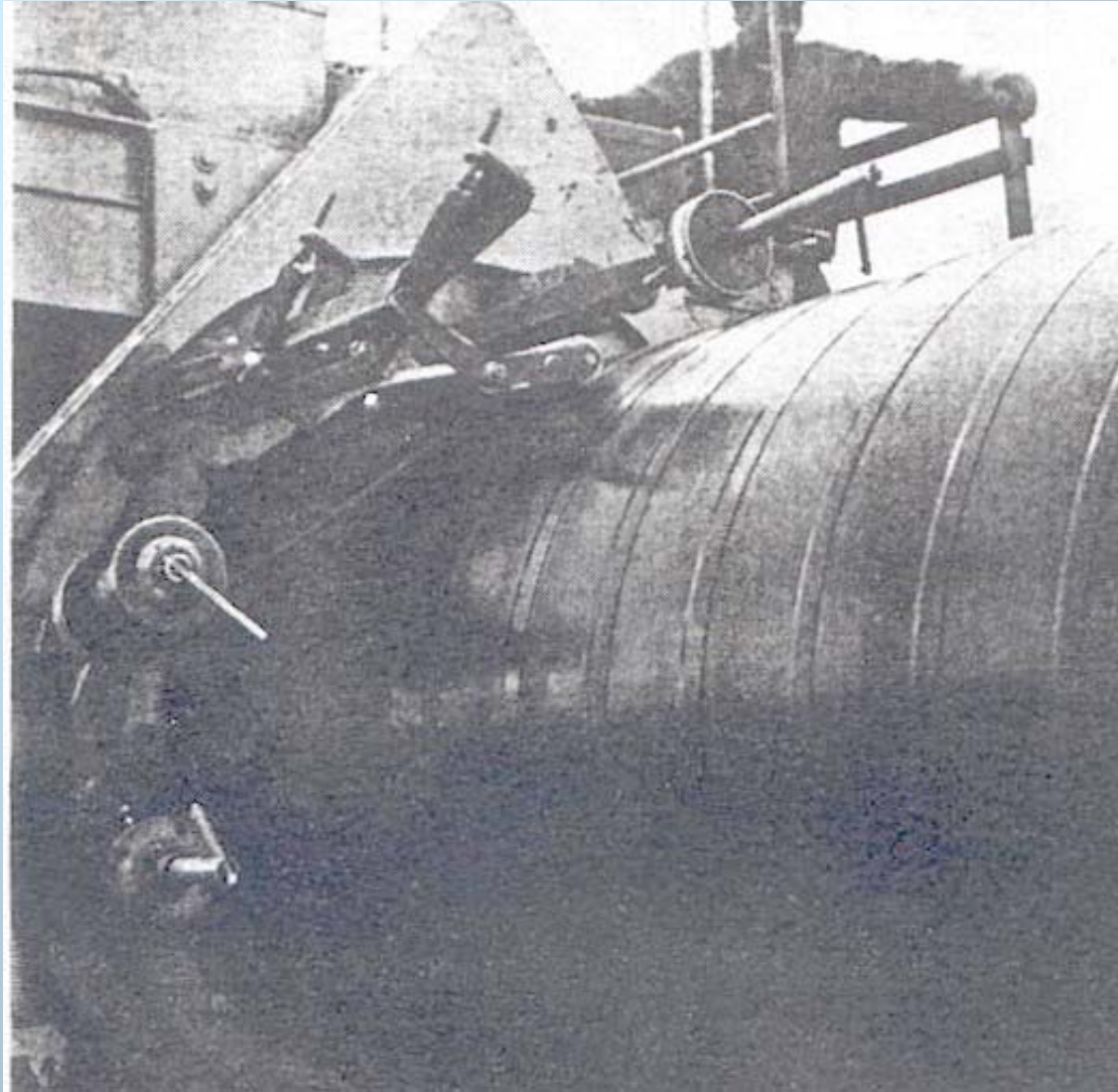


Normal/shear loading for soil anchoring – tested at 60°C

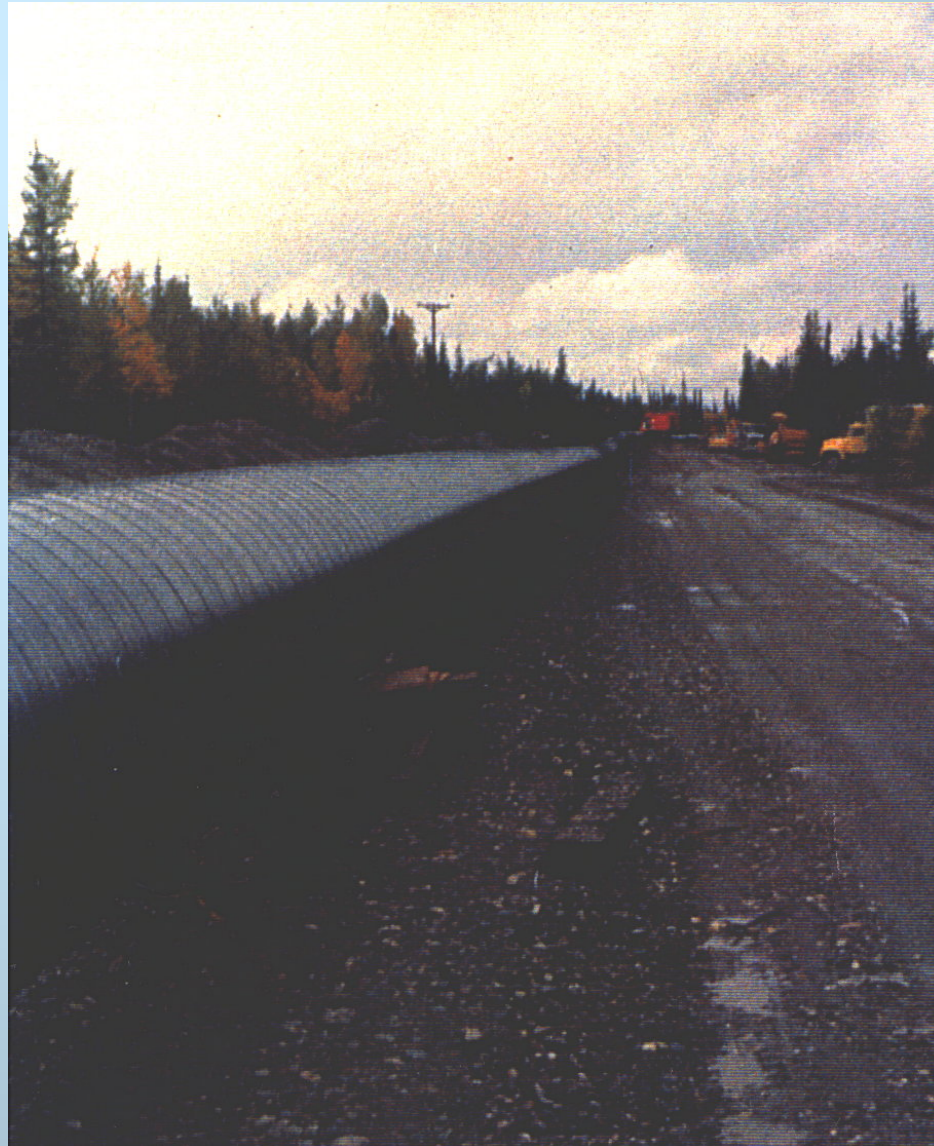
Arcticlاد II Tape Wrapping



Arcticlاد II Tape Wrapping



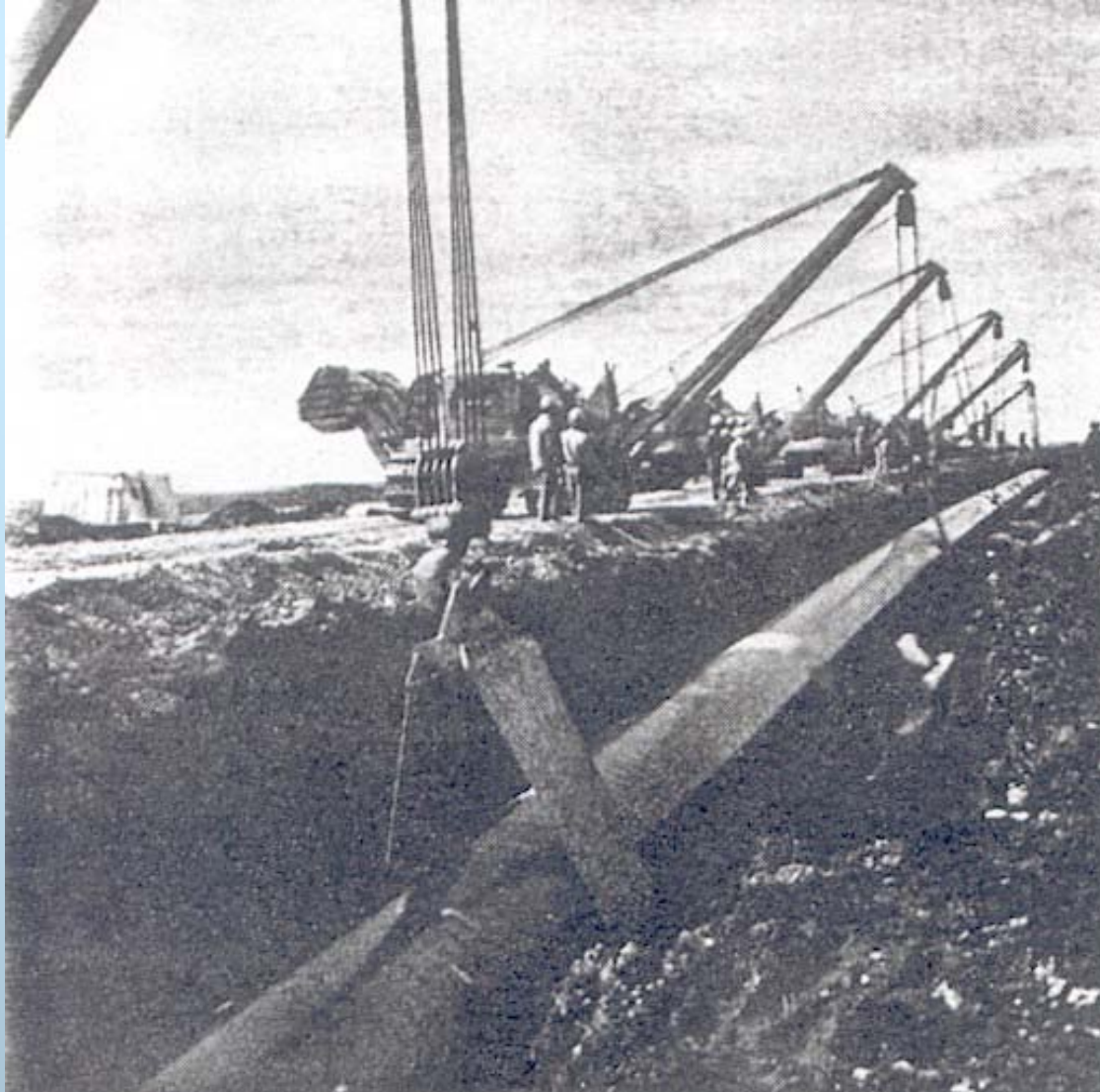
Arcticlad II Protected Pipeline



Arcticlad II Protected Pipeline



