UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

SEP 15 2003

GENERAL NOTICE LETTER
CERTIFIED MAIL-RETURN RECEIPT REQUESTED

President
Chris-Craft Industries, Inc.
767 Fifth Avenue, 46th Floor
New York, New York 10153

RE: Diamond Alkali Superfund Site
Notice of Potential Liability for
Response Actions in the Lower Passaic River, New Jersey

Dear Mr. President:

The United States Environmental Protection Agency ("EPA") is charged with responding to the release and/or threatened release of hazardous substances, pollutants, and contaminants into the environment and with enforcement responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §9601 et seq.

You received a letter from EPA, dated September 7, 1994, notifying Chris-Craft Industries, Inc. ("Chris-Craft") of its potential liability relating to the Passaic River Study Area, which is part of the Diamond Alkali Superfund Site ("Site") located in Newark, New Jersey, pursuant to Section 107(a) of CERCLA, 42 U.S.C. §9607(a). Under CERCLA, potentially responsible parties ("PRPs") include current and past owners of a facility, as well as persons who arranged for the disposal or treatment of hazardous substances at the Site, or the transport of hazardous substances to the Site. Accordingly, EPA is seeking your cooperation in an innovative approach to environmental remediation and restoration activities for the Lower Passaic River.

EPA has documented the release or threatened release of hazardous substances, pollutants and contaminants into the six-mile stretch of the river, known as the Passaic River Study Area, which is part of the Site located in Newark, New Jersey. Based on the results of previous CERCLA remedial investigation activities and other environmental studies, including a reconnaissance study of the Passaic River conducted by the United States Army Corps of Engineers ("USACE"), EPA has further determined that contaminated sediments and other potential sources of hazardous substances exist along the entire 17-mile tidal reach of the Lower Passaic River. Thus, EPA has decided to expand the Study to include the areal extent of contamination to which hazardous substances from the six-mile stretch were transported; and those sources from which hazardous substances outside the six-mile stretch have come to be located within the expanded Study Area.

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In recognition of our complementary roles, EPA has formed a partnership with USACE and the New Jersey Department of Transportation-Office of Maritime Resources ("OMR") ["the governmental partnership"] to identify and to address water quality improvement, remediation, and restoration opportunities in the 17-mile Lower Passaic River. This governmental partnership is consistent with a national Memorandum of Understanding ("MOU") executed on July 2, 2002 between EPA and USACE. This MOU calls for the two agencies to cooperate, where appropriate, on environmental remediation and restoration of degraded urban rivers and related resources. In agreeing to implement the MOU, the EPA and USACE will use their existing statutory and regulatory authorities in a coordinated manner. These authorities for EPA include CERCLA, the Clean Water Act, and the Resource Conservation and Recovery Act. The USACE's authority stems from the Water Resources Development Act ("WRDA"). WRDA allows for the use of some federal funds to pay for a portion of the USACE's approved projects related to ecosystem restoration.

For the first phase of the Lower Passaic River Project, the governmental partners are proceeding with an integrated five- to seven-year study to determine an appropriate remediation and restoration plan for the river. The study will involve investigation of environmental impacts and pollution sources, as well as evaluation of alternative actions, leading to recommendations of environmental remediation and restoration activities. This study is being conducted by EPA under the authority of CERCLA and by USACE and OMR, as local sponsor, under WRDA. EPA, USACE, and OMR are coordinating with the New Jersey Department of Environmental Protection and the Federal and State Natural Resource Trustee agencies. EPA, USACE, and OMR estimate that the study will cost approximately $20 million, with the WRDA and CERCLA shares being about $10 million each. EPA will be seeking its share of the costs of the study from PRPs.

Based on information that EPA evaluated during the course of its investigation of the Site, EPA believes that hazardous substances were being released from the Chris-Craft facility located at 100 Lister Avenue in Newark ,New Jersey, into the Lower Passaic River. Hazardous substances, pollutants and contaminants released from the facility into the river present a risk to the environment and the humans who may ingest contaminated fish and shellfish. Therefore, Chris-Craft may be potentially liable for response costs which the government may incur relating to the study of the Lower Passaic River. In addition, responsible parties may be required to pay damages for injury to, destruction of, or loss of natural resources, including the cost of assessing such damages.

Enclosed is a list of the other PRPs who have received Notice letters. This list represents EPA's findings on the identities of PRPs to date. We are continuing efforts to locate additional PRPs who have released hazardous substances, directly or indirectly, into the Passaic River. Inclusion on, or exclusion from, the list does not constitute a final determination by EPA concerning the liability of any party for the release or threat of release of hazardous substances at the Site. Be advised that notice of your potential liability at the Site is being forwarded to all parties on this list.

We request that you consider becoming a "cooperating party" for the Lower Passaic River

Project. As a cooperating party, you, along with many other such parties, will be expected to fund EPA's share of the study costs. Upon completion of the study, it is expected that CERCLA and WRDA processes will be used to identify the required remediation and restoration programs, as well as the assignment of remediation and restoration costs. At this time, the commitments of the cooperating parties will apply only to the study. For those who choose not to cooperate, EPA may apply the CERCLA enforcement process, pursuant to Sections 106 (a) and 107(a) of CERCLA, 42 U.S.C. §9606(a) and §9607(a) and other laws.

Pursuant to CERCLA Section 113(k), EPA must establish an administrative record that contains documents that form the basis of EPA's decision on the selection of a response action for a site. The administrative record files, which contain the documents related to the response action selected for this Site are located at EPA's Region 2 office (290 Broadway, New York) on the 18th floor. You may call the Records Center at (212) 637-4308 to make an appointment to view the administrative record for the Lower Passaic River Project.

EPA will be holding a meeting with all PRPs on October 29, 2003 at 10:00 AM in Conference Room 27A at the Region 2 office. At that meeting, EPA will provide information about the actions taken to date in the Lower Passaic River, as well as plans for future activities. After the presentation, PRPs will be given the opportunity to caucus, and EPA will return to answer any questions that might be generated during the private session. Please be advised that due to increased security measures, all visitors need to be registered with the security desk in the lobby in order to gain entry to the office. In order to ensure a smooth arrival, you will need to provide EPA with a list of attendees no later than October 15, 2003.

EPA recommends that the cooperating parties select a steering committee to represent the group's interest as soon as possible, since EPA expects a funding commitment for the financing of the CERCLA share of the $20 million study by mid-November 2003. If you wish to discuss this further, please contact Ms. Alice Yeh, Remedial Project Manager, at (212) 637-4427 or Ms. Kedari Reddy, Assistant Regional Counsel, at (212) 637-3106. Please note that all communications from attorneys should be directed to Ms. Reddy.

Sincerely yours,

George Pavlou, Director
Emergency and Remedial Response Division

Enclosure

cc: Brian Kelly, Esq.
Chris-Craft Industries, Inc.

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PRPs in Receipt of Notice Letters:

PRP	Legal Counsel
J. Roger Hirl President and Chairman of the Board Occidental Chemical Co. Occidental Tower 5005 LBJ Freeway Dallas, Texas 75244	Paul W. Herring, Esq. Andrews & Kurth L.L.P. 1717 Main Street, Suite 3700 Dallas, Texas 75201
Joseph Gabriel Vice President of Operations 360 North Pastoria Environmental Corp. 1100 Ridgeway Avenue Rochester, New York 14652-6280	Philip Sellinger, Esq. Sills Cummis Zuckerman One Riverfront Plaza Newark, NJ 07102
Robert Ball, President Alcan Aluminum Corporation 100 Erieview Plaza, 29th Floor Cleveland, Ohio 44114	Lawrence Salibra, Esq. Alcan Aluminum Corporation 6060 Parkland Blvd. Mayfield Hts., OH 44124
Mark Epstein, President Alden Leeds Inc. 55 Jacobus Ave. Kearny, New Jersey 07032	Eric Aronson, Esq. Whitman Breed Abbott & Morgan One Gateway Center Newark, NJ 07102
Alan Bendelius, President Alliance Chemical, Inc. Linden Avenue Ridgefield, New Jersey 07657	Fredi L. Pearlmutter, Esq. Cooper, Rose & English, LLP 480 Morris Avenue Summit, New Jersey 07901-1527
William Gentner, President The Andrew Jergens Co. 2535 Spring Grove Ave. Cincinnati, Ohio 45214	A. Christian Worrell III, Esq. Head & Ritchey, LLP 1900 Fifth Third Center 511 Walnut Street Cincinnati, OH 45202
Gary Cappeline, President Ashland Specialty Chemical Co. 5200 Blazer Parkway Dublin, Ohio 43017	Stephen Leermakers, Esq. Ashland Specialty Chemical Co. 5200 Blazer Parkway Dublin, OH 43017
Klaus Peter Loebbe, President BASF Corporation 3000 Continental Drive North Mount Olive, New Jersey 07828	Nan Bernardo, Esq. and Nancy Lake Martin, Esq. BASF Corporation 3000 Continental Drive North Mount Olive, NJ 07828

Joseph Akers, Vice President Bayer Corporation 100 Bayer Road Pittsburgh, Pennsylvania 15205-9741	Gerard Hickel, Esq. Bayer Corporation 100 Bayer Road Pittsburgh, PA 15205-9741
Yvan Dupay, President Benjamin Moore & Co. 51 Chestnut Ridge Road Montvale, New Jersey 07645	Arthur Schulz, Esq. Environmental Counsel 4910 Massachusetts Ave., N.W. Suite 221 Washington, DC 20016
Alberto Celleri, President Chemical Compounds Inc. 10 Baldwin Court Roseland, New Jersey 07086	Jim Giannotti Chemical Compounds Inc. 29-75 Riverside Avenue Newark, NJ 07104
President Chris-Craft Industries, Inc. 767 Fifth Avenue, 46th Floor New York, New York 10153	Brian Kelly, Esq. Chris-Craft Industries, Inc. 767 Fifth Avenue, 46th Floor New York, NY 10153
John Guffey, President Coltec Industries, Inc. 3 Coliseum Centre 2550 West Tyvola Road Charlotte, North Carolina 28217	John R. Mayo, Esq. Coltec Industries, Inc. 430 Park Avenue New York, NY 10022
Roger Marcus, President Congoleum Corporation 3705 Quakerbridge Road Mercerville, New Jersey 08619	Russell Hewit, Esq. Dughi & Hewit 340 North Avenue Cranford, NJ 07016
Martin Benante, Chairman Curtiss-Wright Corp. 4 Becker Farm Road Roseland, New Jersey 07068	James Maher, Esq. Curtiss-Wright Corp. 4 Becker Farm Road Roseland, NJ 07068
Antonio Perez, President Eastman Kodak Company 343 State Street Rochester, New York 14650	Elliot Stern, Esq. Eastman Kodak Company 343 State Street Rochester, NY 14650
Edgar Woolard, Chairman E.I. du Pont de Nemours & Co. 1007 Market Street Wilmington, Delaware 19898	Bernard J. Reilly, Esq. Corporate Counsel E.I. du Pont de Nemours & Co. 1007 Market Street Wilmington, DE 19898

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David Weisman, CEO Elan Chemical Company 268 Doremus Ave. Newark, New Jersey 07105	Jeffrey Schwartz, Esq. Sarber Schlesinger Satz & Goldstein One Gateway Center Newark, NJ 07102
Al Reisch, President E M Sergeant Pulp & Chemical Co. Inc. 6 Chelsea Road Clifton, New Jersey 07102	None
Mark Tucker, Esq. Essex Chemical Corp. 2030 WMDC Midland, Michigan 48674	Kenneth Mack, Esq. Fox, Rothschild, O'Brien & Frankel Princeton Pike Corp.Center 997 Lenox Drive, Building 3 Lawrenceville, NJ 08648
Todd Walker, President Fairmount Chemical Co. Inc. 117 Blanchard St. Newark, New Jersey 07105	John Ix, Esq. Porzio Bromberg & Newman 163 Madison Ave. Morristown, NJ 07962
Bradley Buechler, President Franklin-Burlington Plastics Inc. 113 Passaic Ave. Kearny, New Jersey 07032	Robert M. Becker, Esq. Kraemer, Burns, Mytelka & Lovell, P.A. 675 Morris Ave. Springfield, NJ 07081
Henry Benz, President Hoescht Celanese Chemicals, Inc. Route 202-206 P.O.Box 2500 Somerville, New Jersey 08876	Anne Conley-Pitchell, Esq. Hoescht Celanese Corp. Route 202-206 P.O.Box 2500 Somerville, NJ 08876
Francine Rothschild, President Kearny Smelting & Refining 936 Harrison Ave #5 Kearny, New Jersey 07032	None
Henry Schact, CEO Lucent Technologies, Inc. 600 Mountain Avenue Murray Hill, New Jersey 07974	Ralph McMurry, Esq. Hill, Betts & Nash LLP 1 Riverfront Plaza, Suite 327 Newark, NJ 07102-5401
Richard Meelia, President Mallinckrodt, Inc. 675 McDonnell Blvd. Hazelwood, Missouri 63042	Patricia Duft, Esq. Mallinckrodt, Inc. 675 McDonnell Blvd. Hazelwood, MO 63042

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Richard Mahoney, CEO Monsanto Company 800 N. Lindbergh Blvd. St. Louis, Missouri 63167	L. William Higley, Esq. Monsanto Company 800 N. Lindbergh Blvd. St. Louis, MO 63167
Joseph Galli, President Newell Rubbermaid, Inc. 29 E. Stephenson St. Freeport, Illinois 61032	Peter Schultz, Director Environmental Affairs Newell Co. 4000 Auburn St. Rockford, IL 61101
Jean-Pierre van Rooy, President Otis Elevator Company North American Operations 10 Farm Springs Road Farmington, Connecticut 06032	Sarah Hurley, Esq. Robinson & Cole LLP 695 East Main Street Stamford, CT 06904-2305
Richard Ablon, President Ogden Corporation Two Pennsylvania Plaza, 25th Floor New York, New York 10121	J.L. Effinger, Esq. Ogden Corporation Two Pennsylvania Plaza, 25th Floor New York, NY 10121
Henry McKinnell, Chairman Pfizer Inc. 235 E. 42nd St. New York, New York 10017	Michael McThomas, Esq. Pfizer Inc. 235 E. 42nd St. New York, NY 10017
Raymond LeBoeuf, President PPG Industries, Inc. One PPG Place Pittsburgh, Pennsylvania 15272	Joseph Karas, Esq. PPG Industries, Inc. One PPG Place Pittsburgh, PA 15272
Lawrence Codey, President PSE&G Co. P.O. Box 570 Newark, New Jersey 07101-0570	Hugh Mahoney, Esq. PSE&G Co. P.O. Box 570 Newark, NJ 07101
Phillip D. Ashkettle, President Reichhold Chemicals, Inc. P.O. Box 13582 Research Triangle Park, North Carolina 27709	Adam S. Walters, Esq. Phillips, Lytle, Hitchcock, Blaine & Huber 3400 Marine Midland Center Buffalo, NY 14203
Robert McNeeley, President Reilly Industries, Inc. 1510 Market Square Center 151 North Delaware Street Indianapolis, Indiana 46204	Paul Rivers, Director Corporate Environmental Affairs Reilly Industries, Inc. 1500 S. Tibbs Avenue Indianapolis, IN 46242

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Robert Finn, President RSR Corporation 2777 Stemmons Freeway, Suite 1800 Dallas, Texas 75207	Howard Myers, Esq. RSR Corporation 2777 Stemmons Freeway, Suite 1800 Dallas, TX 75207
Christopher Connor, CEO The Sherwin-Williams Company 101 Prospect Avenue, N.W. Cleveland, Ohio 44115-1075	Donald McConnell, Esq. The Sherwin-Williams Co. 101 Prospect Ave., N.W. Cleveland, OH 44115
George Barrett, President Teva Pharmaceuticals USA Inc. 1090 Horsham Road North Wales, Pennsylvania 19454	Kirsten E. Bauer, Esq. Teva North America 1090 Horsham Road North Wales, PA 19454
Robert Senior, President Three County Volkswagen 701 Riverside Ave. Lyndhurst, New Jersey 07071	Robert DiLascio, Esq. 30 Park Avenue, Suite 101 Lyndhurst, NJ 07071
Michael Jordan, President Westinghouse Electric Corp. 11 Stanwix Street Pittsburgh, Pennsylvania 15222	Roger Willis, Esq. Westinghouse Electric Corp. 11 Stanwix Street Pittsburgh, PA 15222
Isaac Weinberger, President Wiggins Plastics Inc. 547 Maitland Ave. Teaneck, New Jersey 07666	None

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QUICK ✓

RECEIVED
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GENERAL NOTICE LETTER
URGENT LEGAL MATTER
EXPRESS MAIL - RETURN RECEIPT REQUESTED

Brian C. Kelly, Esq.
Chris-Craft Industries, Inc.
600 Madison Avenue
New York, New York 10022

Re: Diamond Alkali Superfund Site
Notice of Potential Liability for
Response actions in the Passaic River Study Area

Dear Mr. Kelly:

The United States Environmental Protection Agency ("EPA") has documented the release or threatened release of hazardous substances to the Passaic River Study Area which is part of the Diamond Alkali Superfund site ("Site"). By this letter EPA is notifying Chris-Craft Industries, Inc. ("Chris Craft") of its potential liability relating to the Site pursuant to Section 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §9604.