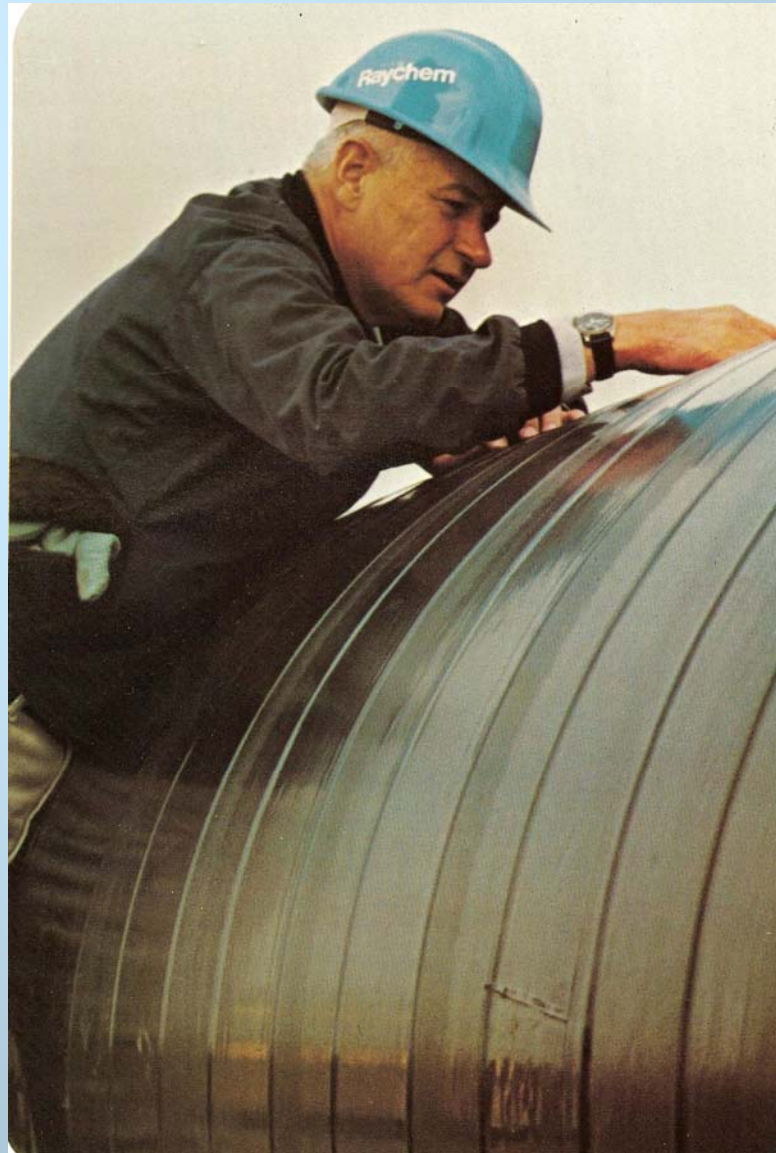
Laying Alyeska Pipeline



Protected Pipeline in Ditch



Chairman's Inspection



Chemist's Inspection



Alyeska Pipeline Results

| | | | |
|----------------------------|--------------|--------------|--------------|
| Raychem sales: | 1974 | 1975 | 1976 |
| \$ x 10⁶ | 118.5 | 148.7 | 171.3 |

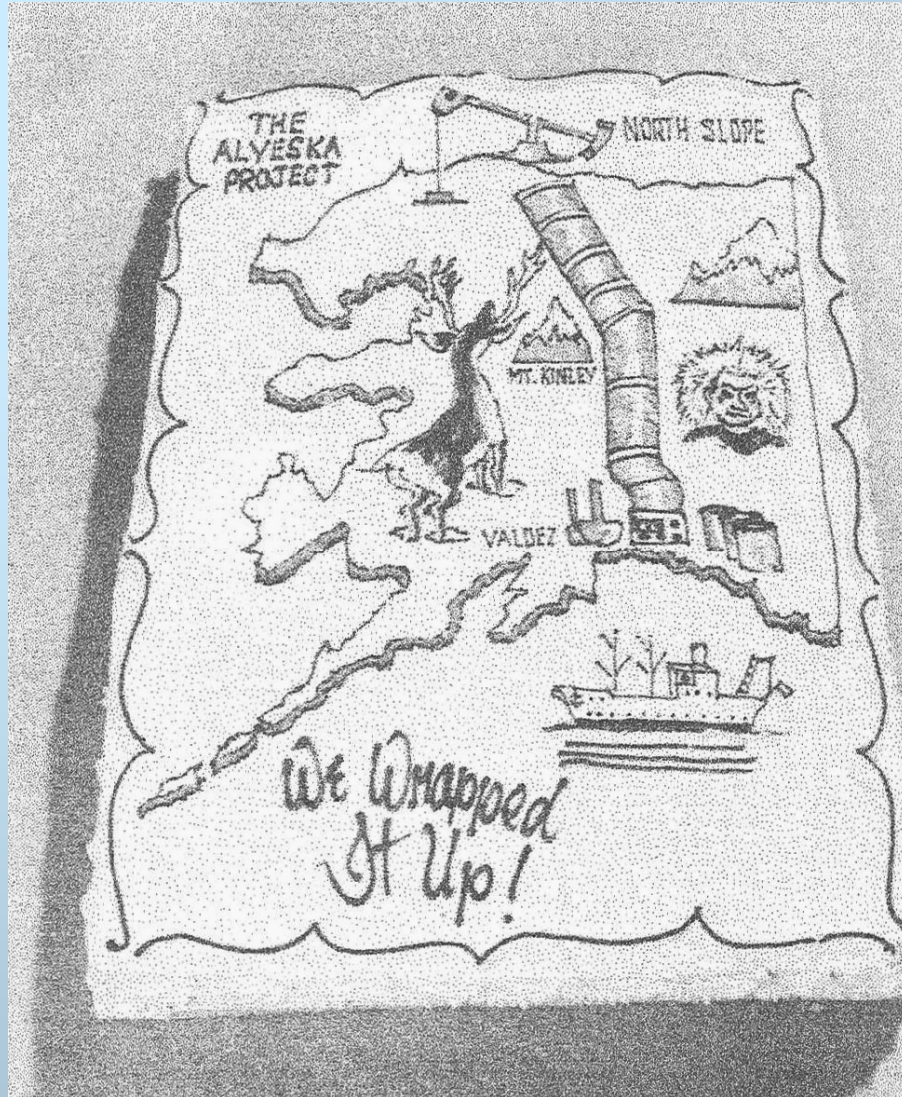
Alyeska project: ~\$26,000,000 total
 ~\$74,000,000 (2005 \$)

Profitability: \$\$\$\$\$

Profit Sharing Production Crew



Production Team Benefit



Continued Marketing

Raychem
Ultratec Division

Arcticlاد
Heat-shrinkable
Pipeline Coating

Arcticlاد is a heat-shrinkable corrosion prevention coating for pipelines operating at temperatures up to 60°C (140°F). Arcticlاد consists of a radiation-crosslinked polyethylene-based backing, coated with a high-shear-strength thermoplastic adhesive. When applied to a clean, preheated pipe, Arcticlاد tape forms a continuous, holiday-free coating which will assure long life protection at minimal cathodic protection costs.

When Arcticlاد tape is applied to a heated pipe, the thermoplastic adhesive melts. At the same time, the backing heats and shrinks, causing the melted adhesive to flow and intimately bond to the pipe surface. Upon cooling, Arcticlاد forms a tough, solid polyethylene-based corrosion prevention coating.

Easy to install
Single-component coating; no primers or release paper required. Installs with conventional equipment.

Strong and tough
Adhesive provides the high shear strength to soil-anchor pipelines. Can be transported with a minimum of damage; resists backfill compaction and soil stresses.

Flexible
Can be handled down to -50°C (-58°F). Allows bending in excess of ANSI B31.4 or B31.8; passes ASTM G-10 (bendability test) in a wide range of temperatures.

Versatile
Stores indefinitely without shelf-life or gel-time problems. Has high resistance to UV, fungus, bacteria and cathodic disbondment.



Product Line Extension

A REPRINT FROM

Pipe Line Industry

Engineering, Construction, Operations of Pipe Lines including Gas Distribution Systems

MAY 1976

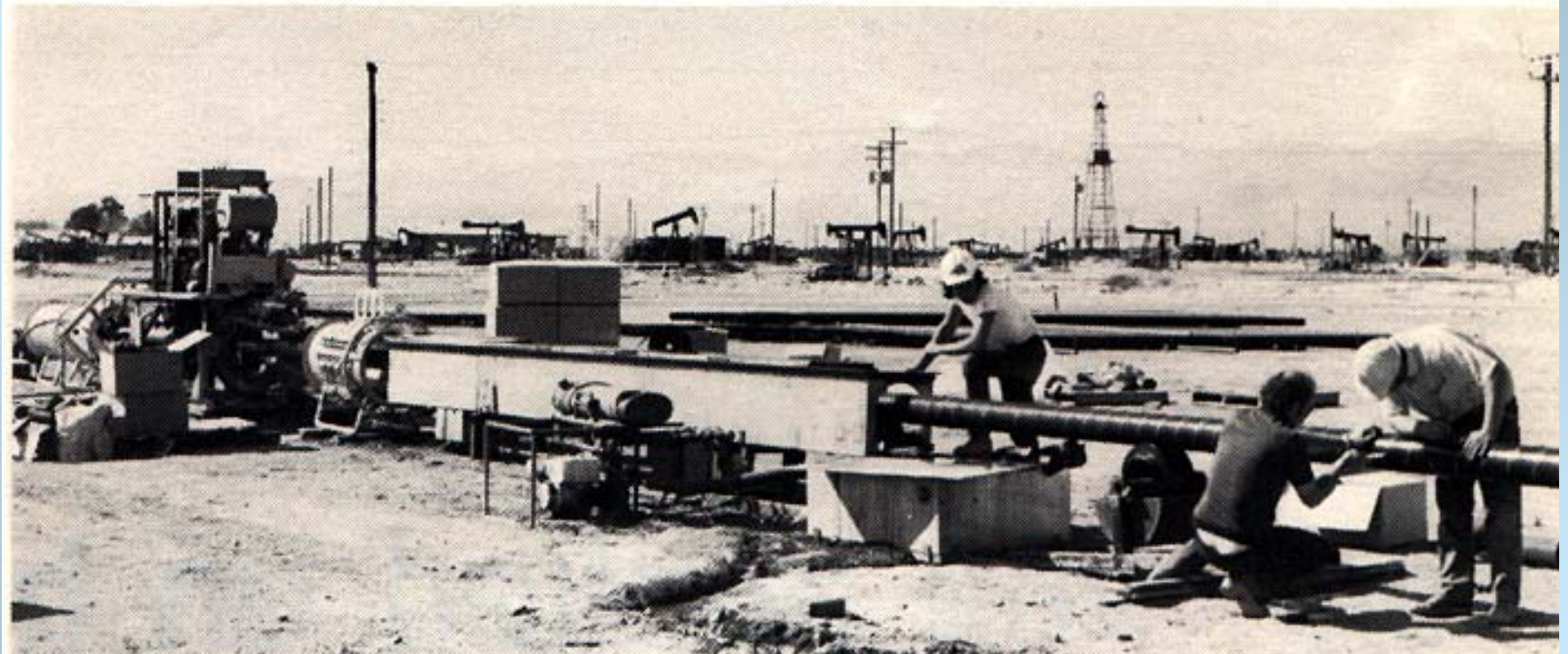
REPRINTED FOR RAYCHEM CORP.