Sediment in the Passaic River contains numerous hazardous substances including dioxins and related compounds. Investigations undertaken by EPA indicate that hazardous substances have been released from the Baldwin/Montrose Chemical Company facility on Lister Avenue, of which Chris Craft is a successor, into the Passaic River Study Area. Hazardous substances released from the Baldwin/Montrose facility site into the Passaic River Study Area present a continuing risk to the environment and the humans who may ingest contaminated fish and shellfish. Therefore, Chris Craft is potentially liable for all response costs which the Federal government may incur relating to the Passaic River Study Area.

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Under Sections 106(a) and 107(a) of CERCLA, 42 U.S.C. §9606(a) and §9607(a), Section 7003 of the Resource Conservation and Recovery Act, as amended ("RCRA"), 42 U.S.C. §6973, and other laws, potentially responsible parties ("PRPs") may be ordered to perform response actions deemed necessary by EPA to protect public health, welfare or the environment, and may be liable for all costs incurred by the government in responding to any release or threatened release at the Site. If response actions are performed by EPA rather than by the PRPs, those PRPs may be subject to legal action pursuant to Section 107(a) of CERCLA, 42 U.S.C. §9607(a), to recover public funds expended by EPA in response to the release and/or threatened release of hazardous substances at the Site. Such actions and costs may include, but need not be limited to, expenditures for conducting a Remedial Investigation/Feasibility Study ("RI/FS"), a Remedial Design/Remedial Action, and other investigation, planning, response, oversight, and enforcement activities. In addition, responsible parties may be required to pay damages for injury to, destruction of, or loss of natural resources, including the cost of assessing such damages.

By this letter, EPA encourages you, as a PRP, to voluntarily participate in the EPA-approved cleanup activities underway at the Passaic River Study Area in conjunction with other PRPs. Any agreement to conduct work at the Passaic River Study Area must be embodied in an Administrative Order pursuant to Section 106 of CERCLA. At the present time, a RI/FS is being performed to determine the extent of contamination in the Passaic River Study Area and to evaluate possible corrective actions to mitigate any adverse effects. EPA will determine at a subsequent time whether additional corrective measures are required to mitigate releases from the Passaic River Study Area and to protect the public health, welfare, and the environment.

At the present time, the Occidental Chemical Corporation ("OCC") under an Administrative Consent Order, is performing the work required to abate any release or threatened release of hazardous substances in the Passaic River Study Area. OCC, through Maxus Energy Corporation, can be contacted at the addressess below.

Correspondence on technical matters should be addressed to:

Maxus Energy Corporation
1015 Belleville Turnpike
Kearny, New Jersey 07032

Attention: Richard P. McNutt, Project Manager

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Correspondence on legal matters should be addressed to:

Vinson & Elkins, L.L.P.
3700 Trammell Crow Center
2001 Ross Avenue
Dallas, Texas 75201-2916

Attention: Ms. Carol Dinkins, Esq.

Be advised that notice of your potential liability at the Passaic River Study Area is being forwarded to OCC by EPA.

EPA requests your cooperation in this matter. If you are interested in participating in the ongoing RI/FS you should notify EPA of your intentions to join with OCC. Notification should be in writing and should be delivered to EPA no later that fourteen (14) days after the date that you receive this letter. Your letter should be sent to:

Lance R. Richman, P.G.
U.S. Environmental Protection Agency
Emergency and Remedial Response Division
26 Federal Plaza, Room 13-100
New York, NY 10278,

with a copy to Ms. Patricia Hick, Esq., of the Office of Regional Counsel at the same address.

If EPA does not receive a written response from you in the time specified above, EPA will assume that you voluntarily decline to participate in the RI/FS, and EPA will pursue its options, which may include the issuance of a Unilateral Order to perform the necessary RI/FS activities at the site. If you wish to discuss this matter further, please contact Mr. Lance R. Richman, P.G., of my staff, at (212) 264-6695 or Ms. Hick, at (212) 264-2642. Please note that all communications from attorneys should be directed to Ms. Hick.

Sincerely yours,

/s/

Kathleen Callahan, Director
Emergency and Remedial Response Division

Attachments

cc: Jose R. Allen, Esq./Peter Simshauser, Esq.
Skadden, Arps, Slate, Meagher & Flom

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Carol Dinkins, Esq.
Vinson & Elkins, L.L.P

Richard P. McNutt, Project Manager
Maxus Energy Corporation

Nicholas Marton, Case Manager
State of New Jersey
New Jersey Department Environmental Protection

bcc: P. Hick, ORC-SUP
L. Richman, SNJSII

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF REGIONAL COUNSEL, 17th FLOOR
290 BROADWAY
NEW YORK, NEW YORK 10007-1866

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 13, 1996

Peter Simshauser, Esq.
Skadden, Arps, Slate, Meagher & Flom
300 South Grand Ave.
Los Angeles, California 90071-3144

Re: Diamond Alkali Superfund Site
Passaic River Study Area

Dear Mr. Simshauser:

This is in response to your letter addressed to Ms. Patricia Hick, dated September 18, 1995, concerning the status of Chris-Craft Industries, Inc. ("Chris-Craft") as a potentially responsible party ("PRP") with respect to the Passaic River Study Area of the Diamond Alkali Superfund Site. As you have stated, Chris-Craft received a General Notice letter from the U.S. Environmental Protection Agency ("EPA"), dated September 7, 1994, relating to the Passaic River Study Area. Since that time, EPA has met with you and representatives of Chris-Craft and has also provided documents to you concerning the potential liability of Montrose Chemical Company ("Montrose") for the Passaic River Study Area. You have raised several issues in your letter which I would like to address.

One of the issues involves the drainage of waste from the Montrose facility. EPA has information that Montrose manufactured various chemicals including, but not limited to, dichlorodiphenyltrichloroethane ("DDT"), dichlorophenoxyacetic acid ("2,4-D"), Lindane, benzene hexachloride, and tricresyl phosphate. Some of the wastes produced during the manufacture of these materials were washed down drains at the Montrose facility. This included, for example, the waste acidic wash water from the tricresyl phosphate production that was not treated or neutralized. Information from former Montrose employees confirms that acidic waste was dumped into drains of the facility by stating that drains and pipes beneath the Montrose facility had to be replaced due to damage and corrosion caused by these wastes. In addition, these employees have stated that the wastes drained into the sewer system. According to the affidavit of

Seymour Lubetkin (enclosed), the former chief engineer of the Passaic Valley Sewerage Commission ("PVSC"), the PVSC routinely allowed untreated wastes to flow directly into the Passaic River during heavy rains to prevent the entire sewer system from backing up. This occurred during the time period of 1950 to at least 1978. Thus, it is very likely that the wastes generated by the Montrose facility and discharged into the sewer line were diverted from this sewer line and bypassed directly into the Passaic River.

You attached copies of 1937 maps to your letter showing that the sanitary and storm sewers appear separate. However, when the Earthline Company (which occupied the former Montrose facility in 1977) applied for a sewer connection permit in that year, one of the conditions in the permit was that the "known illegal cross connection between the storm sewer and sanitary sewer on Lister Avenue . . . be eliminated prior to commencing operations" (see enclosed sewer connection permit).

In your correspondence, you expressed doubt that any hazardous substances could have directly entered the Passaic River. Yet, former Montrose employees have stated that the Passaic River did flood. In addition, during production of Benzene hexachloride ("BHC"), the alpha isomer of BHC (a waste generated during this production) was stored in a pile outside the buildings, uncovered, open to the elements, on the ground of the Montrose facility. Thus, any flooding by the Passaic River certainly could have led to the direct release of this hazardous substance.

While you continue to contest whether Montrose in fact produced 2,4,5-trichlorophenoxyacetic acid ("2,4,5-T") at its Newark facility, Montrose did advertise itself as a manufacturer or producer of the product at the Lister Avenue address in Newark, New Jersey in a November 1952 issue of Chemical Week. EPA has evaluated the testimony of Mr. Solomon Koved, a former Montrose employee, provided to EPA under oath. Mr. Koved has stated that 2,4,5-T was manufactured at the Montrose facility. While you correctly point out that Mr. Koved is currently employed by ENSR Consulting Engineers, a consulting firm currently retained by Maxus Energy Corporation, it should be noted that Mr. Koved wrote a letter to the New Jersey State Department of Health on June 9, 1983 (enclosed) alleging the manufacture of numerous chemicals, including 2,4,5-T, at the Montrose facility, years before he became associated with ENSR Consulting Engineers. In addition, there were several letters exchanged in 1983 between SCA Chemical Services and the New Jersey Department of Environmental Protection and investigative reports (already in your possession) that indicate that 2,4,5-T

and dioxin compounds were found in samples taken at the Montrose facility.

Turning to your concern of whether any other PRPs have been named to date, the investigation of determining other PRPs continues. To date, three more companies have been notified of their potential liability. These include the Sherwin-Williams Company, Reilly Industries, Inc., and E. I. duPont de Nemours and Company (a successor to the Pittsburgh Consolidated Coal Company which acquired the Reilly Tar facility). The issuance of more notice letters is anticipated along with additional Information Request letters.

I also wish to state for the record that Kroll Environmental Enterprises, Inc. is not an EPA contractor but has been retained by Maxus Energy Corporation as a consultant.

If you have further questions, you may contact me at the above address or call me at (212) 637-3141.

Yours truly,

Amelia M. Wagner
Assistant Regional Counsel

Enclosures

Investigator: Gerard B. Connolly

Site: Diamond Alkali, Newark, New Jersey.

ID#: 4TGB02d6BN, CIIS#: 93012, Date: 01/25/94.

SUBJECT: Summary of Interview with Oscar Randell.

On the date indicated above at about 10:00am, this investigator and Lance Richman, Remedial Project Manager for the Diamond Alkali Superfund site, interviewed Mr. Oscar Randell at his residence, 1264 Marcella Avenue, Union, New Jersey, Tel (908) 687-4650. When interviewed regarding his employment at Montrose Chemical Company's Lister Avenue facility in Newark, New Jersey, Mr. Randell stated as follows:

I worked for Montrose Chemical Company from 1951 to the end of 1977. I started work as a Class B operator working in the production of various chemical products. Mr. Kelsey Brown was my boss. I worked with another Class B operator, Thelb Cameron, who presently lives in the Newark, New Jersey area (Belvedere N.J., Tel (201) 759-5228.) I also remember working with an employee named Mo Franklin who is now deceased.

I remember Samuel Rothrosen and Benjamin Rothberg as being at the facility. Mr. Rothrosen was a laboratory chemist and Mr. Rothberg was an official of the company who worked in the main office. Mr. Rothrosen would supply me with the paperwork on the chemical process that I was tasked to implement.

From 1951 to 1956 the company was Montrose Chemical Co., after 1956, the company was owned by Baldwin Chemical Company, then Chris Craft and subsequently IMC which ended operations in 1977. In January of 1978, SCA (Southland Chemical) took over activities at the plant.

The Montrose produced DDT from 1951 to about 1953/54. After that date this operation was moved out west to California. TCP Tricresyl phosphate) was produced at Montrose during the entire course of my employment. It was produced for Shell Oil Company as an additive for its gasoline. DMI was also produced for sale to the Goodyear Tire and Rubber Company. Thelb Cameron worked on TCP production with me.

TCP production was as follows:

> Cresol, a corrosive liquid, was brought on site in tank cars. It was a brown liquid and had a distinct smell. Cresol was pumped into a 2000 gallon vat placed outside for this

purpose. A dry chemical which was packaged in individual bags was added. This mixture was then pumped into a thermal jacketed tank that was heated by a Dixon boiler to a temperature of 500°C for eight hours. A lab sample was taken for analysis. If the process product was not up to the appropriate specifications, further processing would occur. If the sampled process product was satisfactory the mixture was run through condensers and transferred to a big (10,000 gallon) round tank. A mixture containing 98% sulfuric acid was added. The amount of acid added was determined by measuring the volume increase in the tank in inches from calibrations on the tank. Three, five-gallon buckets of a black, dry chemical were then added from a 400-500 lb drum. The process product was than mixed by an agitator in the tank. As the chemical was added the mixture changed color to a" beautiful deep red". The process product was heated and five gallon buckets of an additional white, "sugar-like" chemical were added from a 500 lb paper container. After about 1/2 hour the process product turned crystal clear and had the consistency of vegetable oil. The process product was again sampled. If satisfactory, the process product then went to a wash tank. The process product settled to the bottom of the tank while water from the washing process remained on top. An arm skimming the surface of the inner tank removed the wash-water to an overflow tank. The decanted water was discharged via a Montrose 4" outflow pipe directly into the Passaic River. On one occasion in 1957/58, a worker assigned to one of the three shifts allowed the arm to sink to the bottom of the wash tank. The result was that the entire run of product was discharged into the Passaic River. The worker was fired but no report of the incident was made. The wash-water, which was visible through the floor grating, flowed in drains that were connected to a 4" out flow pipe. The wash-water was a white, milky liquid. I observed the liquid both in the plant drains and discharging via the 4" outfall pipe to the Passaic river. After three washes the material was sampled. If satisfactory, it was sent to 4000 gallon, insulated drying tank. The drying tank contained a "steam jet vacuum" to remove any additional water. The tank used steam heat at a temperature of between 80-90°C. The drying took about eight hours. The finished product was then pumped into a 4000 gallon holding tank. When ready for shipment, it was pumped via a 2" line to the drumming area. The product was spilled regularly. The floor was always sticky with product. The concrete floor required regular repaving because of the spills of product. At times the floor was washed with caustic to remove the product. Any waste water went to the Passaic river. This process remained the same throughout my tenure at the facility. I estimated that between 3000 and 3500 gallons of TCP were produced three time a week.

Many of the iron drainage pipes at the plant would corrode. Employees would then have to jackhammer the pipes out and replace

them. They eventually placed down plastic drainage pipes.

In 1957/58 a 2" pipe used to pump Cresol from tank cars ruptured causing Cresol, a corrosive, to "spill all over." I and other workers routinely dumped five gallon pails of waste cresol into the Passaic River instead of using a waste tank in place for that purpose.

Some time between 1958 and 1960 the river backed up and flowed onto the plant. The water was waist high. Subsequent to the flood, pumps and motors were moved off of the floor because a number of them had shorted out during the flood.

DMI production was as follows:

> DMI was produced in a 4000 gallon tank. It did not need to be washed. 2000 gallons of methanol were used. The methanol had a sweet smell. The methanol was combined with 300, 50 lb bags of dry chemical that were carried to the top of the tank by hopper. A five gallon pail of a substance containing sulfuric acid was added as a catalyst. The tank was closed. The mixture was heated to over 500 degrees using diatherm heat from the Dixon boiler. The heating continued for more than ten hours, after which the methanol was pumped off to an under ground tank located in front of the plant. The DMI was in a holding tank where a "slop cut" was made to a 500 gallon tank. After 1/2 hour, the material was light tested. It was crystal clear. The liquid was then distilled in an insulated tank. 2000 or 3000 gallons of finished product were stored at the plant. The product looked like white snow. Approximately two deliveries a week were made to Goodyear Tire and Rubber Company for a total of 6000 gallons of product.

Concerning DDT production, I was required to scrape hardened material from product pans. This was done wearing a rubber suit and gas mask. The product was then chopped up and shipped, in cotton containers, to California.

I worked almost exclusively on TCP and DMI production.

Three railroad tank cars were buried in front of the plant in the vicinity of Lister avenue. The three tank cars, which went by the numbers 31, 32, and 33, had 10,000 gallon capacities. They were removed by SCA in 1980. I observed the tank-car removal and that is how I learned they were railroad tank cars. The tanks were rusted and falling apart. One of the tanks was used for methanol recovery during manufacturing, another was used to hold "melano". I believe it was used in the production of tear gas.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

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IN THE MATTER OF THE: :

DIAMOND ALKALI SUPERFUND SITE : (Passaic River Study Area) NEWARK, NEW JERSEY :

Nonpublic Proceeding Under : Section 122(e) (3) (B) of the Comprehensive Environmental : Response, Compensation, and Liability Act, 42 U.S.C. : Section 9622 (e) (3) (B)

Index No. II-CERCLA-SUB-94-0101

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March 24, 1994

10:04 a.m.