**New tape applied on hot line
to combat severe corrosion**



COPYRIGHT © 1976 BY GULF PUBLISHING CO.
ALL RIGHTS RESERVED

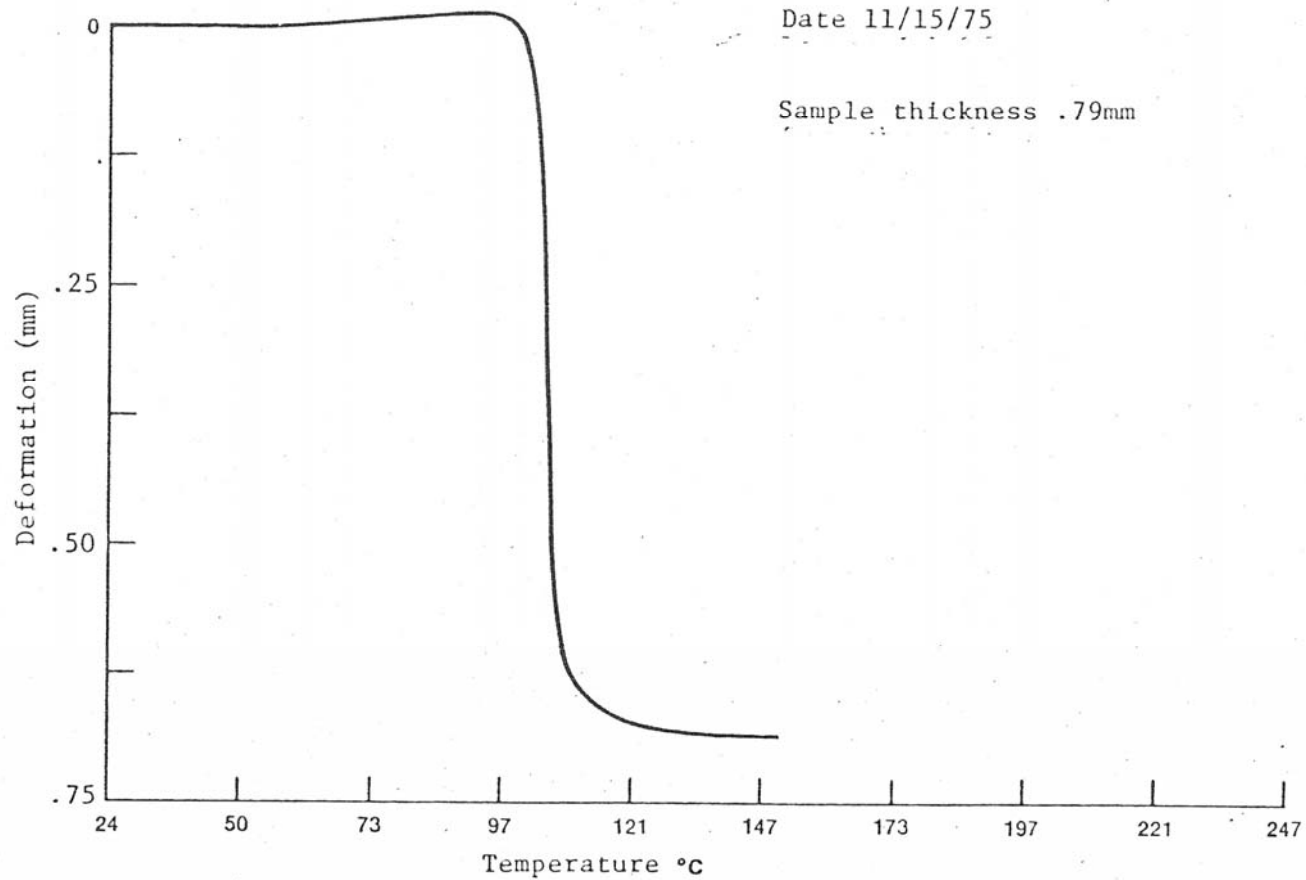
Hotclad Pipe Wrap



Secondary recovery line to operate at 90°C

Hotclad – TMA Studies

Figure 5 Thermal Mechanical Analysis
of HOTCLAD Adhesive



So What Have You Done Since??

Co-Founder/Past-President:

**RadTech International
North America ('91-'92)**

**Council on Ionizing Radiation
Measurements and Standards ('96)**

Starting RadTech International North America

SPECIAL MEETING
"RADCURE GROUP"
The Hilton Gateway
Newark, New Jersey
June 23-24, 1986

ACTION ITEMS

- #1 Allen Keough, Jack Weisman, and Alice Pincus, with input from others, will investigate options and make decision on administrative entity for this organization.
- #2 Alice Pincus will research the name "RadTech International" as to availability.
- #3 Jack Weisman will send all attendees a preliminary program of the upcoming conference on radiation curing in Asia. Jack will also be the official American contact to Professor Tabata.
- #4 Jack Weisman will continue negotiations for our participation in CMM6 and CMM-Japan.
- #5 George Sickinger will send all attendees a copy of the radiation curing brochure. He will also submit to Alice Pincus a revised budget request for this brochure.
- #6 Dave Davis will submit to the executive committee a guideline for code of ethics.

RadTech's First Meeting

| | | | |
|---|---------------------------------|---|------------------------|
| FUNCTION SHEET | | ACCOUNT NUMBER | 216957 |
| NATURE OF FUNCTION | | Cocktails, Hors d'oeuvres, Meeting | ROOM Grendal |
| DATE AND DAY | | Monday, December 8, 1986 | TIME 6:00 pm - 8:00 pm |
| NAME OF ORGANIZATION Radtech International | | | |
| 4 Watchway | | | |
| BILLING ADDRESS Huntington, NY 11743 | | | |
| PERSON/S IN CHARGE & PHONE Tony Berejka 516-549-8517 Beth Perry 312-480-9080 | | | |
| ROOM CHARGE \$ n/c* NO. TO PREPARE FOR 40 GUEST ROOMS: SGL 3-M DBL 31-D SUITE | | | |
| FOOD MENU | | COFFEE BREAK | |
| MEAL LOCATION | TIME | TIME | QUANTITY |
| SIT DOWN <input type="checkbox"/> BUFFET <input type="checkbox"/> | PRICE \$ | Copy of Confirmation to: | |
| MENU: | | Ms. Beth Perry 600 Bevere Drive Suite 500 Northbrook, IL 60062 | |
| MEETING ROOM SET UP | | | |
| MEETING | | | |
| HORS D'OEUVRES <input type="checkbox"/> | | TIME 6:00 pm | |
| LOCATION Grendal | | | |
| <input type="checkbox"/> 1 Raw vegetable tray with dip @\$50.00++ <input type="checkbox"/> 1 Cheese & fruit tray @\$50.00++ <input type="checkbox"/> 50 Mini Reubens @\$49.00++ <input type="checkbox"/> 50 Chicken Livers in Bacon @\$40.00++ | | | |
| BAR | | | |
| CHARGE <input type="checkbox"/> | CASH <input type="checkbox"/> | TICKETS <input type="checkbox"/> | |
| LOCATION Grendal | | | |
| OPEN 6:00 pm | CLOSE 8:00 pm | | |
| REOPEN NO | CLOSE | | |
| PRICE PER DRINK \$ | Bear - 1.50-1.75 | Wine - \$2.00 | |
| BRANDS: TOP SHELF <input type="checkbox"/> | 2-2.50 | Soft Drinks - 50¢ | |
| BAR BRANDS <input type="checkbox"/> | 2-2.25 | | |
| BARTENDER FEE \$ | 40.00 | | |
| WAITRESS TAKES COCKTAIL ORDER <input type="checkbox"/> | | | |
| TIME 6:00 pm | C.O.D. <input type="checkbox"/> | CHARGE <input type="checkbox"/> | |
| <input type="checkbox"/> 6:00 pm - Champagne Toast for 40 people. Great Western @\$15.00++ per bottle. (Master Bill) | | | |
| FOOD AND DANCE | | | |
| HEADTABLE <input type="checkbox"/> NO | LOCATION Grendal | *\$100.00 room rental waived due to food and beverage. | |
| TABLE ARRANGEMENT | RISERS <input type="checkbox"/> | NO. PERSONS | |
| Rounds of 8 | | | |
| BOOKED BY Barbara | | DATE CONFIRMED 12/2 pat | |

| | | | |
|---|---------------------------------|--|------------------------|
| FUNCTION SHEET | | ACCOUNT NUMBER | 216957 |
| NATURE OF FUNCTION | | Meeting/Lunch | ROOM Grendal/Monks |
| DATE AND DAY | | Tuesday, December 9, 1986 | TIME 8:30 am - 4:00 pm |
| NAME OF ORGANIZATION Radtech International | | | |
| 4 Watchway | | | |
| BILLING ADDRESS Huntington, NY 11743 | | | |
| PERSON/S IN CHARGE & PHONE Tony Berejka 516-549-8517 Beth Perry 312-480-9080 | | | |
| ROOM CHARGE \$ n/c* NO. TO PREPARE FOR 40 GUEST ROOMS: SGL 3-M DBL 26-M SUITE | | | |
| FOOD MENU | | COFFEE BREAK | |
| MEAL Lunch | TIME Noon-1pm | TIME | QUANTITY |
| LOCATION Monks | | 8:30 am - Coffee, tea, sanka and danish. | |
| SIT DOWN <input checked="" type="checkbox"/> BUFFET <input type="checkbox"/> | PRICE \$ 6.25++ | 10:00 am - Replenish beverages. | |
| MENU: | | 2:00 pm - Assorted soft drinks. | |
| Tossed Greens | | | |
| Chicken Breast Cacciatore | | | |
| Chef selects 2 accompaniments | | | |
| Rolls & Butter | | | |
| Beverage | | | |
| No Dessert Requested. | | | |
| MEETING ROOM SET UP | | | |
| MEETING | | | |
| HORS D'OEUVRES <input type="checkbox"/> | | TIME | |
| LOCATION | | | |
| Copy of confirmation to: | | | |
| Ms. Beth Perry 60 Bevere Drive Suite 500 Northbrook, IL 60062 | | | |
| BAR | | | |
| CHARGE <input type="checkbox"/> | CASH <input type="checkbox"/> | TICKETS <input type="checkbox"/> | |
| LOCATION | | | |
| OPEN | CLOSE | | |
| REOPEN | CLOSE | | |
| PRICE PER DRINK \$ | | | |
| BRANDS: TOP SHELF <input type="checkbox"/> | | | |
| BAR BRANDS <input type="checkbox"/> | | | |
| BARTENDER FEE \$ | | | |
| WAITRESS TAKES COCKTAIL ORDER <input type="checkbox"/> | | | |
| TIME | C.O.D. <input type="checkbox"/> | CHARGE <input type="checkbox"/> | |
| *\$100.00 room rental waived due to sleeping rooms. | | | |
| <input type="checkbox"/> TROUBLED <input type="checkbox"/> FOOD AND DANCE <input type="checkbox"/> BAR | | | |
| Cincinnati Drawbridge Inn and Convention Center <small>175 at Buttermilk Pike Ft. Mitchell, Kentucky 41017 ***Four Star Mobil Rating Phone: 606/341-2800</small> | | | |
| <small>\$15 OR 15% MINIMUM GRATUITY PER WAITRESS, WHICHEVER IS GREATER Cancellations within 72 hours prior to function subject to penalty. Exact attendance must be guaranteed 48 hours in advance not subject to reduction, and charges will be made accordingly. The Inn will be prepared to setup and serve 5% over the guarantee. If no guarantee is received, the Inn will assume the guarantee to be the number shown on the function sheet. Thank you. Room Location Subject To Change</small> | | | |

RadTech's First Seminar

RADTECH INTERNATIONAL

THE NEW ASSOCIATION
FOR THE ADVANCEMENT
OF RADIATION TECHNOLOGY

RADIATION CURING: APPLICATIONS UPDATE '86

Monday, December 8, 1986
Cincinnati Drawbridge Inn
Fort Mitchell, Kentucky, USA

FINAL PROGRAM

| | | |
|---------------------------|---|------------------------|
| 9:00 a.m. - 12:00 noon | FUNDAMENTALS OF RADIATION CURING Chairman: Allen Keough, President, RadTech International | Firar's & Monk's Rooms |
| | Electron Beam Equipment —Ted Tripp, Energy Sciences Inc. U.V. and EB Equipment —Dave Blake, RPC Industries Radiation Chemistry —Bill Bayer, Interez Manufacturing Practices —Debbie Friebele, Arco Markets and End Uses —George Sickinger, Borden Chemical | |
| 12:00 noon - 1:00 p.m. | LUNCH (Not included in registration.) Tickets available at registration desk. | Yeoman's Room |
| 1:00 p.m. - 2:15 p.m. | WORKSHOP SESSION I | |
| | Workshop A — Getting Started in Radiation Processing Panel Leaders: Jack Weisman, Energy Sciences Inc. Peter Schessler, Lord Corporation Keith Clark, UCB-Radeure Specialties | Monk's Room |
| | Workshop B — Graphic Arts Applications Panel Leaders: Elmer Griese, Sun Chemical Corp. Steve Siegel, UV Process Supply Bill Jones, Nor-Cote Chemical Co. | Ploughman's Room |
| | Workshop C — Coatings for Metals, Plastics, Paper Panel Leaders: Camille Kallendorf, Borden Chemical Jim Fleischer, Red Spot Paint & Varnish Co. Dave Cyterski, Lord Corporation | Firar's Room |
| | Workshop D — Emerging Technologies and New Developments Panel Leaders: Alice Pincus, Pincus Associates Tony Burejka, Consultant Rick Mazzariello, Union Carbide Corp. | Merchant's Room |
| 2:15 p.m. - 2:30 p.m. | COFFEE BREAK | |
| 2:30 p.m. - 4:00 p.m. | WORKSHOP SESSION II Workshops A—D will be repeated in the same rooms | |

60 Revere Drive • Suite 500 • Northbrook, Illinois • 60062 USA
312/480-9576 • Telex 910-221-5870 • Telecopier 312/480-9282

RadTech's Seminar Program

RadTECH INTERNATIONAL

THE NEW ASSOCIATION
FOR THE ADVANCEMENT
OF RADIATION TECHNOLOGY

NEWS RELEASE

Contact Beth Perry
312/480-9576

For Immediate Release
March 25, 1987

RadTech International Announces Five Seminars on Radiation Curing

RadTech International, the association for the advancement of radiation technology, has scheduled five additional full-day seminars on radiation curing for 1987. These seminars will be held in different locations, several in co-operation with related trade shows, throughout the year.

Radiation Curing: Applications Update '87 consists of two sessions. The Fundamentals of Radiation Curing session features experts in radiation curing discussing the basics of ultra-violet and low energy electron beam equipment, radiation chemistry, safe manufacturing practices and the markets and uses for this technology.