Deposition of SOLOMON H. KOVED, held at 26 Federal Plaza, New York, New York, pursuant to Administrative Subpoena, before Mindy Perlish, C.S.R., R.P.R., a Notary Public of the State of New York.

850550001

A P P E A R A N C E S :

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 Federal Plaza
New York, New York 10278
BY: PATRICIA C. HICK, Assistant Regional Counsel
LANCE RICHMAN, Remedial Project Manager
GERARD CONNOLLY, Civil Investigator

VINSON & ELKINS, L.L.P.
Attorneys for Maxus Energy Corp.
One American Center
600 Congress Avenue
Austin, Texas 78701-3200
BY: AMANDA G. BIRRELL, ESQ.

A L S O P R E S E N T:

JANNETTE L. GRAVES, Environmental Protection Agency Paralegal Specialist

MS. HICK: My name is Pat Hick. I'll be conducting the deposition today.

With me is Lance Richman, who is the Remedial Project Manager, Gerard Connolly, who is a civil investigator, who is assisting us in this site, and Janet Graves, who is a paralegal, also assisting me.

The purpose of this deposition is essentially to obtain information on operations at the facility named Montrose or Baldwin-Montrose or Chris-Craft in Newark, New Jersey and the products and processes that occurred at that facility.

Amanda Birrell has asked to make a brief statement on the record.

MS. BIRRELL: Yes.

My name is Amanda Birrell. I'm with Vinson & Elkins, L.L.P. We represent Maxus Energy Corp. Maxus Energy Corp. has retained ENSR Consulting Engineers as a consulting expert concerning the Passaic River, and Mr. Koved is employed by ENSR.

I'm present in the deposition with Mr. ENSR because -- I'm sorry -- with

Mr. Koved because of Maxus' relationship with ENSR. I am not representing him personally.

MS. HICK: Just a few guidelines that I'd like to talk about.

If you don't understand a question that I ask, please ask and I'll repeat it or try to clarify it for you.

Because the stenographer won't be able to understand gestures, I would ask that you not nod your head. Just vocalize and answer yes or no.

THE WITNESS: Okay.

MS. HICK: This may be more important when we start talking about descriptions on maps, and I'll try to remind you.

I'll try to remember to have you describe gestures or pointing on the map.

If you need a break to either use the facilities or to talk to your attorney, just say the word.

THE WITNESS: What's the word? Please is the word.

S O L O M O N H. K O V E D, subpoenaed as a witness, having been first duly sworn by

Koved

a Notary Public, was examined and testified as follows:

EXAMINATION BY

MS. HICK:

Q. Please state your name for the record.

A. Solomon H. Koved.

Q. And your address?

A. My address is

Q. I would just like to ask a few informational questions about your background.

The address that you gave to the stenographer is your home address?

A. Indeed. Yes.

Q. Could you give us your telephone number, please?

A.

Q. And your Social Security number?

A.

Q. I understand you brought a copy of your resume?

A. Yes.

MS. HICK: I would ask that you mark that as Exhibit 1.

Koved

(Whereupon, Exhibit 1, Resume, one page, marked for identification.)

Q. Could you summarize your educational background for us?

A. Yes.

In 1943, I graduated from City College, Convent Avenue campus in Manhattan with a degree of bachelor of science, major, chemistry, minors in physics and chemical engineering.

In approximately 1974 or '5 -- I don't know exactly -- I earned a master's of arts in education at Montclair State College in Montclair, New Jersey.

During that period I also took extension courses at Rutgers University in industrial wastewater treatment, loss prevention control and industrial safety, pollution control and toxicology.

Q. Could you provide a brief summary of the positions you held prior to beginning work at the Montrose Chemical Company?

A. Zero.

Q. What years were you employed by the Montrose Chemical Company?

Koved

A. 1943 to 1971 with the exception of a two-year period from 1944 to 1946 when I served in the U.S. Army.

MS. HICK: I would like to have marked as Exhibit 2 this map.

(Whereupon, Exhibit 2, Department of Public Works map, one page, marked for identification.)

Q. On this map I would -- this map is a section of Newark that encompasses the Montrose chemical facility. I would just ask you to mark on that map the location of the facility.

A. May I have a clarification?

Q. Yes.

A. I assume that this is a -- oh, it's a public works map?

Q. Right.

A. And the lines that we see are railroad lines?

Q. I think that's it.

MR. RICHMAN: Some of them are railroad lines. They're also street --

THE WITNESS: Well, the streets --

MR. RICHMAN: -- designations.

Koved

THE WITNESS: Yes.

I have no problems with the streets, but I was uncertain whether these were lot boundaries or railroad lines.

MR. RICHMAN: No, sir, they are not lot boundaries, to my understanding.

THE WITNESS: Okay. Fair enough.

A. Montrose Chemical Company was located -- property was located astride this railroad line (indicating) and extended from Lister Avenue midway to the river.

Q. What was on the other end of the lot to the river's edge?

A. From the Montrose boundary -- and I might say at this point I don't know whether the property was owned or rented, but we occupied that site (indicating) designated, and I'll put an "M" on that.

The property that extended from the north end of the Montrose site to the river was occupied by a number of firms at different times.

When I arrived on the scene, it was occupied by Swan-Finch, S-W-A-N - F-I-N-C-H -- well, I'll just guess at refinery, because they

Koved

dealt in petroleum products.

At a later date, it was owned by Thomasett, T-H-O-M-A-S-E-T-T, Color, C-O-L-O-R, who were manufacturers of dyes, and I say this not from absolute knowledge, the place was of different colors. It was obviously dyed, but I don't know -- I don't have the information firsthand.

There may have been one other occupant of the property, which I do not recall at this time, that would have been between Swan-Finch and Thomasett.

Q. Okay.

MR. RICHMAN: Could you tell us what the address was at Montrose Chemical?

THE WITNESS: The people worked there believed it to be 120 Lister Avenue. However, I've seen it referred to in literature as 100 Lister Avenue. Both would be accurate.

MR. RICHMAN: Did you receive mail at both those addresses?

THE WITNESS: I didn't receive mail.

MR. RICHMAN: Did the company receive

mail at both of those addresses?

THE WITNESS: There was only one box, so --

MR. RICHMAN: Okay.

THE WITNESS: The postman knew his territory.

MR. RICHMAN: So at this point if it was 100 or 120, it would go in the slot?

THE WITNESS: Whatever, 100 or 120, was delivered to that office, yes.

Q. Who were the companies on either side of the Montrose facility on Lister Avenue, if you remember?

A. Well, on the east was a firm that was recessed some distance from the street that produced vermiculite, V-E-R-M-I-C-U-L-I-T-E. There is very little activity there, and I never saw any personnel.

Beyond vermiculite and not touching -- and to the east and not touching the Montrose territory -- realty was the Benjamin Moore Paint Company.

To the west was a firm with the name of Duralac, D-U-R-A-L-A-C.

Koved

And behind Duralac was a firm by the name of Sargeant, S-A-R-G-E-A-N-T, Chemical Company.

And to the west of that, to my knowledge, was initially Kolker, K-O-L-K-E-R, Chemical Works, which was purchased by Diamond Alkali, which was subsequently purchased or named, I have no idea, Diamond Shamrock.

And then there were subsequent names of which I'm not aware.

MR. RICHMAN: Was it possible to walk from the facility, the Baldwin facility, to the river? Were there gates in the way?

THE WITNESS: No gates. It was a driveway that extended to the river, but I never went there, and to my knowledge, no one else -- I never saw any of our employees go there. There was no motivation for going there of a business nature.

Q. Would people walk down there on breaks? You're not --

A. I can only answer that by saying the breaks were too short to make that walk.

MR. CONNOLLY: Was there any specific

policy prohibiting employees from going down there?

THE WITNESS: No.

Perhaps Thomasett or Swan-Finch had their own rules.

Q. I would like to ask you about the corporate ownership of Montrose Chemical and name changes.

When you were hired by Montrose Chemical --

MS. HICK: Strike that.

Q. You were initially hired by Montrose Chemical; is that correct?

A. Correct.

Q. At some point, the name of the facility was changed to Baldwin-Montrose; is that correct?

A. Yes.

Q. Do you know the approximate year in which that occurred?

A. I do not.

Q. Were you ever employed by the facility after it was purchased by Chris-Craft?

A. Yes.

Q. Do you recall approximately the year in

Koved

which that occurred?

A. No.

Q. If you could, would you please describe to us the positions that you held at the Montrose facility during your employment there?

MS. BIRRELL: Can we go off the record?

(Discussion off the record.)

Q. Could you describe the corporate structure of the Montrose Chemical Company during your employment there?

A. I might preface it by saying that I was not privy to the business activities of the firm, but I was an observer.

When I was hired in May of 1943, the company was named Montrose Chemical Company. It had the appearance of private ownership, but it was believed by the employees that there were a number of silent partners.

The Rothberg family, that would be Pincus Rothberg as president and Benjamin Rothberg as vice president and plant manager, ran the company.

In what year, I don't know, the family went public and sold stock retaining half the

stock for control. Half the stock was owned by the family -- various members of the family. The rest was traded on the market, probably the curb exchange. It didn't make the big board.

In a year I do not recall, a consortium, perhaps simply Baldwin Rubber Company or a few firms that were acquired and managed by Baldwin Rubber Company, purchased enough stock to merge with Montrose Chemical Company, and while the conglomerate -- and I don't know if that's an accurate term -- owned or managed Montrose, it was known as Baldwin-Montrose, which were the terms of the merger.

However, at no time was Baldwin-Montrose a factor in our -- in the activity of the plant. We still worked for Montrose and were paid by Montrose, and the checks had Montrose Chemical's name on it, as I recall.

Subsequently, Baldwin Rubber Company came on hard times because their principal customer was the automobile industry, and initially the automobile industry used considerable rubber, including the mats in the

cars, as I understand, and the automobile industry switched to plastic.

What happened to Baldwin Rubber Company, I don't know, but evidently in around that period, the Baldwin-Montrose complex was absorbed by another conglomerate, whose name I didn't recall because it in no way affected the activities at our site.

And there may have been a number of acquisitions and mergers, but it finally wound up with Chris-Craft at the top.

At no time was our site associated with the name Chris-Craft. This was, as far as we were concerned, a business deal. It had no effect on the employees.

And that's about -- well, Montrose had some difficulty in the couple of years prior to my departure from the company in there were insufficient number of products to make the site profitable, and so approximately two-thirds of the employees were separated from the company. They were let go. And that was 1971, and I subsequently went to work for my -- the following employer.

Koved

But I do know that Sobin Chemical Company based in Boston -- because the Montrose facility did business, and the next thing I heard the facility was shut down, and whoever was the present occupant of the site moved into it.

Q. Okay.

MS. BIRRELL: Hold the record.

(Discussion off the record.)

Q. Could you summarize for us the positions that you held with the Montrose company during your employment there?

A. The structure of the operations were extremely informal. I would say that when I arrived, the company -- was employed by the company, there were possibly personnel total of ten, and I was hired as a shift chemist, two-men shifts, both chemists, one of the two designated leader with no title.

As the company added more products, it was expanded. And let's see. In 1946 when I returned from the Army, the company was making in addition to Tricresyl phosphate, DDT, and the number of personnel perhaps at that point was about twenty.

Koved

Q. Just as a point of clarification, when you were shift chemist, Tricresyl phosphate was being manufactured?

A. Yes.

Q. Were there other products?

A. No.

Q. That was the only --

A. Right.

Q. Then when you returned in 1946, the product line had expanded to include DDT as well?

A. That's right.

Q. Did you come back as a shift chemist in 1946 as well?

A. We had no titles. Everyone, including the designated leader, worked, and essentially independently. The designated leader of each shift would make sure that no errors were made. There were no titles.

There was at this point a plant manager who oversaw the three shifts a day, twenty-four hours a day, seven days a week operation, and his function was to schedule the production and oversee it.

Would you care for a name?

Koved

Q. Yes, please.

A. Michael Koplan, K-O-P-L-A-N.

I would say that he left the employ of Montrose about 1948.

Q. Was he replaced?

A. Yes.

Not for a period of time. The entire operation was managed by Benjamin Rothberg, although he didn't work.

Q. Is Benjamin Rothberg a chemist?

A. Yes.

MR. CONNOLLY: Do you remember the designated chemist that you worked with or were you a designated chemist, designated leader?

THE WITNESS: No. No, I suppose -- no, I don't. I don't recall the names of the people. They generally -- there was not that much personnel turnover, but I didn't have any personal ties with any of them.

MR. CONNOLLY: You didn't come back as a leader or anything like that?

THE WITNESS: Well, based on my industriousness, they made me a designated

leader.

Q. In what year was that?

A. Oh, I would say when I returned from the Army in 1946. The leader got a salary about ten cents an hour more than the others.

Q. In the first position you held when you were hired by the company, did you supervise anyone?

A. No.

Q. Could you tell us what your responsibilities were essentially when you were initially hired?

A. It was a production job. In no shape or form was it a laboratory job. And we manufactured Tricresyl phosphate, which was a number of operations. And there would be -- it was a batch -- batch-wise process, so that at any one time there might be four or five batches moving through the plant in various states of refinement -- manufacture and refinement.

Q. Were you responsible for overseeing that process or were you --

A. No, I did it. Everybody worked.

Q. So you essentially made the TCP?

Koved

A. Yes, yes, yes, yes.

Q. Did your job expand -- after you came back in 1946, were you still working on TCP or were you broadening out into DDT as well?

A. Well, keep in mind that it was a very small firm, so that everyone did everything -- was capable of doing everything that needed to be done, including when we needed a new transfer line for the liquids. If there was an opportunity at night -- in other words, if the work load was not too heavy, put in pipelines, cut pipe, threaded pipe, put it all together.

Q. So do I take it to mean that if there was a product going through the plant at this time, after you got back in 1946, you probably had something to do with the production?

A. I had -- I was required to do anything that needed doing.

Q. Okay.

How many years -- for how many years were the Tricresyl phosphate and the DDT produced before another product was added to the process?

A. That's a difficult question inasmuch as at that time there was no reason to commit any --

anything of that nature to memory. I simply didn't. I could name most or all of the products that were produced during the twenty-eight years that I worked there, but they're certainly -- those that I have provided in the past certainly are not all the products that were produced.

Q. Let's go back to the question about the positions that you held during the years.

You said that when you came back in 1946 or shortly thereafter, you were essentially made a designated chemist.

How long did you continue in that position, if you recall?

A. I'll go back to the statement that there were no titles, and there was not much differentiation in -- in the work that the production people did. But I worked in several departments. I worked in production. Most of the time I was there, but I also worked in the research laboratory when production was slow.

I worked in pilot plant when that was necessary. I even for a short period of time managed the maintenance department when -- when the maintenance manager was on vacation.

Koved

I suppose my value to the company was versatility, and it -- it was easy to do all these jobs because it was all going on around us and we all participated in it. So I would say that the maintenance men were not production operators and neither were the laborers. There was a labor department and so forth.

As the number of products and the volume of the products grew, all these things were added, and I would say at about the time that I left the company, there were between fifty and sixty employees.

Q. From approximately 1946 until the time that you left the company, you held this position which was shift leader/designated chemist/supervisor?

A. Um, I -- I can't accept all those titles because --

Q. Okay.

A. -- again there were no titles.

I -- I would say in about 1947, because of my versatility and probably as a reward for my industriousness, I was given a permanent day shift slot so that I was able to provide

continuity between shifts and assist in the resolving of problems or even detecting problems and alerting management to what the problem was.

There was a period of time when I was -- I trained operators. They hired nine men, graduates from a Newark high school, and I spent about three months training them in how to perform the production work, so I had no title.

I -- at various times I acted as assistant plant manager when the plant manager was on vacation, I managed the maintenance department when the manager was on vacation, and I was just generally useful.

Q. You said at one point right after you came back that there was a plant manager named Michael Koplan.

Can you tell us through the years who your supervisors were as they changed over time?

A. Well, I can say for some periods that we did not actually have a plant manager -- a plant manager. The plant was run by either Benjamin Rothberg or a I would say production manager by the name of Peter Lewesky, L-E-W-E-S-K-Y. And frankly, there's only one

other -- the name -- I can recall one name of the plant manager who managed the plant probably for about five years, approximately, and his name was Paul Hammer, H-A-M-M-E-R.