Workshops on the Recent Advances in Radiation Curing are intended for those already familiar with radiation curing. This session covers the latest developments in radiation equipment and chemistry. Innovations in radiation curable coatings for paper, plastics and metals, in the graphic arts and in adhesive systems are discussed with session attendees.

Organized by industry consultant, Tony Berejka, The RadTech International seminars will be held on:

- . Friday, April 10 in Indianapolis, Indiana, in cooperation with Midwest Graphics '87.
- . Friday, May 29 in Toronto, Ontario.
- . Tuesday, September 15 in Washington, DC at CMM6.
- . Thursday, October 8 in Dallas, Texas, following the Paint Industries' Show.
- . Monday, November 2 in Palo Alto, California.

For additional information and registration, contact Beth Perry, RadTech International, 60 Revere Drive, Suite 500, Northbrook, Illinois 60062. Telephone (312) 480-9576 or 9080.

RadTech Founders

8

The following
FOUNDER MEMBERS
facilitated the realization of
RADTECH INTERNATIONAL
by extending significant support
beyond normal dues:

W.G. Bayer, Interez, Inc.
J.R. Benson, BASF Inmont
Anthony Barejka, Consultant
Richard Bickford, Goldschmidt Chemical Corp.
Dave Blake, RPC Industries
Claire Bluestein, EPOLIN, Inc.
Charles Demos, Sartomer Associates
Donald Eshenbaugh, PPG Industries, Inc.
James Fleischer, Red Spot Paint & Varnish Co.
Debbie Friebely, Sartomer Associates
David Harbourne, Fusion Systems Corp.
Camille Kallendorf, Borden Chemical
Martin Kaufman, Engineered Printing Systems
Allen Keough, Metallized Products, Inc.
Gordon B. Knight, UVIII Systems, Inc.
Urs Lauppi, Charmilles Div., ESI
Kenneth Lawson, DeSoto, Inc.
A.P. LeBel, Mead Release Products
Rick Mazzariello, Union Carbide Corp.
William R. Near, Henkel Corp.
Alice Pincus, Pincus Associates, Inc.
Joseph Plamondon, Rohm & Hass Co.
William Radak, PPG Industries, Inc.
Tony Rodrigues, RPC Industries
George T. Sickinger, Borden Chemical
Stephen B. Siegel, UV Process Supply, Inc.
Donald Spero, Fusion Systems Corp.
Meredith P. Stines, American Ultraviolet Co.
Yoneho Tabata, University of Tokyo
David W. Teloh, Pierce & Stevens Corp.
Chan Thanawalla, CNIT Associates
Edwin Tripp, Energy Sciences, Inc.
Jan Visser, Radcure Specialties, Inc.
Jack Weisman, Energy Sciences, Inc.
Norman Wolcott, Jr., Nor-Cote Chemical Co.
Don Wostratzky, Ciba-Geigy Corp.

The following
CHARTER MEMBERS
facilitated the realization of
RADTECH INTERNATIONAL
by extending support
beyond normal dues:

John Anderson, The Meseran Co.
David Armbruster, Armbruster Associates
Joseph Barrett, Barrett & Blandford Associates
Gary Ceska, Sartomer Associates
Kieth Clark, Radcure Specialties, Inc.
Richard Costin, Sartomer Associates
Richard D. Cowell, Potters Industries
David Cyterski, Lord Corp.
David Fergesen, Fergesen Design Co.
Dennis Fraula, W.R. Grace & Co.
John Fries, National Starch & Chemical Corp.
Elmer Griese, Sun Chemical Corp.
David Huettner, Dow Corning Corp.
Robert LieBerman, Occidental Chemical
James McCusker, Acumeter Laboratories, Inc.
Gene J. Mirolli, Hercules, Inc.
Owen Quantz, Morton Thiokol, Inc.
John Rie, Consultant
Charles Rybny, Penn Color, Inc.
Joseph V. Sinka, Occidental Chemical
Frank S. Stowe, Occidental Chemical
Nadji Tehrani, Technology Marketing Corp.
A.S. Tuccio, Jr., Sartomer Associates
Herbert van Denend, Glenro, Inc.
Fulvio Vara, GAF Corp.
Peter J. Whitman, The Upjohn Co.
Willard Wooten, The Upjohn Co.


| RadTech International | | |
|-----------------------|--|---------------------------|
| Alice Pincus | | President |
| Jack Wiseman | | Vice President |
| Allen Keough | | Past President |
| Headquarters | | |
| John Messervey | | Management Overview |
| Beth Perry | | Administrative Director |
| Greg Schultz | | Communications Director |
| JoAnne DeYoung | | Administration |
| John Waxman | | Internat'l Conf. Director |

RadTech Incorporation

File Number 5474 791 8

87449513

STATE OF ILLINOIS
OFFICE OF
THE SECRETARY OF STATE




Whereas, ARTICLES OF INCORPORATION OF
RADTECH INTERNATIONAL
INCORPORATED UNDER THE LAWS OF THE STATE OF ILLINOIS HAVE BEEN
FILED IN THE OFFICE OF THE SECRETARY OF STATE AS PROVIDED BY THE
GENERAL NOT FOR PROFIT CORPORATION ACT OF ILLINOIS, IN FORCE
JANUARY 1, A. D. 1937.

87449513

Now Therefore, I, Jim Edgar, Secretary of State of the State of Illinois, by virtue of the powers vested in me by law, do hereby issue this certificate and attach hereto a copy of the Application of the aforesaid corporation.

In Testimony Whereof, I heretofore set my hand and cause to be affixed the Great Seal of the State of Illinois,
at the City of Springfield, this 29th
day of JULY AD. 19 87 and
of the Independence of the United States
the two hundred and 12th



Jim Edgar
SECRETARY OF STATE

Council on Ionizing Radiation Measurements and Standards



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899

January 8, 1991

Mr. Anthony J. Berejka
President-Elect
RadTech International North America
c/o Ionicorp
P.O. Box 79
Gold Spring Harbor, NY 11724

Dear Mr. Berejka:

Letters we have received and many discussions have pointed to the need for a committee to coordinate activities by the NIST and others in the area of ionizing radiation measurements and standards. Such coordination would be useful in view of the increasing concern about measurement quality assurance and the need for more efficient use of limited resources. The group could be called the Committee on Ionizing Radiation Measurements and Standards (CIRMS) (pronounced "kirms"), or another appropriate name. The purpose of this letter is to invite the RadTech International North America to send a representative to a one-day meeting to be held at the National Institute of Standards and Technology on February 26, 1991 which will consider all aspects of forming such a committee.

To give you some idea as to what is being considered, some functions of this committee might be:

- (1) To provide a forum for discussion of common national ionizing radiation measurement and standards problems,
- (2) To study and gather information on the present and future needs of the ionizing radiation measurement community,
- (3) To define and prioritize needed work in ionizing radiation measurement and standards, including suggesting where such work might be done,
- (4) To provide data useful to the Ionizing Radiation Division of NIST in pursuing its lead role as the national laboratory for ionizing radiation standards, and
- (5) To coordinate the development within the U.S. of written standards for ionizing radiation measurement.

The proposed committee, if successful, should lead to the following benefits to your organization and to the nation: (1) improved communication within the ionizing radiation community on issues of measurements and standards; (2) identification and prioritization of the most important work needed in ionizing radiation measurements and standards; (3) development of a partnership between the ionizing radiation community and NIST on questions of national standards, transfer standards, calibrations, and traceability; and (4) better coordination within the U. S. on the written standards for ionizing radiation measurement. This Committee would provide an opportunity for long range planning and development of consensus views in ionizing radiation measurements and standards.