MR. CONNOLLY: Would you know if any of these gentlemen are still alive or around in the area?

THE WITNESS: Well, it would be pure conjecture on my part. I didn't keep in touch.

Q. Peter Lewesky, do you remember approximately when he held that position or how long he held that position?

A. Well, he reported to the plant manager, and I would -- and it would be a pure guess. I would say from about -- started sometime around 1948 or '50, somewhere in that range, and continued beyond the time that I left.

Q. What about Paul Hammer, do you --

A. That would take another guess. And the only -- the only measure I have of reference I have is the fact that he worked for about a year before 2,4-D was manufactured till about a year after, and I cannot give the exact dates that

2,4-D and 2,4,5-T were manufactured. I cannot give the exact dates.

Q. When Peter Lewesky was the production manager, was he your supervisor?

A. No.

He scheduled production and maintained records of inventory and was somewhat removed from the plant. I would say the structure was that whoever was the plant manager or Ben Rothberg would tell them what products were needed in what quantities. But he in no way supervised the activity in the plant.

And I must stress again that everybody who worked in production in this informal supervisory capacity was a self-starter, and we really didn't need any direction.

Q. But did Peter Lewesky instruct you as to what products should be manufactured?

A. Yes, he did.

Q. You mentioned that when you began at Montrose there were ten personnel, and you said when you left there were approximately fifty to sixty.

Can you trace the growth of the company

through that time that you were employed there?

A. It would be extremely difficult. It was something not of my concern. Just the fact that someone departed and others joined the company was my only interest, but with regard to numbers, I couldn't tell you. When I started with the firm and because of the size of it, everyone did everything including my -- I characterize it as packaging.

In other words, we manufactured only Tricresyl phosphate at that time. The packaging involved either putting it into drums or putting -- or loading it into tank cars, railroad tank cars. And when I returned and DDT was being manufactured, the number of employees expanded because we now had two products, and I might add that the ten people that were added approximately were all added in production. So the production force may have tripled or quadrupled.

MR. CONNOLLY: Would it be fair to say that as each new product was added, personnel was added to produce that new product?

THE WITNESS: Yes, that would be fair, yeah.

Koved

I would also add that at no time do I recall more than three products being manufactured at the same time.

Q. If the people involved in production increased as a result of each new product, did the number that were involved in, say, maintenance or accounting remain the same?

A. Well, I might -- I might add that not only were employees added as the number of products expanded, but that it expanded with the volume of business that we did, the amount of production.

Q. The production employees, this is?

A. Yes.

Q. Okay.

A. And a number of additional departments were created because the volume of work and the production people could no longer keep track of shipping and receiving or maintenance, and so forth, so a maintenance department was created, and a shipping/receiving department was created, and the laboratory staff was expanded.

Q. Approximately how many people would you say on average were there in the maintenance

department?

A. On average, during the height of the business, twelve.

Q. What were their responsibilities?

A. Fabricate new equipment, install new equipment, maintain existing equipment.

Q. Who was responsible for cleaning the facilities or the equipment?

A. The production people. When there was time, you know, in the production schedule, the designated leader of a shift, or shift foreman. We will call him the shift foreman at this point because it was the shifts increased from two to about five. So there was a designated foreman, but he worked like everybody else did, and whoever had the time would hose down the floor or whatever.

Q. How many people on average worked in the laboratory during the time that you were there?

A. Well, it started with -- I'm smiling. It started with perhaps Ben Rothberg tinkering in the laboratory -- tinkering. The laboratory was a very crude bench.

Koved

And then the designated shift chemist, if he had time, would under the instruction of Ben Rothberg do some tinkering? It was not chemistry of a research nature. It was chemistry of a development nature. In other words, how to improve the quality of the product or increase the yield.

And then at some time -- indeterminate time, a research director was hired by the name of Jacob Rosin, R-O-S-I-N. And I would guess he was hired probably in the 1948-1950 period, and gradually people were added to his staff until the laboratory had ten people.

Q. How about the shipping department, what was the average number of people that were involved in that and when did that become a separate office?

A. Well, I'd say that started about 1946 when they went into DDT production, which was very labor intensive, so the shipping/receiving department added about -- starting with a few probably went as high as eight people, whose responsibility was to move packaged raw materials and finished goods, either in drums or bags, or

load trucks or unload trucks.

Q. Was the shipping department separate from the sales department? Was there a separate sales department?

A. Separate what?

Q. Sales department.

A. There was no sales department unless it was someone in the office. I might point out that the company had -- what are you scratching there? It's furious.

The firm, when I joined it, I believe I indicated it was private but it had silent partners. One of those partners was purported to be R.W. Greef, G-R-E-E-F, a chemical broker or brokerage in Manhattan, and it was my belief that they handled the sales.

Q. What other persons would be characterized as management other than Pincus Rothberg and Benjamin Rothberg, if any?

A. It was a closely-held company. In other words, the decision-making was entirely in the office. There were no other technical people in the office, although there was a business manager/bookkeeper and a whole range of

Koved

business people. Possibly totally about six or seven, including secretaries.

Q. That would include accounting people as well?

A. Yes.

Q. During your employment with Montrose, did you supervise other people in the production process? Let's limit it to that.

A. I would say so, yeah.

Q. Can you think of any people that you supervised? Can you recall the names of any people that you supervised?

A. Well, I can -- not too many. I can remember some first names.

The only one I can remember -- recall, and it's because someone recently jogged my memory, is someone by the name of Oscar Randall.

Q. Can you think of -- is that all of the people that you can recall?

A. At the moment.

If I were to engage in conversation with someone I knew at that time and we threw names back and forth probably it would start to surface in my memory, but at this point I can see

some faces, but I can't attach any names to them.

Q. Can you think of the names of any people who held the same type of job that you did that you may not have supervised?

A. Yes, I can.

Q. Can you tell us some of those?

A. Sure.

At the point when we had about forty employees and were making three products simultaneously, we had possibly five men on each shift of which two were foremen and most, but not all, had degrees, and the names were Manny Kimmel, K-I-M-M-E-L, Jimmy -- James Friedman, Kelsey Brown, K-E-L-S-E-Y, George Cook, C-O-O-K.

At this time, that's all I can recall.

Q. Do you know --

A. Obviously, that's not six, but there are people that came and went.

Q. Do you know where any of these people are now?

A. Kelsey Brown is still around, but I only know of him -- I only have secondhand knowledge.

MR. CONNOLLY: If you have an idea

where they are, you know -- well, to your best --

THE WITNESS: Mostly they all live in Newark.

MR. CONNOLLY: To your best recollection.

THE WITNESS: Well, I can say that Jimmy Friedman is dead.

Manny Kimmel, is still alive, and he lives in Iselin, New Jersey.

Oh, yeah. I might add to -- pertinent to not this immediate question but a previous question, the person who headed the shipping and receiving department was Seymour Shiffman, S-H-I-F-F-M-A-N, and as an employee he proceeded me and he was there when I left.

Do you want to know where he is?

Q. If you know.

A. Vaguely.

He was with the firm when Sobin bought it and dissolved it, and in good conscience, Sobin sent him to another facility, gave him a job in Louisiana, and that's as much as I know.

Peter Lewesky was also there when the

company was discontinued; Peter Lewesky being the production manager. And again, Sobin sent him to a plant, gave him a job somewhere on Lake Erie producing chlorine. Sobin had chlorine plants on Lake Erie.

MR. CONNOLLY: Is that in upstate New York or --

THE WITNESS: I'm thinking of the geography. I would say upstate New York. Horrible climate.

MR. CONNOLLY: I've got to agree with you there.

THE WITNESS: I mean if you know anything about chemistry, chlorine is an outdoor plant because of the fumes, and you're subject to all kinds of weather.

And the head of the maintenance department for as long as the maintenance department existed was a man by the name of John, in parentheses, Scottie closed parentheses, Hyman, H-Y-M-A-N, who was a Scotsman and lived in Kearney, New Jersey, where all Scotsmen live.

Q. When they're not in Glasgow?

A. Um hmm.

Q. You said that you left the employ of the Montrose Chemical Company in 1971?

A. That's correct.

Q. What motivated you to leave the company?

A. An invitation to leave, discontinuance of salary.

Basically, at that point, as I recall, the company was part of the conglomerate headed by Chris-Craft, and in order to survive -- the company income for whatever reason was way down and couldn't sustain the work force of that size, so they cut the work force by about two-thirds, and I was one of those people. After twenty-eight years, it was a shock.

MS. HICK: I would like to have that marked as Exhibit 3.

(Whereupon, Exhibit 3, Letter from Mr. Koved to Dr. Richard Goldstein dated June 9, 1993, one page, marked for identification.)

MS. HICK: We'll take a brief recess.

(A brief recess was taken at this

time.)

BY MS. HICK:

Q. I want --

A. May I say something prior --

Q. Yes.

A. A thought I had on the way to the john or coming back.

To demonstrate how closely operated the plant was, in that the owners in the person of either Pincus or Ben Rothberg were ever present that Ben would regularly, several times a day make tours of the plant to be certain that everyone was working.

There was no question of that, but he would also look in trash bins and if something was in the trash bin that he felt still had use, he would pick it out with a stick and bring it to someone and say, why is this in the trash bin or whatever or if product -- I mean if product was spilled, to the best of our ability we'd pick it up and put it back in the tank.

That the people who worked in the plant were totally responsible, could be -- an example would be, in one instance when I was walking

through the plant and I passed a leaking pump and Ben Rothberg was ten paces behind me and he saw the leaking pump himself, he would take me to task for not having repaired it on the spot.

And all of us walked around with tools in our back pockets to do the small repairs that were necessary.

So that the family, I might say, had very tight control of the operations.

Q. Okay?

A. Okay.

Q. This has been marked as Exhibit 3.

(Ms. Hick handing to the witness.)

Q. Do you recognize that?

A. I do.

Q. Can you tell us what it is?

A. Well, evidently in 1983, the date of the letter, or just prior to it, there was much news in the daily papers about dioxin contamination on Lister Avenue and in the vicinity of the plant that was owned by Diamond Shamrock. And inasmuch as Diamond Shamrock, which was located at 80 Lister Avenue was not the sole producer of 2,4-D or 2,4,5-T it may not have

been the sole perpetrator, at least at that time. I felt that the attention to the problem should be extended to include Montrose Chemical Company, because during some of the period of Diamond Shamrock's production of the two chemicals, Montrose produced it as well.

And in the next to the last paragraph, I give my reasons for bringing this to the attention of the authorities. The two reasons were that the 120 Lister Avenue site be investigated in its own right and not as an adjunct to the investigation of Diamond.

My second reason was that the newspapers carried information to the effect that there was some concern about the employees of Diamond Shamrock having been exposed to a chemical that was -- is a known carcinogen, of which I had not been aware prior to the newspaper stories, and I felt that a medical evaluation of the long-term Montrose Chemical Company employees should be done as well.

Now, this letter is written to Dr. Goldstein, the health commissioner, and -- because his name was prominent in the newspaper

stories. However, prior to writing this letter, I called EPA, Region II in New York City and was told by the person I spoke to that it was not in the jurisdiction of the federal agency but was a state matter.

I tried calling the state, and I couldn't get anyone to listen to me, so I wrote the letter.

However, this is one of two letters. I don't know if the other letter was written before this or after this, but they were written with about a two-month interval between because I received no response to the first letter, whichever was first. Neither did I receive a response to the second letter, so what I did was make copies of the two letters and with a cover letter, send it to the then governor by registered mail.

Then I got a telephone call. I don't know who I spoke to, but the individual who called me was very focused on dioxin, which he assumed was in a -- in still bottoms.

And the fact of the matter is, with the Montrose process for making 2,4-D, 2,4,5-T and

related products, there were no still bottoms.

I do not know the production method that Diamond Alkali used.

His questioning on the telephone focused on still bottoms, and he wanted to know where they were at that point in time, and my answer was, I don't know where they are, and he lost -- immediately lost interest.

And that's where the matter stopped.

Q. I'd like to ask you about some of the waste from products that you list in this letter.

You mentioned that the first product that you worked on at the Montrose Chemical Company was Tricresyl phosphate?

A. Yes.

Q. I think you state in this letter that it produced chlorinated Tricresyl phosphate; is that correct?

A. No, I don't think I say that.

(Perusing.)

May I read this?

Q. (Indicating.)

MS. BIRRELL: (Indicating.)

A. Oh. Well --

Q. Do you want to take time to review that letter before we talk about it?

A. I see it now. I say that's an error. It's not a typographical error. It's just an error of thought.

Q. So Montrose did not produce chlorinated Tricresyl phosphate?

A. No, no.

Q. Okay.

Is Tricresyl phosphate abbreviated as TCP?

A. Yes.

Q. Could you go through the process of making TCP with us and what your familiarity is with the production?

A. Sure. Yes.

Tricresyl phosphate, which was the one and only product produced by Montrose when I joined the firm, was a key product in the war effort. And when I went to work for Montrose, I had a one-year deferment, but I went into the Army anyhow.

It was -- it was very important to the war effort. It was made from two raw terms,

Koved

cresol and phosphorus, P-H-O-R-U-S-- I'd better take that back. I think I lost track. Phosphorus, P-H-O-R -- I'm sorry. Let me write it down.

Okay. P-H-O-S-P-H-O-R-U-S. Phosphorus oxy, O-X-Y, chloride, C-H-L-O-R-I-D-E. Oxychloride being one word.

It is made up of the elements of phosphorus, oxygen, and chlorine.

Phosphorus oxychloride and cresol were mixed in a reactor in the correct quantities and a catalyst added to promote the reaction.

The reaction proceeded at a temperature ranging from about 180 degrees centigrade to 225 degrees centigrade, and the reaction caused the liberation of hydrochloric acid gas.

The reaction was assumed to be complete when there was no more hydrochloric acid gas released.

Now, the hydrochloric acid gas was conducted by lead pipes to an absorber which contained a measured amount of water -- city water, and the hydrochloric acid gas was absorbed in the water making a hydrochloric acid solution

of an approximate concentration of 32 percent.

The hydrochloric acid gas was not intentionally liberated into the atmosphere, but there were leaks.

When the reaction was complete, it would be blown out of the tank. In other words, we didn't use a pump. We just put pressure on the tank and opened the bottom valve and the liquid would be pushed out, very hot liquid.

Q. Which liquid is this now?

A. The Tricresyl phosphate crude, and it would be mixed with water, which was a lot of steam attendant with it, as one can imagine, in order to cool it down. It was a liquid that is immiscible, I-M-M-I-S-C-I-B-L-E -- immiscible with water. In other words, much the same as oil -- it does not mix with water and is slightly heavier than water, so if there were two layers, it would be on the bottom, be pulled out of the tank in which it was mixed with water and placed in 1,000 gallon open-topped tanks, which were referred to as wash tanks.

We had four of those, steel -- mild, M-I-L-D, steel, and then the operator would

proceed to give a batch, and if there were four tanks, there were approximately four batches at a time in various stages of purification being worked at the same time. And the operator would add an equal amount of water and variously -- the first washes would be to remove the acid of the -- that had remained with the TCP, and it was washed till it was neutral. And then the wash -- a few washes following, two or three, would be alkali washes to remove unreacted cresol. And then there would be an oxidizing wash, which used either sodium peroxide initially, and then through some laboratory work found that potassium permanganate was used to oxidize. It was done in an aqueous medium, mixing it with the TCP, the purpose being to reduce the color, which was initially lemon yellow, and the lighter the color, the better price they could sell it for.

And then there were some other washes -- water washes, alkali washes, until we achieved the lightest color that was possible.

The water went to the sewer, water of different pH's, water containing a variety of dissolved chemicals.

Koved

Q. Let me clarify.

The water from all of these washes went to the --

A. Sewer.

Q. -- sewer?

A. Processed water.

Q. Another point of clarification, when you say that it went to the sewer, that was a sewer that was hooked up to the city sanitary sewer, if you know?

A. I don't know.

It -- our sewers came together -- most of them were surface troughs, so if there was any spillage, it could be squeegeed into the trough, and so was the process water conducted to the troughs.

And there were -- there was a network of troughs around the plant, and they all -- they didn't all come together. They would join one another, and I know in a general way the configuration of the troughs, but eventually, went underground -- and for a short distance and emerged in what we refer to as a sewer box, which was a four-foot diameter wooden containment that

Koved

was sunk into the ground to receive sewage or process water, and it included -- the sanitary waste from the office building all joined in the sewer box, which was approximately ten feet from the north margin of Lister Avenue, and it went in the direction of Lister Avenue.

I don't know what was under Lister Avenue or where it went.

Q. But at the point of the sewer box, it went off-site, it went off of the Montrose facility?

A. Well, it went in the direction of Lister Avenue. There wasn't enough space for it to make a turn because there was also a railroad track that went just outside of our property line and along the north side of Lister Avenue.

Q. Okay.

MR. RICHMAN: Storm water would also go into these open conduits?

THE WITNESS: Yes.

Q. I'd like to go back and ask you to fill in some information on the process of manufacturing TCP.

You mentioned that cresol and

phosphorus oxychloride were the two raw materials that went into production of the TCP.

Do you have any information about the purity of either of those raw materials or --

A. Yes.

Q. -- or the brand names?

A. Well, phosphorus oxychloride was usually manufactured as a relatively pure compound by a firm that was basically in the chlorine business, which included Diamond Alkali. We may have purchased it from Diamond Alkali.

We purchased it in railroad tank car quantities, and we had storage facilities on-site.

I cannot with authority tell you who we purchased it from, but it's a matter of record. It's no problem. It's a relatively esoteric chemical for which there were not that many manufacturers.

Cresol, on the other hand, comes from two sources. It did at that time. It came from either petroleum or from coal, and was a somewhat pure product -- and I'll explain that in a moment -- that was distilled either from petroleum or

coal.

When it was distilled from coal, what was left was coke. So it was a coking -- a product of a coking process.

Now, the steel industry uses a lot of coke, and the steel industry as a byproduct produced cresol.

Cresol produced from coal was relatively pure or had fewer impurities of an obnoxious nature.

Cresol produced from petroleum had many grades, depending on the quality of the crude.

Now, it is a public fact that there is clean coal and clean petroleum and dirty coal and dirty petroleum. The difference being sulfur and how the resource was formed when -- in the distant past. Because the better cresol from either source made a better product, an attempt was made to use only that.

We were offered cresol from Kopper's Chemical, which produces coke, and coke was a heating fuel at that time for homes, whatever, and we would buy cresol from U.S. Steel and Richfield (phonetically) Oil, and we even

purchased cresol from Britain.

Now, the way it usually went was the cresol vendor would send us a sample, a gallon sample, and we would make sample batches in the laboratory, and I participated in that work. And our sole investigation was not what the impurities are, but whether it would make a good product. And economic laws dictate that the poorer quality cresol is cheaper, and so in some cases we would make an effort to take the cresol that was not of great quality and to subject it to what we considered would be a purification step, and sometimes it worked, but most often it didn't work.

And so for the most part we bought cresol that either could be treated to be acceptable or was acceptable right off.

What the impurities were, I don't think anyone at the company identified because our sole interest was in producing a product that was saleable.

Q. Okay.

A. I want to say one more thing, if I may. There are three forms of cresol; ortho, meta,

para, and they -- the three types refer to the juxtaposition of the two active groups on the benzene ring. And I won't go into detail on that, but we recognize that there are three types.

Orthocresol is recognized as if ingested into a living creature would cause -- would attack the nervous system and would paralyze, so a specification of purchase was that the cresol we purchased would be a mixture of meta and para and contained a maximum of 5 percent ortho, which at the time was considered accessible. Not accessible.

MS. BIRRELL: Acceptable?

THE WITNESS: Acceptable.

A. And we did not analyze the cresol for the proportions of the isomers, but we would accept what was termed in the trade as a Certificate of Analysis.

In other words, the shipment was accompanied by a certificate that said that the maximum quantity of ortho was within the desired range.

Q. How did the cresol come in to the

facility? Was that tank cars as well?

A. Well, as I indicated, it sometimes arrived in tank cars, occasionally in tank wagons, frequently in drums, and the drums would be stored in the yard and occasionally -- for long periods of time and occasionally corroded to a condition of leaking.

Q. Was the phosphorus oxychloride also stored in the yard?

A. It was, as a matter of fact, but it happens to be a terribly corrosive dangerous chemical, so it was stored in the yard simply because there would be sufficient ventilation around the tank, but it was protected from the weather because it was in sealed tanks.

Q. What color was the cresol that went into this process?

A. Well, the very good grade would be slightly off colorless. A very poor grade would be amber, dark amber.

Q. What was the phosphorus oxychloride like? Was that a powder, was that a liquid?

A. No.

I can describe it as a heavier than

water clear colorless liquid that if inhaled would give the symptoms of edema. It was tremendously corrosive to the mucous membranes. It even put a person who inhaled it into the hospital.

If it -- if there were vapors in the air and an individual passed through the vapor, the mucous membranes and your eyelids would be severely attacked, so that your eyelids felt that they had sand in them, and it was terribly painful. If it touched the skin, it would immediately raise enormous blisters and destroy the skin that it touched. It was handled with care.

Q. So you essentially had two liquids that would be put together in this reactor.

What were the approximate ratios of each and how were they put into the reactor?

A. Well, they were combined in stoichiometric, S-T-O-I-C-H-I-O-M-E-T-R-I-C, quantities, which means that for each phosphorus oxychloride molecule there were three cresols, because it formed Tricresyl phosphate.

MR. RICHMAN: You had it in tank cars,

you had it in barrels?

THE WITNESS: No, no barrels.

MR. RICHMAN: When you actually put them into, I assume, a hopper of some sort or into a tank, how was that tank specifically --

THE WITNESS: Okay, I'll explain that.

A. The cresol was measured in what we call the charge tank, which was approximately 500 to 800 gallons with a sight glass and from whatever source the creosol would be pumped into it to a line in the sight glass. The line was not absolute because the quality of the cresol varied. And if it was poor quality, we needed somewhat more cresol and very good quality, somewhat less. But within a very narrow range in the sight glass.

The phosphorus oxychloride was moved in a unique way because it was so extremely corrosive and dangerous to handling it, so the two storage tanks were connected to what we call a blow case by an underground line, and then -- the blow case being a small underground steel vessel. And the storage tank valve was open, and

it would flow into the blow case, the blow case being a vent -- being a line that ran up to the roof of the building, okay. So that the amount of liquid in the blow case was more or less fixed, it wasn't exact.

Then the storage tank valve would be closed and a valve opened that connected the blow case to a tank on the roof that was, oh, let's say, three, four hundred gallons. And that tank -- what we moved by using compressed air, or actually we used a cylinder of carbon dioxide to put pressure on the blow case. When the liquid moved up the line and into the tank on the roof, the tank on the roof had a level control that was always the same. It was never varied, so that the cresol would be varied, but the phosphorus oxychloride never varied.

The bottom of the tank had a small pipe connected to it that looped around (indicating), and then ran back to the storage tank, so that when you blew up a charge which exceeded the capacity, the overflow would go back to the storage tank untouched by human hands. No mechanical devices.

Then that charge would be transferred to the reactor by opening a valve on the bottom of the tank on the roof, and it would run into the reactor.

And it was as simple as that.

Q. What color would the mixture of cresol and phosphorus oxychloride be?

A. I never looked. It -- you know, everything was sealed. If I did it in the laboratory, it would be somewhat lighter amber than the color of the cresol because it de-lighted by a colorless clear liquid, so it was intermediate color.

Q. What was the catalyst that went into the reactor?

A. The catalyst initially was zinc chloride that came in pails, and it was measured by scoops.

Q. What color --

A. A scoop being approximately five pounds or something like that.

And as I recall, initially we used fifteen pounds of zinc chloride to make a 500-gallon batch.

Koved

It was later thought -- at least the word came down that perhaps aluminum chloride would be better, and aluminum chloride was better insofar as much smaller quantity was used, and it was about three pounds, and the reaction started at a lower temperature than with the zinc chloride and proceeded much more rapidly.

Q. Was that also put in by scoop?

A. Yes, there was like (indicating) what we call a handhold, take a plate off the top of the reactor and you scoop out what you need and throw it in.

Actually, we measured it into a bucket on a scale so we were fairly accurate, but it was observed that the reaction was a little too rapid and not that controllable, so what we eventually did was use a mixture of zinc chloride and aluminum chloride. That gave us the right rate of reaction, because if it reacted too rapidly, pressure of hydrochloric acid gas would build up, and it became a concern.

MR. RICHMAN: You were afraid it would rupture?

THE WITNESS: Well, not really rupture.

Maybe it would spring a leak on the transfer lines.

The transfer lines were lead pipe that was, depending on the use, either an inch or two inch in diameter. And lead is pliable. And while it presumably resists corrosion of the acid, there's a certain amount of reaction going on. And just like if you had a piece of steel and you got rust on it, the combination of iron and oxygen, it would stop, but if you touched it and the rust fell off, then it would start all over again, so you lose more steel. And this is essentially what was happening in the pipes. And while I never recall a pipe being corroded through, it would cause leaks.

Q. Approximately how long would the reaction take place?

A. I'd say about three or four hours.

The reaction -- if one heated it rather rapidly, it would proceed almost instantly, but we controlled the heating so that it was manageable.

MR. CONNOLLY: Were the leaks -- did

the leaks that occurred occasionally -- what effect did that have on the plant floor? Was it continually --

THE WITNESS: There was always from one place or another leaks of hydrochloric acid.

Hydrochloric acid was almost always in the air, and it attacked everything. Everything was mostly metal -- mostly iron, and it attached the iron. And after a while, we'd have to replace the pipe supports and whatever because they were just chewed up.

That was the main job of the maintenance department, replacing structural steel.

Q. In the wash process, were the washes always liquid based, or did you put any powdered chemicals into --

A. Well, as I indicated, there were some powdered chemicals that were the oxidant reducing color of the product, and the oxidant, because it was an aqueous wash, dissolved in the water. They were all soluble in water.

But in the oxidation process, the nature of the oxidant changed, so it became

something else, and permanganate became manganus and so forth.

Q. Do you have an idea of what the color of the raw TCP liquid was?

A. I would say yellow, medium yellow, dark yellow. Not amber.

The finished refined -- oh, it ranged from almost colorless to lemon yellow.

Q. Were there any other notable color changes among the wash process?

A. Well, the wash process, whatever form it took, was to reduce any raw materials that persisted. There was an excess of cresol.

In a chemical reaction, there is always -- when I mention stoichiometric quantities, it's close to it but never identical, because to favor the reaction, there was always a slight excess, up to 5 percent of whichever was the cheapest raw material because that eventually was wasted. It went into the processed water and out.

Q. That's what I want to talk about next, the waste along this process and any byproducts.

Now, the HCL gas went into a solution

with water.

A. (Witness nodding.)

Q. What was done with that solution?

A. Well, we had no use for it, and because of the nature of the source, the reaction, it had a certain amount of contaminant in it, which was traces of cresol and maybe even traces of phosphorus oxychloride. And because of the nature of the pipes that conducted it to the point where it was made into solution, it had some metals that it picked up along the way?

So in essence, it was what was referred to as technical grade or industrial grade, so that in essence, it was relatively useless to be used by other firms that might have employed hydrochloric acid solution and a production process, so it was sold to a trucker, I believe directly, but I may be wrong, who would transport it to a metal working shop of one type or another to pickle metal -- in other words, to clean it up -- prior to electroplating or welding or whatever they did. It was used to clean up metal.

We would sell -- we would accumulate in

the storage tank -- HCL was absorbed in a tank and then transferred to a storage tank where it was held for the trucker to pick it up, who picked it up, I would presume, based on his sales. And again, I say I don't know for certain that it was sold to the trucker or to the ultimate user, but whatever, we would ship approximately 12- to 1500-gallon quantity at a time. What didn't sell -- and we had excess byproduct production -- went to the sewer.

Q. On the other side of the process relating to the washes of the raw TCP, you said previously that all of the those washes went into the troughs.

What trace contaminants might you expect to find in those as a result of the cresol phosphorus oxychloride reaction?

A. Well, you would find sodium cresylate, which is a reaction between sodium hydroxide and cresol, which physically changes from a water insoluble state to a water soluble state.

You might find some trace phosphorus compounds.

You might find copper, because your

reactor was copper, and the reaction would chew away at it until every so often it would spring a leak, and we'd either try to repair it or we'd buy a new vessel.

Q. What kind of reactor was it?

A. It was copper. It was a horizontal, thousand-gallon vessel, oh, maybe -- oh, about three to four feet in diameter and about eight feet long.

Q. Did it have a brand name?

A. No. They were manufactured to specification.

Q. Do you have any documents relating to this process at all that you have among your documents?

A. I -- first of all, I didn't have any access to any documents, and secondly, I had no interest in them.

Q. Approximately what years during your employment was TCP manufactured?

A. During the entire time.

Tricresyl phosphate has many uses, and we were probably one of the chief producers, so there was always sales potential.

Koved

Q. You said earlier that this was done in a batch process?

A. Um hmm.

Q. How frequently were batches run?

A. Um, we operated around the clock. I would say about one and a half batches per twenty-four hours.

MR. CONNOLLY: How was the wastewater separated from the product after the wash?

THE WITNESS: Oh, well, that's also a clever device.

When the wash was in an aqueous state and the TCP was at the bottom, there was approximately -- there was a two-inch pipe that went through the side of the vessel.

Now, you visualize it. It's like a vat. It's like about eight feet in diameter and about ten feet tall, and that would be -- with a slightly conical or dished bottom -- a round bottom. And there was an outlet on the bottom which had a valve on it. And the batch would be brought into a wash tank from the initial cooling down process with water, and it would be pumped into one of the

vessels until -- and the line bringing the material into the vessel was about eye level or slightly lower than eye level of the operator.

The operating platform was about five feet off the ground, and there was a catwalk that ran along the tanks and had a railing, and the operator could reach all the valves that were associated with the tanks and everything else.

The crude was brought into one of the vessels, and that vessel, probably one-third distance from the bottom, had a two-inch pipe that passed through the wall, okay, and the inside of that pipe had a couple of swing elbows -- and it was two-inch pipe -- and attached to those elbows -- elbow was a pipe that ran almost across the tank with an elbow turning up (indicating), okay. The outside of it was connected -- ran down the side of the tank into the sewer, okay.

Now, after a batch had received a wash and the water was laying on the top, the far end of this pipe had a chain on it similar to

a chain that they used to use in window sash cord, metal chains with hinges, small hinges, and the operator would let the pipe down until it was below the water, but the pipe had now about a 45-degree upward cant, so that once it got below the water, the water would start running into the pipe through the wall of the tank down to the floor, and to the trough, to waste, okay.

Now, the wash waters were generally clear. This may have been brown or yellow or colorless, but they were clear, so he could always see the far end of the pipe, and he would let it down by notches until it got close to the level of the TCP, and then it would stop.

I have to amend what I said. The water did not run on the ground into the trough immediately.

The water that was taken off each wash ran to what we call the trap tank, which was a wooden tank about four feet high and about twelve or fifteen feet in diameter. And in the center of that tank, hanging from the

top, the pipe ran across the middle -- it's intersecting the center of the tank. And from that pipe hung a sheet of lead, and that lead sheet went down to within about six inches of the bottom of the tank. So the water went into the tank on one side of that sheet of lead, and on the other side, directly opposite the inlet, was an outlet near the top, an overflow, okay.

So as a consequence, that tank was always full of water, but the TCP that was entrained in siphoning off the wash tank would entrain -- certain particles expended TCP, and when it entered the tank, in order to get past the baffle, it would have to go under the baffle, and then going under the baffle -- and then the water coming up again on the other side, it would encourage the TCP, which was heavier, to stay down. It would coalesce with whatever TCP was there.

And by observation every so often, we saw that the level of TCP gradually increased, so when it got to a point where we wanted to recover it, we'd pump it out and

put it in one of the wash tanks.

I might add that it was very poor quality, so it would end up in a somewhat colored product when we tried to clean it up, and so what we would do, we'd blend it off with good product in small quantities and, create good product out of it.

MR. CONNOLLY: That process where the skimming process was, how exact was that? Could there be occasions when they would go below the water level and pump TCP up?

THE WITNESS: Yes.

MR. CONNOLLY: Did that happen on occasion?

THE WITNESS: Yes, but the trap saved it. We never lost anything. We lost -- I wouldn't say we didn't lose anything.

There is always a degree of entrainment, and depending on how many washes were going through that trap tank at one time, it stands to reason that the greater the volume per unit times the more was entrained and taken out, but generally, it was pretty efficient. Not perfectly

efficient.

Q. Did the process for manufacturing TCP change during the time that you were there other than you've told us that the catalyst was changed from zinc chloride? But were there any other changes?

A. Yes.

There was no product that we made that was not changed on a continuous basis, because part of the research that was done was to make -- improve the quality and improve the yield, the efficiency. But that the changes were not that -- of that magnitude that it would in any way change either byproduct or waste or anything else, you know.