CIRMS Formation Meeting

Background Information for Organizational Meeting for COUNCIL ON IONIZING RADIATION MEASUREMENTS AND STANDARDS

For Meeting, February 26, 1991

Suggested Names for Organization:

Council on Ionizing Radiation Measurements (CIRM) (pronounced "kirm")

Council on Ionizing Radiation Measurements and Standards (CIRMS) (pronounced "kirmz")

Radiation Standards Council (RSC) (pronounced "r-s-c")

Suggested Functions of the Council:

1. To provide a forum for discussion of common national ionizing radiation measurement and standards problems.
2. To study and gather information on the present and future needs of the ionizing radiation measurement community, and to articulate those needs.
3. To define and prioritize needed work in ionizing radiation measurement and standards, including suggesting where such work might be done.
4. To provide information and data useful to the Ionizing Radiation Division of NIST in pursuing its lead role as the national laboratory for ionizing radiation standards.
5. To provide information and data useful to Secondary Standards Laboratories and Radiation Measurers in pursuing improvement of the National System for Radiation Measurement.
6. To help coordinate the development within the U.S. of written standards for ionizing radiation measurement.

CIRMS Formation Meeting

2

Suggested Council Structure:

The Council Officers could be Chairman, Vice-Chairman, and Secretary. The Secretariat could be provided by one of the member organizations. Meetings would be held once per year, or more often if required. Committees or task groups could be established as needed, but it is not anticipated that more than one or two would exist at any given time. There would be no membership fee, but member organizations would be expected to pay for travel of delegates to meetings.

Possible Initial Activities:

1. Prepare a prioritized list of needed research and standardization activities throughout the national radiation-measurement communities.
2. Prepare an annotated list of written standards for ionizing radiation measurement including those available, being drafted, or planned from both the U. S. and international radiation communities.

Other Attached Background Information:

Excerpt from 1990 Center for Radiation Research Technical Activities

Excerpts from Council on Optical Radiation Measurements (CORM) Fifth Report and from CORM By-Laws

Medical-Industrial Radiation Facility Draft Proposal

CIRMS Formation Meeting

Summary of the CIRMS Organizational Meeting

Date of the Meeting: February 26, 1991

Location: National Institute of Standards and Technology

Attendees: See Attachment A

Agenda: See Attachment B

After brief introductory remarks by Randy Caswell, the attendees were welcomed by Katharine Gebbie, Director of the Physics Laboratory, NIST. She also presented an overview of the NIST organizational structure, with emphasis on the Physics Laboratory. The Laboratory facilities, technical programs, and sources of funding were described, and the Council for Optical Radiation Measurements (CORM) was identified as a possible model for the proposed CIRMS.

Randy Caswell then presented the background of the proposal for a group like CIRMS. His presentation is summarized in attachment C, which also includes suggested names for the proposed group, suggested functions, and benefits that would result. Possible council structure and initial activities were described.

A comprehensive overview of the organizational structure and technical work of the Ionizing Radiation Division was presented by Bert Coursey. It was followed by a brief statement from each attendee who represented an organization at the meeting.

CIRMS Organizing Committee

COUNCIL ON IONIZING RADIATION MEASUREMENTS AND STANDARDS

CIRMS OFFICERS-ORGANIZING COMMITTEE MEETING

March 31, 1992

10:00 a.m. -- 5:00 p.m.

Room C235 Radiation Physics Building
National Institute of Standards and Technology
Gaithersburg, MD 20899

PROPOSED AGENDA

1. Welcome
2. Report on Election of Officers
3. Functions
4. CIRMS Procedures Document or By-Laws?
 - Voting and Approval Procedures
5. Executive Committee
6. Committees and How to Establish
7. Lunch with Physics Laboratory Management
8. Brochure on Radiation Interests of Member Organizations?
9. Funding
10. First Meeting of CIRMS
11. Sponsorship of March 1993 Workshop on Measurement Quality Assurance?
12. Report and Invitations to Potential Member Organizations
13. Induction of New Officers
14. Other Business
15. Adjournment

CIRMS Formation Meetings

The Objectives of CIRMS

Randall S. Caswell

National Institute of Standards and Technology

CIRMS Formation Meetings

SOME HISTORY

- 1981** "Cannon Report" recommends system of secondary laboratories
- 1988** Major restructuring, reduction in staff of Ionizing Radiation Division
- 1989** Letters to NIST from USCEA, HPS, AAPM expressing concern over NIST support for Ionizing Radiation Programs
- 1989** NIST responds, offering to work collaboratively with organizations in Radiation User Community--joint studies to evaluate priorities

CIRMS Formation Meetings

MORE HISTORY

- 1990** **Difficulty of working one-on-one with many different organizations leads to idea of a Council**
- 1990** **Broaden priority studies whole national radiation measurement system--users, tertiary & secondary laboratories, research organizations, NIST. Example: CORM**
- 1990** **Suggestion: Council help coordinate written standards for IR M&S**
- 1991** **Organizational meeting-- February 26, 1991**

CIRMS Formation Meetings

RECENT HISTORY

- 1991** Organizing Committee held 2 meetings. On June 17 proposed a slate of officers.
- 1992** Ballots mailed to participants in Organizational Meeting. Officers elected February 10.
- 1992** Officers and Organizing Committee meet March 31. CIRMS turned over to officers.
- 1992** Invitations to join sent in April to organizations, corporations, and individuals.
- 1992** Inaugural Meeting scheduled for October 22-23.

CIRMS First Meeting – 1992

Council on Ionizing Radiation Measurements and Standards

Inaugural Meeting

National Institute of Standards and Technology (NIST)
Gaithersburg, Maryland
Room C301, Radiation Physics Building

Agenda

Thursday, October 22

9:30 - 10:00 Coffee

10:00 - 10:05 **Welcoming Remarks**
Katharine Gebbie, Director, Physics Laboratory, NIST

10:05 - 10:30 **The Objectives of CIRMS**
Randall Caswell, NIST

10:30 - noon **Panel Presentation: The Diversity of Ionizing Radiation Measurement Needs**
Chair: Marshall Cleland, Radiation Dynamics, Inc.
President, CIRMS

Nuclear Medicine; William Eckelmann, National Institutes of Health

Radiation Oncology; Peter Almond, University of Louisville

Diagnostic Radiology; H. Thompson Heaton, Food and Drug Administration

Industrial Processing; Jeffrey Beck, * Johnson & Johnson

Industrial Radiography; Harold Berger, Industrial Quality, Inc.

Nuclear Energy Radioactivity; Felix Killar, US Council on Energy Awareness

Noon - 1:00 Lunch

1:00 - 2:15 **Panel Presentation (continued)**

Nuclear Power Materials Dosimetry; to be announced

Defense; Eric Kearsley, Armed Forces Radiobiology Research Institute

Radon; Wayne Lowder, Environmental Measurements Laboratory

Environmental Radioactivity; David McCurdy, Yankee Atomic

*Not confirmed

CIRMS First Meeting – 1992

2:15 - 3:00 **The Commonality of Measurement and Standards Problems:** Bert Coursey, NIST

3:00 - 3:20 Coffee Break

3:20 - 4:30 **Open Discussion:** Bringing Diverse Uses and Common Interests Together

Chair: Peter Almond, University of Louisville
1st Vice-President, CIRMS

4:30 - 5:15 **Discussion of CIRMS Functions and By-Laws**

Coordinator: Elmer Eisenhower
Secretary-Treasurer, CIRMS

6:15 pm Cocktails and Dinner: Holiday Inn, Gaithersburg

After-Dinner Speaker: Professor Eric J. Hall, Columbia University
"Living with Radiation"

Professor Hall was born and educated in Great Britain, receiving a B.Sc. in physics from University College, London and a D.Phil in radiobiology from Oriel College, Oxford. Following work as a medical physicist, he came to the United States in 1968 as Professor of Radiology at Columbia University. Since 1984 he has served as Director, Center for Radiological Research at Columbia. Dr. Hall has won numerous awards including the Roentgen Award of the British Institute of Radiology, the Failla Award of the Radiation Research Society, the Janeway Medal of the American Radium Society. He has served with distinction on numerous committees, including those of the National Academy of Sciences. Professor Hall is an author of many books, including *Radiation and Life*.