The changes were essentially using more or less of an oxidant or different temperatures, different sequences of the washes. You know, there was constant attempt to improve.

Q. Okay.

You said a few minutes ago that you estimated that there were approximately one and a half batches for twenty-four hours?

A. Right.

Koved

Q. And you also said that the reaction took place in a thousand-gallon vessel.

Can I deduce from that that there was approximately a thousand gallons that were generated from a batch or --

A. No, 500 gallons.

Q. Five hundred, okay.

A. The reaction was too violent for a full vessel. We wouldn't have the vessel.

Q. Okay.

A. It's just that much -- you know, basically an explosion is the production of a lot of gas in a short period of time. We were producing considerable quantity of gas, and there were limits to how fast we could do it or the capacity of the tank. The reactor is never full, any reactor of any type.

I would say the batches were approximately 500 gallons, and we used one-thousand-gallon wash tanks, of which 500 gallons was a batch and approximately 500 gallons was the water.

Q. All right.

On Exhibit 3 you state that 2,4-D was

produced --

MS. BIRRELL: Can we take a break?

MS. HICK: Hold the record.

(Discussion off the record.)

MS. HICK: All right. We'll break for lunch now.

(At 12:15 p.m., a lunch recess was taken.)

Koved

A F T E R N O O N S E S S I O N

(Time Noted: 1:35 p.m.)

S O L O M O N H. K O V E D, resumed and testified as follows:

CONTINUED EXAMINATION

BY MS. HICK:

MS. HICK: Could you read back the last question that I asked?

(Record read.)

Q. To step back for just a minute and just as a wrap-up to the TCP discussions that we were having before lunch, Mr. Koved, do you recall saying that the reference that you had to chlorinated TCP on Exhibit 3 was incorrect?

A. That's -- yes, that's true.

Q. Is there any chemical called chlorinated TCP?

A. I'm not aware of it. And from a structural point of view, I believe there would be no point for making the product. I can't imagine that it would have any industrial usage. I know of no incident of chlorinated Tricresyl phosphate, and I believe it does not exist. And my only explanation is that when I was typing, I

may have been distracted while typing that phrase and typed it erroneously, and I never noticed it before, until it was called to my attention.

Q. Chlorine is used in the process of manufacturing TCP, though, isn't it?

A. Well, no, not per se. It exists as part of phosphorus oxychloride, but does not participate in the reaction. It's a byproduct of the reaction, and the reaction proceeds because the hydrochloric acid is removed and never at any time is part of the final product.

Q. Okay.

In looking over the letter now, are there any other changes that you would want to make to that letter?

A. Well, to the entire letter? I've read it twice since we reconvened and nothing immediately comes to mind about the letter that needs a correction except hexachloride and benzene hexachloride is misspelled.

Q. Okay.

A. Which proves that I was somewhat distracted.

Q. All right.

Koved

Now I'd like to ask you some questions about the manufacture of 2,4-D at the Montrose facility.

A. Yes.

Q. 2,4-D is an abbreviation for 2,4-dichlorophenoxyacetic acid; is that correct?

A. Yes.

Q. Could you tell us about your knowledge of the production of this? I guess as a first step, is this one of the processes that you were involved in?

A. Yes.

Q. What were the raw materials that went into the product?

A. Um, there were three principal raw materials: Phenol, P-H-E-N-O-L, chlorine and chloroacetic acid.

Q. Can you tell me about the -- again, the purity or the brand name of these raw materials?

A. The raw materials.

Chlorine, we were very big purchasers of chlorine, and we purchased from a number of different firms. Among them, Diamond Alkali and Hooker Chemical, and I'm sure there were others.

Koved

There were a number of chlorine manufacturers, and that's a matter of record.

We purchased phenol as a relatively pure product, but I couldn't say from whom.

And the chloroacetic acid was a pure product, and I don't know the supplier or if there were more than one supplier.

Q. Okay.

Why don't you take us through the process of how it was put together and what the byproducts were?

A. Well, in the reactor, a charge of phenol was introduced, and it had a volume of approximately 500 gallons. I'm not certain exactly how many.

The temperature was elevated to possibly a hundred degrees centigrade, and I'm not certain of what temperature that the reaction took place and chlorine was introduced.

It had been determined in a research laboratory that the absorption of chlorine could be measured by the specific gravity of the reactant or material removed -- small amounts of material periodically removed from the reactor to

track the progress of the chlorination.

It was determined in advance exactly what the specific gravity would be when the phenol was optimally chlorinated, and by optimal chlorination I mean that virtually all the phenol had been converted to 2,4-dichlorophenol, or in the manufacturer of the other product, 2,4,5-trichlorophenol.

You have to understand that the reaction is not that straightforward, in that chlorination proceeds until all the phenol is gone and all you have is dichlorophenol.

At the optimum point, I'm sure there are phenol, monochlorophenol, trichlorophenol and tetrachlorophenol in varying amounts, but all of a quantity that was acceptable.

Q. What do you mean by "acceptable"?

A. Well, acceptance is based on how much final product you get. So if you started with a hundred pounds of phenol and you wound up with -- you would expect to wind up with, let's say, a 120 pounds of 2,4-dichlorophenoxyacetic acid, and that's the theoretical, calculating it on paper. But, in fact, you wind up with 110 pounds or

105 pounds or 100 pounds, and the acceptance is based on the fact of a purity of the final product and whether or not you're going to make a profit on your investment.

Q. Was the 2,4-D purified --

A. Yes.

Q. -- to eliminate these other isomers -- not isomers. What's the word I want?

A. Yes.

Well, they're isomers or derivatives. Derivatives would be a better word.

Q. Derivatives.

A. You have to understand that we're not talking about pharmaceuticals, okay, and a product that's 98 percent or even 93 percent or even 90 percent pure will do the job, and the effort to raise the purity from 90 percent to 98 percent makes it unprofitable.

So if, let's say, a farmer purchased 2,4-D as a herbicide to kill weeds and it killed the weeds in the manner which he expected and which was of reasonable cost, then he didn't care what percentage it was or what other compounds were in it.

Koved

Q. What level of purity was the aim for the production process at Montrose?

A. I have no idea. I have no idea. Basically, the purity would be based on industry standards.

In other words, if a product was manufactured at, let's say, 90 -- 92 percent purity and purity wasn't really an issue, not much investigation was given, but -- and a competitor came up with 94 percent, and then so we would make an effort to meet that challenge, and so it went.

But as I indicated, the issue of purity frequently didn't enter into it, particularly in an industrial chemical.

If it was something that would -- might eventually reach the consumer, then color and impurities and so forth became an issue, but if it was used industrially or agriculturally or whatever, or even militarily for that matter, purity was not really an issue and not much attention was given.

Q. But you did indicate that there was a purification process?

A. There was a purification process.

Q. Could you go through what that process was?

A. Sure.

Well, we didn't make the product yet. We only got as far as the 2,4-dichlorophenol.

Q. Okay.

Then why don't we finish that process?

A. Yes.

At that point -- my memory does not serve me absolutely, but that 2,4-dichlorophenol was reacted with chloroacetic acid after having been converted to a sodium salt.

What I mean by that is the dichlorophenol would be treated with an alkali, sodium hydroxide, to create a sodium salt in an aqueous solution.

The chloroacetic acid was dissolved in water, and the two solutions mixed and brought to reaction temperature.

The reaction temperature would have to be less than 100 degrees centigrade because water boils at 100 degrees centigrade.

The sodium of the chloroacetic acid

Koved

and -- no, wrong.

Chloroacetic acid was dissolved in its original form.

The chlorine of the chloroacetic acid would react with the sodium of the 2,4-dichlorophenylate, and would form salt or sodium chloride, and the two compounds would then join together to form 2,4-dichlorophenoxyacetic acid.

EXAMINATION BY

MR. RICHMAN:

Q. Is that the end of the process?

A. Well, no.

Q. Okay.

A. Basically -- at that point, the 2,4-D, as I recall -- and I'm not absolutely sure at this point -- would be isolated because it was insoluble in the water solution and formed a granular solid which was filtered, leaving the 2,4-D acid on the filter.

And all the other impurities, to what extent, I don't know, were in the water phase, and then the filtration process was removed from the 2,4-D acid and discarded to the sewer.

Koved

The 2,4-D acid was sold in that form, and depending on the demand, some of it was converted to a sodium salt and sold in that form, and some of it was reacted with a low molecular alcohol, which I'll refer -- which are referred to as esters of the 2,4-D and sold in that form.

I -- I'll carry it one step further. After the salt or the acid was isolated, it was -- well, the acid was washed -- the 2,4-D acid was washed with water to remove any adhering liquid from the reaction, and that would be the principal form of purification.

The wet solid would be dried in a tunnel dryer using hot air to evaporate the water.

The hot air then went through the dryer -- went through a bag house to remove any solid fines, F-I-N-E-S, that had been picked up and entrap them and return to the process.

And before entering the atmosphere, that air would also go through a cyclone separator, which was the last attempt to take 2,4-D out of the air.

And as most industrial processes at

that time, none of it was a hundred percent perfect, but how much escaped was not determined. No effort was made to determine that.

The sodium salt, I don't recall how that was isolated, but that went through the tunnel dryer also and dried with hot air.

The esters were liquid and inasmuch as we didn't make very much of that -- of those products, I do not recall how they were refined, and I think that summarizes the process.

Q. Okay.

If I could, I would like to go back to the beginning of the process and kind of talk about some specifics related to that.

A. Yes.

Q. You had mentioned that chlorine, phenol and chloroacetic acid were the raw materials.

Could you tell us what those raw materials looked like, how they were handled and any other kind of housekeeping details that you could remember related to the raw materials coming into the factory?

A. Okay.

Phenol is directly related to cresol

but is of a smaller molecular weight, but has similar characteristics. They each have characteristics similar to one another, except that phenol is a liquid at a temperature exceeding 40 degrees centigrade, but below that was a solid.

It would be brought into the plant in either railroad tank cars or truck tank wagons.

In either case, when loaded by a manufacturer, the liquid -- the phenol was liquid but might solidify en route, so whatever the means of carrying it, there were always heating coils in those vessels so that upon arrival at the plant, somebody would visually open up the hatch on whatever vessel to see the condition of the material. And for the most part, it was semi-liquid, partly solidified, partly liquid. And so a steam hose would be hooked up to the coil and the contents heated until it was all liquid.

I might add that phenol -- at that period of time, phenol at that period of time was a disinfectant, and as a matter of fact, in small quantities it was in many household preparations.

Koved

If anyone here is old enough, they may remember CN, which came in an orange box and had a strong disinfectant odor, and I wouldn't say it was principally phenol, but it had a fair proportion of phenol in it. It was used in hospitals in similar preparations for disinfecting the floors and whatever, so that the odor in the hospital almost invariably was phenol.

Not -- I bring this up because phenol does attack biological material and in dilute -- dilute form it works fine as a disinfectant. In the form that we handled it, it's extremely corrosive to people, whether inhaled or on their skin. If it touched the skin, it immediately raised blisters, enormous blisters, which didn't heal that well because of the damage to the tissue.

But -- so we handled it as -- with minimum of spillage, and precautions were taken so that no one would get hurt.

Occasionally, we had someone hurt as a result of an accident. It was -- the phenol was stored in two or three 5,000-gallon vertical

storage tanks, which were minimally heated so that the material would stay liquid, and a charge would be pumped to the chlorinator. And in comparison to my description of the Tricresyl phosphate operating conditions, it was not absolutely necessary to be exact on the amount of phenol that composed the charge, simply because the final product was monitored to the degree of chlorination by measuring the specific gravity of the final product, meaning not the -- not the 2,4-D, but the dichlorophenol.

Q. Okay.

Could you tell us a little more about the chlorine in the --

A. Yes.

The chlorine was -- we purchased initially when I went to work for them, it was fifteen ton tank cars, railroad tank cars, which as audacity increased and technology increased got larger and larger until they were enormous, you know.

Chlorine in the tank cars was liquefied, so you had a lot of chlorine there. Chlorine is easy to liquefy. It is a gas that's

easy to liquefy. It's something similar to ammonia. You compress it and cool it and you have liquid.

They were in sealed tank cars, and they arrived under a slight pressure, and when -- there was no need to open the tank car because in no way could we assay the purity of it. It was pure -- accepted as pure. So it arrived under some slight pressure, maybe fifteen or twenty-five pounds, air and nitrogen or something. Well, yes, and liquid chlorine would be drawn from the bottom. It had a valve. And when it came in, it was parked on a spur siding, two tank cars at a time, so our production would never be interrupted. When one emptied, the other was available.

The liquid chlorine would be -- a line was attached to the bottom where the valve was, and that line would go to a -- what we call a chlorine boiler, which converted chlorine from liquid to gas.

And the reason we needed the boiler is if left to its own, it would evaporate, but slowly.

Koved

So the steam -- basically, what it was was nothing more than a possibly four-inch steel pipe with a six-inch steel pipe welded around it to make a jacket, and then the jacket, we injected steam, and that heated the liquid chlorine entering the bottom, and gas would come out of the top.

And, of course, along the way, wherever it was necessary to attach or detach a tank car or whatever, there were valves to isolate whatever part it is.

Very rudimentary system it was, and it would -- the gas would emerge from the boiler at about fifty pounds pressure. There was a pressure gauge on top, which in chemical plant terms is relatively insignificant.

And we had several chlorine operations, two of them possibly going at the same time. One of them being chloral -- the production of chloral for DDT, and the other being the production of dichlorophenol for 2,4-D.

So we had -- and I'd have to discuss the layout of the plant, but all this chlorination equipment and the chlorinators were

out of doors because we couldn't afford to have it anywhere else from the point of view of safety. There had to be lots of ventilation.

The chlorine as a gas came out of the boiler and went to what's referred to as a flow meter and for which there was one for each vessel that was used to -- used as a chlorinator.

I could describe the flow meter and perhaps some of the people here have seen it.

A flow meter is an approximately one-inch glass tube that is tapered. It's narrower at the bottom than at the top, and the tube -- one-inch diameter glass tube, and the tube is possibly a foot in length, and it has graduations which are done at the factory where they're made.

And the volume -- the volume of chlorine flowing it -- through it would lift -- we call it a bob. It was a metal disk. And the degree of flow would afford a lift for the disk in accordance with the amount of flow, so that when the disk was at the top, it was the maximum flow.

And by initial observations we were

able to interpret the graduations on the tube in terms of how many pounds of chlorine we're adding to the batch. And all the initial investigation gave us information as to how many pounds you would need for a charge of phenol, so that an operator did not have to take specific gravity readings for the entire term of the -- of the chlorination, but only when he calculated, he approached the end of the amount of chlorine that he needed.

The flow meter had two valves on it, the gas going in the bottom and coming out the top. There was a valve at each point, so you could -- by manipulating those valves, you could regulate the flow of the chlorine through the flow meter. And so the control of the process was, A, the flow of the gas and, B, the cumulative weight of the gas and, C, the temperature of the phenol, and finally, D, the specific gravity of the 2,4-dichlorophenol.

It's a good thing I'm not writing a letter.

Q. Could you give us an idea of the color of the phenol and the chlorine?

Koved

A. Well, the chlorine is a yellow gas, and it's not a particularly obvious one. There's a yellow tint if you look through the flow meter, and the reason the flow meter is glass is so that you can see the disk that's raised, and usually we had a light or a flashlight. At night the guy would hold a flashlight behind it so we could see where the disk was, but in some cases we would mount a light in back of it.

But the flow meter, I should add, was -- encompassed a steel case, okay, with a glass in front and a glass in back. But it was sort of like a safety measure because the glass, while it was thick, it was fragile as well, you know, and they were known to explode, although we never had that experience.

Q. What about the phenol, what color was it?

A. Well, the phenol was -- if it was extremely pure when it came in, it was almost a colorless liquid. But by oxidation and maintaining it at a warm temperature, it gradually became pink and maybe even a light shade of red, which indicated it had been

oxidized by simply being exposed to the air.

The final product, the 2,4-dichlorophenol was very dark red, almost black, which would indicate there were other products.

MR. CONNOLLY: Was anything added to that subsequently to change the color?

THE WITNESS: No.

Q. That was its natural color?

MR. CONNOLLY: It stayed dark red?

A. Well, as I said, it would indicate that there were byproducts in there, which were not of concern, because they seemed not to affect the quality of our final product.

I dare say if one took a crude dichlorophenol and subjected it to distillation in the lab, it would be colorless.

MR. CONNOLLY: But nothing was added to that to reduce the color or to change the color?

THE WITNESS: Oh, no, no, no, because it was too early. Any effort to reduce the color at that point would go -- essentially go down the drain because it would get

colored all over again, and adding color to color, it's not that obvious.

Q. Let's step back just a little further. I wanted to talk about the chloroacetic acid.

A. Yes.

Q. How did that look when it came in?

A. Oh, it was a white, granular solid. It was not a powder. It was like a crystalline solid, similar to sugar. It was a relatively pure product. Anything that exists in a crystalline form is pure -- relatively pure.

Q. How was it brought in? Was it brought in by truck?

A. Well, it came in and -- it initially came in in wooden barrels, and then after a while it would come in in fiber drums which had like a plastic lining, you know, because it's very corrosive.

And I might add, I believe but I'm not absolutely certain that it was hygroscopic -- hygro with a "G" -- which means that it would absorb moisture out of the air, which in no way was detrimental, but if it started to weep, you ran the risk of getting it on your skin, and it

was very corrosive to the skin.

Q. Okay.

MR. CONNOLLY: How was the acid added to the mix?

THE WITNESS: Added to make -- to create the reaction?

MR. CONNOLLY: Yes.

THE WITNESS: It was dissolved in water.

MR. CONNOLLY: Okay.

How was that accomplished from --

THE WITNESS: Well, we had a separate tank and, you know --

MR. CONNOLLY: Was it ladled in, shoveled in?

(At this time, Ms. Hick and Mr. Richman were conferring.)

THE WITNESS: Well, wait till they finish.

(Pause.)

THE WITNESS: Basically, we had a tank for making the solution and that tank was made of wood. By that I mean it was built like a barrel, and it had loops that pulled

the individual staves together, and it had a wooden bottom. The vertical staves were notched at the bottom to receive the bottom of the tank, and the whole thing was pulled together. It's called -- the person who makes it is called a cooper --

MR. CONNOLLY: Yes.

THE WITNESS: -- and is a highly skilled individual.

We had a number of wooden tanks because wood proved to be the material that withstood corrosion. Wood stands up very well to corrosion. And we had a number of wooden tanks and other wooden devices that have stood up better than steel or whatever.

Now, we will say today wood is not used because there are other materials that have been developed, which include glassine pipes and plastics of various types. So, you know, it's a matter of economics.

Since the coopers began to die off, their work became very expensive.

Q. Okay. I'd like to move on now just a bit.

Koved

We've got the phenol, we've got the chlorine, and we've got the chloroacetic acid.

Now, you had indicated before that the phenol was introduced into the system, okay?

A. (Witness nodding.)

Q. I guess what I'm interested in is how, specifically, was that done. How was the piping set up and what size was the vat that it initially went into? How was it heated up, as you said it heated to about a hundred -- can you talk a little bit about that?

A. Sure. Sure.

The chlorinators, which were used -- which were -- they were vertical tanks of about 750-gallon capacity. And by vertical I mean they were like maybe four or five feet in diameter and about seven or eight feet tall.

And they were of a special construction, which design came from probably the Rothbergs from whatever, their previous experience, but they were manufactured specifically for us.

And what they were were -- it was a steel casing of a lead tank, and I'll just

briefly describe how it was manufactured so you'll get a visual picture of what it looked like.

You take a circle of lead, which was maybe perhaps a half-inch thick, flat, and laid it on top of a circle of steel that was, let's say, four to six inches bigger in diameter, and let's say, half inch thickness, which was enough to support the lid. And then they would take a sheet of lead and make a tube out of it, and then weld a seam (indicating). Not weld. It was called lead burning, where two pieces of lead were joined together by melting both pieces at the same time and forming a bead, and this is similar to steel welding. They would make that.

I was not ever present when it was manufactured. I saw them -- we'd go to a shop and see them in different stages of manufacture, but -- and we didn't buy that many. Maybe during the whole term of the existence of Montrose they bought ten or something like that, two or three or four being in use at one time.

This tube would be placed on the lead circle, and then lead burned all the way around

to form a seal, so now you have a tube with a bottom, and then they would do the same thing with the top -- with the circle of lead laid on top, and then lead burned around, so now you had a closed tube.

Now, concurrently you had a steel shell that was built around it to support it, because if lead stood by itself, it eventually would sag, particularly at elevated temperatures. So lead -- a steel shell was built around it.

You had a plate on the bottom, and then they built a steel containment for it (indicating) to support it, and that containment was not continuous, because the cylinder that went around the cylinder of lead was not as long as the lead itself, but maybe was -- there was a gap of six inches to the bottom and six inches to the top -- at the top, and the pieces were joined, and that was flanged with the top to the steel, and those pieces were joined by bolts that both provided support vertically, but allowed access to the burn that went around the top, the burn that went around the bottom and the vertical burn, so you had a gap of approximately six or

eight inches with the steel pieces held together by these bolts, and also providing visual access to the most vulnerable part of the lead that could succumb to the corrosion.

The top sheet of steel had a number of holes in it, and through these holes -- they would go down through the steel holes and make holes in the lead and attach pipes to it. So those pipes -- and there were a number of them with -- of lead, and some of them -- one would be for loading the phenol, one would be -- would go through the top and all the way to the bottom and it was perforated, and that would introduce the chlorine, and then there was one to carry the vapor out a vent, and of course, there was one on the bottom to empty the tank when it was done -- when the batch was done and so forth.

So that's basically what the -- and there was a coil in it to provide heat. There was a lead coil in it that came through the side of the steel, and we would attach steel lines to it and use that to heat the phenol.

Q. Could we talk a little bit about the heating system? I know you've said that the

chlorine was actually boiled, so in a sense --

A. Yes.

Q. -- you had chlorine gas coming in there at a certain temperature?

A. Right.

Well, the temperature was not of consequence, not of meaning. As long as it was vaporized, it's the only reason that temperature was not controlled.

Q. So the temperature would be -- the temperature of the chlorine coming in would be what?

A. Almost ambient.

Q. Almost ambient?

A. Yeah.

Q. All right.

So let me ask you this question: Where did you get the steam that heated your facility?

A. Ah, yes. We bought the steam, and the steam was purchased from a plant that was immediately to the rear of our property. At one time it was Swan-Finch and at another time it was Thomasett Color.

But they had the boilers to produce the

steam, not only for this plant but for others as well, and that steam was metered and we paid for it.

Q. How was the temperature within the vat controlled?

A. Um, what vessel are you referring to?

Q. Where the chlorination process --

A. Okay.

Q. You had said a hundred degrees -- approximately a hundred degrees?

A. It's a guess. I -- that's a detail I don't recall, but it was not excessive.

And how was it controlled? Well, another aperture that went into the internal vessel was what we might term a thermometer well, which was a blind pipe that goes into the vessel, and then you drop a sensor into that, and either by a dial on that sensor or a transmission line and a readout on a chart, we knew what the temperature was.

MS. HICK: Did I understand you to say just a little while ago that you weren't really sure exactly what the temperature was?

THE WITNESS: Yes.

Koved

Q. Whose responsibility was keeping that temperature at --

A. Well, each operation had an operator, and the operator had specific instructions as to temperature, rate of the chlorine flow, pressure of the chlorine and the rate, and these conditions, reaction conditions, had been predetermined by whatever work was done in the laboratory to obtain an optimum product.

Q. You had indicated that -- you told us approximately what the color was, and obviously someone had to go in and take samples to run the specific gravities.

Explain to me how that was done.

A. Okay.

Another aperture on the side of the tank was a sampling line and -- which -- with a valve on it, and let's say a little curve and opening -- a valve and -- with a vessel under it. You would collect a sample that we considered representative of what was in the tank, and that would be poured into a cylinder at a particular temperature.

Now, specific gravity is very sensitive

to temperature, and the lower the temperature, the higher the specific gravity. So the specific gravity had to be taken at a particular temperature.

And so the cylinder was immersed in some kind of oil bath or whatever, and somebody would rotate the thermometer until they got what looked like the reading that he wanted, and he would drop the specific gravity instrument into it and then read it.

Q. Can you give us a rough amount from your experience approximately how long this chlorination process took place?

A. I would guess twelve hours.

Q. Was there ever a time that you can recall when you, I guess, ruined a batch, that you had to dispose of a vat of this or perhaps you heated it too much or --

A. My recollection -- and you have to understand that I was only there eight or ten or twelve of the twenty-four hours.

To my recollection, there were no spoiled batches. I would dare say that if there were a spoiled batch, I would have heard about it

because bad news is quickly disseminated.

Q. Did you ever hear of anyone being fired or laid off because they ruined a batch of --

A. At no time. In any of the products we made, nobody was fired because of poor performance.

Probably -- well, most certainly in the laboratory -- and I did work in research and development for about eight years -- a part of the development of the process was to subject the unit processes to extremes of conditions. In other words, too hot, too cold, too little, too much, so that we could identify the parameters of excesses and also to identify what would happen to the product, whether it was an intermediate or a final product, and finally, to develop means both to detect it and to correct it. So that the management was pretty well alert to excesses and also how to cope with them. So from a management point of view, it was well done, and this is uniformly true of virtually every product we made.

Q. Okay.

You had indicated that those tanks that

you discussed were approximately 750-gallon tanks or --

A. Somewhere in that neighborhood.

Q. Okay.

What was the size of the batch that you would normally --

A. Well, probably 500 gallons.

Q. 500 gallons?

A. I cannot tell you how we measured it, except to say that we would do it by difference. In other words, we would measure the volume of the storage tank before and after the transfer, and I have no recollection how we did it, and I would say that would be the most logical way.

Q. I think I may have already asked this, but was there ever a time that you put too much in and you had to scrape some out, or you had some kind of an accident along that with the volumes?

A. No, not that I recall. Those things rarely occurred. We had a pretty competent group.

I know when I was personally involved in anything like that, I was a very nervous

individual, and I was back and forth, back and forth -- is it going to the right tank, is it coming from the right tank -- and back and forth (indicating), during an entire procedure, which might have lasted fifteen or twenty minutes, but I was ultra-nervous about getting it done right, and I presume mostly everybody was that way.

Q. So now we have the chlorinated phenol?

A. (Witness nodding.)

Q. Let's talk a little bit about the chloroacetic acid.

As I recall, you had said that that was mixed with sodium hydroxide or sodium --

A. No, that was an error, and I retracted it, and I said --

Q. Yes.

A. -- that it was dissolved in water --

Q. Okay.

A. -- as it was received.

It was dissolved in a wooden tank, and the way it was charged to the tank was that the water would be --

MS. BIRRELL: Sorry?

THE WITNESS: I'm mumbling to you, but

she's doing fine.

A. The water would be charged to the tank. Measuring the height of the water and the amount of water was flexible from the point of view that the concentration was not a factor.

So the proper amount of water was charged to the tank, and the chloroacetic acid that arrived in drums was lifted up to a platform where the operator stood, and the platform was maybe two feet from the top of the tank, so that he could tip over the drum (indicating), so that it emptied into the tank, and the tank was agitated.

Q. How heavy were those drums?

A. Oh, I would say 200, 250 pounds.

Q. So a person standing there would have to pick up the drum?

A. No, no.

Q. It would just tilt in?

A. Yeah.

I did it, and I'm not exceptionally strong.

MR. CONNOLLY: They where 55-gallon drums?

Koved

THE WITNESS: No, they were approximately 30-gallon fiber drums.

MR. CONNOLLY: Thirty gallons.

THE WITNESS: I said that originally they came in in wooden barrels, but not for a particularly protracted period of time. It was much more economical to ship it in fiber drums.

Q. So then would you have a liquid?

A. Yes, a solution.

Q. A solution.

And then how did you mix that solution with the chlorinated phenols? How was that process --

A. Since the chlorinated phenol was the standard batch size and we knew how much that batch size was, shall we say preordained, it was regulated to be of that size, that it would require so many drums of chloroacetic acid. In other words, there are no parts involved. They were pretty well matched, the phenol being the regulated factor.

If you charge a particular amount of phenol that's equivalent to how many drums of

Koved

chloroacetic -- that would be used, and it was a standard amount, all the batches were the same size.

Q. When you added the chloroacetic acid with the chlorinated phenols, was there any kind of a color change? Was there any -- it stayed that --

A. I think I mentioned earlier that the chlorophenol was made into a sodium salt solution. In other words, sodium hydroxide was added to it and water, so that the sodium dichlorophenylate was a water-soluble compound, and it formed a solution.

Now, the reactor was about 3,000-gallon size, so you had 500 gallons approximately of dichlorophenol, so many drums of chloroacetic acid and water, which made it a manageable solution, and that vessel was agitated (indicating) to keep it all mixing.

What the temperature conditions were, I have no idea.

With regard to the color, at this -- at that juncture when the dichlorophenol was added to -- and a water solution created, it was very

dark. And even though the chloroacetic acid solution was colorless, the two of them together were very dark.

Q. Can you give us a rough idea of how long the residence time, save the chlorinated --

A. I have no idea, but I would imagine it's a relatively brief reaction, and by that I mean it probably was finished in eight hours. But I have no recollection of how long it took or what temperature the reaction occurred, except for the fact that it had to be less than 100 degrees centigrade. So it was somewhere between ambient and 100 degrees centigrade.

Q. Why is it that -- why would it have to be less, because of the water?

A. Well, yes.

It could not exceed that, and it need not exceed that because the reaction went that well that it didn't need temperature to foster it. Increased temperature increases reaction speed, and it was sufficiently rapid to be acceptable to the flow of everything going through. Inasmuch as it would take I think I said about twelve hours to make a chlorinated

batch, anything less than that would be acceptable for -- that would be a manageable reaction.

Q. Just one other -- that 3,000-gallon tank where the final reaction occurred, was that heated in any way that -- it did have coils in it?

A. I'm sure it did. It was a mild steel tank that was closed at the top.

MR. CONNOLLY: What is mild steel?

THE WITNESS: Mild steel is ordinary steel. It is carbon steel. Some people refer to it as carbon steel, and it has no special alloy and no particular strength, and it's the cheapest kind of steel there is.

Mild steel is steel that is used for structural members and things like that. It's the most common form of steel. Whereas there are other steels --

MR. CONNOLLY: Yes.

THE WITNESS: -- as well.

Q. You had indicated that once the product was formed, they would occasionally make it into esters and sell it that way?

A. Um hmm.

Q. You said you didn't recall what processes they used?

A. No.

Q. You don't remember if it was a distillation process?

A. The reason I don't remember is that my inclination would be that we didn't make very much of it.

Q. Okay.

Kind of on that same -- you, as I recall, said that you drove off the water by basically introducing hot air or sending it through a tunnel of hot air?

A. (Witness nodding.)

Q. Where did that hot air come from?

A. Well, it was ambient air. Let's say there was a fan at one end, something like an attic fan, but larger.

Q. Yes.

A. And the speed of the fan and the pitch of the blades and the diameter of the fan would dictate how much air it would move.

And the -- the tunnel dryer is a

manufactured item by people who manufacture tunnel dryers. And they -- what you would do if you wanted to use one is, say, go to the manufacturer and say, I want to dry so many pounds of wet material that has this percentage of water. Construct a dryer for me that will operate.

Q. So it would just be air that's heated by an --

A. Yes.

Q. -- element?

A. Exactly.

It was -- the blower was at one end and it would suck air, ambient air, and push it through a heater that -- with a grating, more or less, and air would pass over the heated surfaces and become hot.

Q. All right. Just one general question.

How long did this production process go on? Can you give us years?

A. I would say approximately two years. And I -- I would say something like 1948 to 1950, but it's a guess, and I'm not good at dates. And I think it would be a matter of record if you

would determine when it was sold by Montrose.

CONTINUED EXAMINATION

BY MS. HICK:

Q. How frequently were batches made?

A. Well, it would depend on orders, but I would say it averaged out to one a day, you know. I mean, some parts of the process went faster -- more rapidly and others went more slowly, and there was always repairs and maintenance, and that made variables. I would guess that it averaged out to one a day.

Q. In going through this process, could you identify for us likely points where there would be a waste or a byproduct from that process?

A. Anything that's subjected -- that's subjected to chlorination would result in byproducts. Anything that's subjected to heat would result in byproducts. Anything that's subjected to a reaction between two reactants would generate a byproduct.

Q. Why don't we then limit it to those byproducts that would be discharged through the drain or the trough?

Koved

A. Well -- all of them?

They all at one point where there was an aqueous process would be soluble, either in water or reside with the finished product.