Friday, October 23

8:30 - 9:30 **Tour of NIST Radiation Facilities**

9:30 - 10:30 **Organization of Committee Structure to Delineate Committee Tasks**

Coordinator: R. Thomas Bell, US Department of Energy
2nd Vice-President, CIRMS

10:30 - 10:45 Coffee Break

10:45 - 12:30 **Membership of Committees and Future CIRMS Activities**

Coordinator: Marshall Cleland

12:30 Adjourn

CIRMS Incorporation

1-593 8:164

ARTICLES OF INCORPORATION
OF
COUNCIL ON IONIZING RADIATION
MEASUREMENTS AND STANDARDS, INC.

For the purpose of forming a non-stock charitable corporation for one or more lawful purposes under the provisions of the Corporations and Associations Article of the Maryland Annotated Code, as amended (hereinafter sometimes referred to as the "General Corporation Law"), the natural person hereinafter named as the person acting as the incorporator of the said corporation does hereby adopt and sign the following Articles of Incorporation of the Corporation, as authorized by the General Corporation Law and does hereby acknowledge that his adoption and signing thereof are his act:

FIRST: (1) The name, including the full given name and the surname, of the incorporator is Howard L. Rose.

(2) The said incorporator's post office address is:
6550 Rock Spring Drive, Suite 240, Bethesda, Maryland 20817.

(3) The said incorporator is at least eighteen years of age.

SECOND: The name of the Corporation (hereinafter called the "Corporation") is:

COUNCIL ON IONIZING RADIATION
MEASUREMENTS AND STANDARDS, INC.

I.D. NO# D3569696
ACKN. NO. - 135C3064201
COUNCIL ON IONIZING RADIATION MEASUREMENTS AND STANDARDS, INC.

ST 8 WJ 5 NOV 83

1

STATE OF MARYLAND

NO. OF CERTIFIED COPIES - 1

I hereby certify that this is a true and complete copy of the page document on file in this office. DATED: 25, 1993
STATE DEPARTMENT OF ASSESSMENTS AND TAXATION

Start of “Needs Reports”

MEMORANDUM

November 30, 1993

To: S & T Subcommittee Chairs - (H.T. Heaton, C.B. Gogolak, K.L. Swinth,
R.L. Clough), R.S. Caswell, M.R. Cleland

From: H.W. Koch *Phil*

Subject: Re Committee Report - Part I - Administrative Details

The following draft of administrative details (Part I) and a plan (Part II) for the production of a Committee Report is my first summary of conversations and reports at, and since, the annual meeting on November 8 - 10, 1993. I invite your criticisms and suggestions:

1. Persons responsible for the preparation of the report - Until the CIRMS Executive Committee instructs us differently, the Science and Technology Committee consists of the four Subcommittee Chairs and the S & T Chair. Thus, the five of us have the responsibility for producing a draft of a report.
2. Time schedule - I would like to aim for the production of a first draft by March 1, 1994. In order to meet that date, a number of prerequisites must be accomplished by the following dates:
 - a. Each subcommittee Chair should produce a brief summary of his subcommittee's coverage of subject matter and also complete a trial of a "Measurement Program Description" (MPD) for one or two measurement programs to be discussed in Part II to this Memo - Deadline Date is December 15, 1993 (about 2 weeks from now) for transmittal to me.
 - b. Based on these prototypes approved by me, each subcommittee Chair should then write up the remainder of his MPDs and submit to me by January 15, 1994.
 - c. Based on the complete collection of MPDs, I will write introductory material with the help of Subcommittee Chairs and some Executive Committee Members not yet identified. - Deadline date is February 15, 1994.
 - d. First Draft - Deadline date is March 1, 1994.
3. Method of Communication - In order to meet these very tight time schedules, we will have to communicate typed material rapidly. The preferred method is probably by FAX. In my case, the only reliable FAX facility is the one in the Physics Department at Denver University, which is operated continuously. I can only pick up FAXed items on Thursdays and Fridays when I am in my Littleton house. If I am in Estes Park or out of town, I will have my computer, which has a FAX-MODEM that I will shortly have operational. I propose that each of us confirms a proposed FAX transmission before it takes place, if that proves practical. If we run into telephone tag, let's transmit the FAX anyway. In my case it would be to the University at the number given in the ^{FAX}letterhead of this memo.

And Since Then??

National Research Council panels:

Physics Lab ('97-'02)

Measurement Services ('02)

National Academy of Science panel:

Ensuring the Safety of the US Mail ('01)

Consultant to the IAEA ('03-'05)

IAEA Meeting Topics

- + Emerging applications of radiation processing
- + Advances in radiation chemistry of polymers
- + Industrial Radiation Processing of Polymers
Status and Prospects – June 2005 (report)
- + Recent trends in radiation sterilization
- + Radiation curing of composites

IAEA Cairo Meeting 2005



Notre Dame Contingent

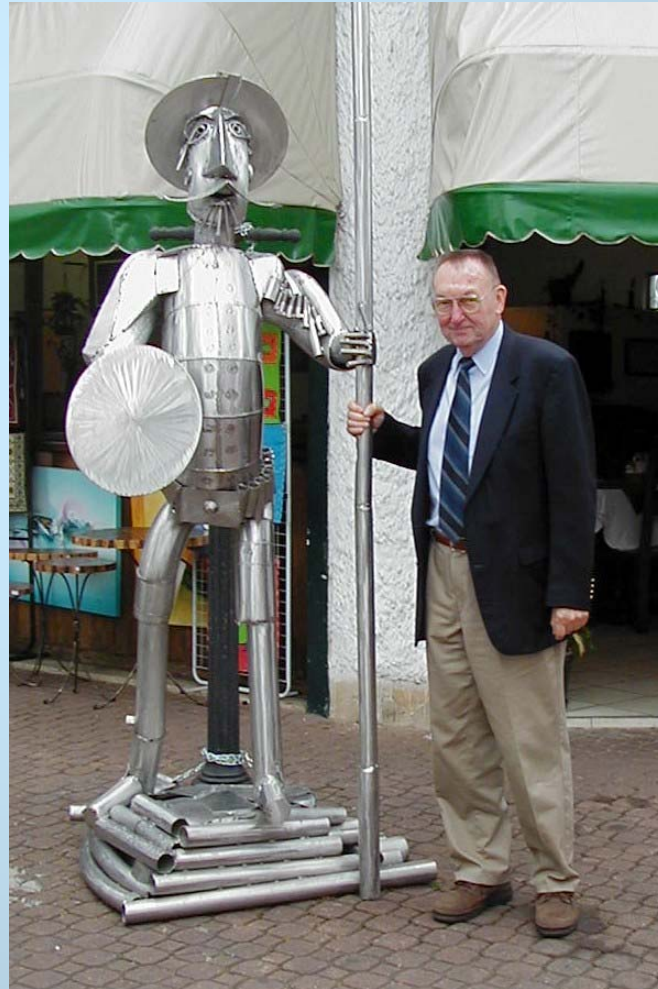
IAEA Cairo Meeting 2005



IAEA Sao Paulo Meeting 2005



IAEA Sao Paulo Meeting 2005



Irradiation Processing: “The Impossible Dream”

THANKS!