Q. For example, when the 2,4-dichlorophenol -- well, actually, let's back up.

Were there any points in the process of creating 2,4-dichlorophenol that you specifically remember that there were wastes that went off that would have gone into --

A. No.

Q. What about in the process of mixing the 2,4-dichlorophenol with the chloroacetic acid?

A. Yes. Whatever products had been generated prior to that and whatever products were created during that reaction existed at that point and had one of two directions to go: One with the water that was discharged and the other with the product.

Again, I must point out that there was not too much concern about byproducts, only in the final yield. And there was no identification of byproducts. The only concern was the purity

or the salability of the product.

You have to understand that we didn't have either the capability or interest in these matters because anytime that was invested in, it was nonproductive.

Q. As I understand the process, the dichlorophenoxyacetic acid would be essentially filtered; is that correct?

A. Yes.

Q. So you would have the --

A. Wet.

Q. -- wet portion of that?

A. (Witness nodding.)

Q. Where did the wet portion, the distillate, so to speak, where did that go?

A. What distillate? There was no distillate.

MR. RICHMAN: What was left after the filtering?

THE WITNESS: Aqueous solution.

Q. Yes, aqueous solution.

A. Okay.

What happened to it?

Q. Right.

Koved

A. It went to the sewer.

Q. From your understanding of the process, what would be the likely contaminants that would be contained in that aqueous solution?

A. I can only say there was no interest in contaminants. It had to be a material that didn't -- simply didn't react, whatever excess materials there were. And they had to be some chlorinated phenols in small amounts. There had to be overchlorinated phenols in some amounts. There had to be byproducts of the phenol chlorination. Just a wide range of things that --

MR. RICHMAN: Do you recall what color it was?

THE WITNESS: Yeah, it was a dark color. It was dark color. All the color, which to my mind represents impurity, were all water soluble.

MR. CONNOLLY: Was this being made while the Tricresyl phosphate was being manufactured?

THE WITNESS: Sure.

MR. CONNOLLY: And was all of this

stuff going into the same trough at the same time?

THE WITNESS: Well, not the same trough. The same sewer box.

MR. CONNOLLY: Yes.

THE WITNESS: There were different locations in the plant which converged on the sewer box.

MR. CONNOLLY: Was there a point where the stuff would kind of come together before it went underground -- before that underground point?

THE WITNESS: I don't think so, according to the geography of the plant.

MR. CONNOLLY: Different workers might see things, different colors or different types of liquid flowing together?

THE WITNESS: Nobody dwelled on the colors. The only concern was that the product got into the wrong place, like the sewer, and so if someone saw solid coming from the 2,4-D process, they would -- they knew immediately there was a problem and do something about it.

Koved

If someone saw insoluble oils coming from the TCP process, they knew that something was wrong and it shouldn't have been there and do something about it, but otherwise there were no safeguards or whatever.

And there was no -- there was no dwelling on what was going into the sewers except for the fact that mostly everything that went to the sewer was visible at some point before it actually entered the sewer. And by that I mean when going to the trough, you could see the pipe, where it was falling into the trough, so you know, that was sufficient.

MS. HICK: Let's hold the record so the reporter can change her paper.

(Discussion off the record.)

Q. Referring back again to Exhibit 3, you mentioned that the Montrose facility manufactured 2,4,5-T; is that correct?

A. That's correct.

Q. Is it correct that 2,4,5-T is an abbreviated name for 2,4,5-trichlorophenoxyacetic

acid?

A. That's correct.

Q. Were you involved in the production of 2,4,5-T up at the Montrose facility?

A. Yes.

Q. Could you give us a summary of what that process was?

A. Well, I could make it extremely short by saying that it was essentially the same, except that the phenol was chlorinated to a higher degree, and therefore, a higher specific gravity, and that's the only difference.

Q. So do I understand that the Montrose facility manufactured 2,4,5-trichlorophenol?

A. That's correct.

Q. Why don't you take us through that process?

A. Well, as I say, it's essentially -- it's exactly the same except for the degree of chlorination of the phenol, and it would be in a sense redundant to say it again.

MR. RICHMAN: If you could explain, did you increase the temperature, did you extend the residence time, did you --

THE WITNESS: I don't know. I don't recall.

The only thing that I could say is that it was chlorinated to -- more chlorine was added, which was measured by a higher specific gravity, which is a measure of how much chlorine was retained by phenol, and whether it was a different temperature or any conditions were changed is unlikely, and I don't recall.

MR. RICHMAN: Okay.

Q. So just in a shorthand, you go through the first process where you mix the phenol with the chlorine, and you said that the process for 2,4-D was approximately twelve hours. You don't have any reason to believe, based on your recollection, that it was substantially different than that?

A. Well, the speed of addition of chlorine was a function of how quickly the phenol would absorb it, so that I would guesstimate that the chlorine was added at the same rate, simply for a longer period of time, and I would guesstimate that everything else was the same, the reaction

temperatures and so forth.

Q. You said that the 2,4-dichlorophenol was a very dark red.

Was the trichlorophenol a very dark red as well?

A. Yes.

Q. In the reaction of the 2,4,5-trichlorophenol with the chloroacetic acid, were the two products of that reaction the sodium chloride and the 2,4,5-trichlorophenoxyacetic acid?

A. The reaction was identical and probably proceeded in the same manner, and the 2,4,5-trichlorophenoxyacetic acid precipitated out as a solid and was purified in much the same manner by filtration and washing the solid with water until essentially all the mother liquor was washed out, mother liquor being the aqueous reaction medium and the liquid -- the water solution that was discarded. It's referred to as mother liquor because the product was created in it. And as I recall, there were no purification processes other than washing out the mother liquor.

Koved

Q. So it was filtered as was the 2,4-D?

A. Exactly. Same equipment.

Q. Was the same equipment used?

A. Yes.

Q. How was the equipment cleaned out between batches?

A. It wasn't. It wasn't because the amount of cross-contamination was minor.

It's a solid that was shoveled out into drums to transfer to the dryer, and it could be shoveled pretty clean.

MR. CONNOLLY: The heating vessels that you used, were they capable of developing hot spots? Could hot spots develop that would make the temperature uneven?

THE WITNESS: I'll give you a piece of information you haven't requested that may be pertinent, and that's the fact that we bought steam, and the steam's maximum pressure was, I believe, 180 pounds. And if you look -- if you check a steam table, you can read exactly the temperature that's steam. Steam pressure and temperature are interdependent. The higher the pressure, the higher the

temperature.

So that I don't recall exactly what the equivalent temperature was to 180 pounds, which is also a vague recollection, but I would say that the steam temperature was about 150 degrees centigrade, and that's a guess.

And that by virtue of the fact that if the vessel was either jacketed or had a coil, steel conducts heat very easily, and it's unlikely there would be hot spots. It would be of equal temperature everywhere, not exceeding 150 degrees centigrade.

I might add that when the person from the state that called me about the letter was inquiring of still bottoms, which would indicate that there was a distillation from the temperature of our steam, it's unlikely we could effect a distillation. It just wasn't hot enough, speaking solely of the Montrose process.

So that temperatures that the literature talks about pyrolysis formation of dioxin, the literature that I read, those

conditions did not exist.

But there are other conditions. Those aren't the sole conditions for the formation of dioxin. It's one of the conditions.

MR. RICHMAN: Can you give us an idea of how long the 2,4,5-D was produced?

THE WITNESS: 2,4,5-T.

MR. RICHMAN: I'm sorry. 2,4,5-T. I'm sorry.

THE WITNESS: I'd say for a short period of time. At most, six months. Probably less than that. It did not appear to be a popular product.

Q. Was 2,4,5-TCP produced, the 2,4,5-trichlorophenol?

A. Yes.

Q. Was that produced for other purposes than simply as a product to use as a basis of --

A. No, it was produced solely for the production of the final product.

2,4-dichlorophenol was produced for 2,4-D, and 2,4,5-T was made from 2,4-trichlorophenol, and it was captive. It wasn't made solely for that chain of reactions.

Koved

Q. Consequently, 2,4,5-TCP was only produced for approximately six months or --

A. No. I said that 2,4-D was produced -- what I vaguely recall is a two-year period whereas the 2,4,5-T may have been produced over a six-month period or less.

Q. No, the 2,4,5-TCP was only --

A. Produced when we made 2,4,5-T.

Q. Okay.

The distillate -- no, I said that word wrong again.

The aqueous liquid from the distillation process --

A. Condensation process.

Q. -- condensation process, that was again put into the sewers at the site?

A. Yes.

All process waste went to the sewer if it was liquid and to a waste pile if it was solid.

Q. Were any of those wastes treated prior to their discharge into the sewer system?

A. No.

Q. In regard to the process of 2,4,5-T

manufacture, if you can estimate, what would be the volume of an aqueous liquid that would have gone into the sewer system?

A. Well, it would be a function of how many batches were made, but I would say about a thousand to fifteen hundred gallons of aqueous per batch. And again, that's purely a guesstimate.

Q. How much 2,4,5-T was produced per batch?

A. Approximately 500 gallons.

Weightwise, it could be worked out, but I would say -- I would guess at 6,000 pounds if its specific gravity was -- no, not 6,000 pounds -- 5,000 pounds. I'm looking at 500 gallons times the specific gravity -- times the weight of water per gallon, so I'm sort of mentally calculating it, but it could be worked out.

Q. How frequently were batches of 2,4,5-T made?

A. One a day at most. And for a limited period of time, it seemed to me we did not make a huge volume. It never reached the shipping

levels of 2,4-D.

Q. What year or years encompassed this six-month period, if you recall?

A. Well, I would say if we're -- if we're focusing on the years of 1948 to 1950 as the years of production -- and that I have no reference point so it can't be precise as to when that occurred. But if it were during that period, it would be the earlier part of 1949.

MR. RICHMAN: Just one question.

Was this also an alkali process, making the 2,4,5-T, similar to the 2,4,-D production?

THE WITNESS: Exactly.

The processes beyond the point of chlorination of the phenol did not differ.

MR. RICHMAN: Did you ever measure the pH measurement of the alkalinity, or was any of that work ever done?

THE WITNESS: No.

MR. RICHMAN: No.

MS. HICK: Okay.

MR. CONNOLLY: Can I ask just one thing?

Koved

MS. HICK: Sure.

MR. CONNOLLY: Were there releases or spills that occurred in conjunction with this manufacture at any time on the production line, leaks in the vessel or --

THE WITNESS: Not particularly. I don't recall any incidents of that occurring, but again, I was only there eight hours out of the twenty-four. Unless in any of the processes there was a special accident or a failure of equipment, there was spillage of the type that might come from a leaking tank for a short period of time or a corroded connection.

But as I indicated earlier, the personnel were sensitive to leaks only from the point of view of lost profits, but for no other reason.

MR. RICHMAN: The final products, what color were they and what texture were they?

THE WITNESS: We are referring to the 2,4-D?

MR. RICHMAN: The 2,4,5-T and the 2,4-D.

Koved

THE WITNESS: Right.

They were both white. White granular powder.

I'm saying granular because they were not fine, and they were not small diameter. They were --

MR. RICHMAN: So it looked like sand or like snow?

THE WITNESS: Exactly, but they were not crystalline.

MR. RICHMAN: Not crystalline.

THE WITNESS: They were insufficiently pure to be crystalline.

BY MS. HICK:

Q. You mentioned that you estimated approximately 1500 gallons of wastewater that went to the sewer system per batch of 2,4,5-T?

A. Yes.

Q. What would you estimate the amount on the production of 2,4-D?

A. Well, it would be comparable.

MS. BIRRELL: A break?

Hold the record.

(Discussion off the record.)

Koved

MS. HICK: We'll take a brief recess.

(A brief recess was taken at this time.)

BY MS. HICK:

Q. You state in Exhibit 3 that Montrose manufactured DDT; is that correct?

A. That's correct.

Q. Can you tell us at what point in the process waste materials or byproducts that could have gone into the sewer system were produced?

A. Um hmm. It might take a few minutes.

Q. Okay.

A. Chloral was produced from ethyl alcohol that was purchased under a federal license, and that chloral was chlorinated in much the same vessels as I described for the 2,4-D and the 2,4,5-T and under similar conditions, except there were three chlorines added to one ethyl alcohol molecule.

Now, we'll leave it at this point and move on.

Well, let's continue with that.

When the chloral was produced and under relatively mild conditions, it can't be too hot

because then you lose the ethyl alcohol, which has a low boiling point, so it was -- it was produced at elevated temperature, but substantially less than 100 degrees centigrade. And the final product was a mixture of chloral, chloral hydrate and chloral ethylate, which was simply an attachment of an ethyl alcohol to the chloral in a manner similar to an attachment of water to the chloral, which made chloral hydrate.

To be useful in the process to make DDT, the chloral had to be free of water, and when I say free of water, it had to also be free of any excess alcohol because in the process to which it would go, alcohol was similar in reactivity to water, and water would either slow or stop the process from making DDT.

So it had to be dried, and it was moved to a still which is in the same vicinity, which was essentially a 700-gallon still that was agitated -- had an agitator, had a vapor line, and then a condenser and a receiver to catch the chloral.

The crude chloral from the chlorination process was moved to the still, and that would

approximate the volume was about five hundred gallons -- four or five hundred gallons. They -- most of the processes seem to be that quantity, and I can only explain it by the fact that that was the mentality of the people who planned it.

In the still was added spent sulfuric acid, and that's the part I'll come to a little later.

The mixture of crude chloral and sulfuric acid was agitated with a mixer and subjected to temperatures that would cause the chloral to distill.

Now, only chloral distilled because the sulfuric acid absorbed the water and the alcohol. So what we would distill is pure chloral, and that was collected in the receiver.

Q. Do you have an approximate temperature for that?

A. Well, it's easy to determine it by looking up the boiling point of chloral, which would be, I guess, maybe somewhere between ninety and a hundred and ten degrees centigrade, but a guess.

The chloral being a solid in its

relatively pure state was collected in a volume of monochlorobenzene, simply to dissolve it so that it would stay a liquid so it was easily movable. We could pump it from one point to another rather than have a solid and break it up and put it in drums and move it. It makes for a clean operation. Clean, in a sense easy.

This was done in the same area near the front of the plant that the 2,4-D process proceeded.

The chloral dissolved in chlorobenzene was moved to the back of the plant where we had two or three reactors to make DDT.

DDT is a result of a reaction between two monochlorinated benzene molecules. In other words, we have two of those to make the DDT. Monochlorinated benzene is benzene with one chlorine on it, and you need two of them to make one molecule of DDT.

Into a reactor, which was 2,000 gallons, was charged and in a quantity of chloral, and a large quantity far in excess of an amount required to make the DDT. Maybe two or three or four times the quantity of

Koved

chlorobenzene.

And the reason for the large quantity is to create a medium so that when the DDT was produced, it would be dissolved in it and the whole thing would stay liquid and became quite manageable.

The mixture of monochlorobenzene and chloral was cooled to between five and fifteen degrees centigrade by brine -- cooled brine circulating through a jacket of the vessel, and the vessel being agitated, and it was a closed, sealed vessel with a vent to the roof.

Refrigeration was provided by two 30-ton ice machines, which -- as they were referred to at that time, which compressed ammonia and cooled the brine. It's a big operation.

We had a vast reservoir of brine, which constantly circulated through the jackets of these two vessels.

That mixture was cooled, and when it reached between five and fifteen degrees centigrade, to it was added with agitation of a material in the vessel 20 percent oleum,

Koved

O-L-E-U-M, which was a hundred percent sulfuric acid in which was dissolved, I think, 12 percent SO3.

Now, both the hundred percent sulfuric acid and the SO3, what may be referred to as -- and I don't think the word exists -- a dehydrant. I just made up the word -- which essentially absorbs water and doesn't release it. And the product of the reaction of two molecules of monochlorobenzene and one chloral produces water upon the formation of DDT. So if we had an ideal situation, you would get DDT and a molecule of water and nothing else, okay. But we had the excess of monochlorobenzene, and the oleum would absorb the water, and therefore, in absorbing the water, it caused the reaction to move favorably from the raw materials to the DDT or finished product and encouraged that reaction.

The agitation was there to make sure that when the water was released, the oleum would pick it up immediately, so that the reaction proceeded.

The reason for the refrigeration is that -- is that the reaction was exothermic. In

other words, it produced heat. And if the reactive elements were higher than the designated five- to fifteen-degree centigrade ideal conditions, then the oleum would start attacking the DDT molecule and the monochlorobenzene molecules and form other byproducts, which reduced the efficiency and made the product more costly.

Q. So what types of these byproducts would you --

A. They're well-known byproducts called sulfonated benzenes, and sulfonated benzenes are about as close to or -- well, are close to or similar to synthetic soaps, detergents.

Detergents are sulfonated products but they're more fancy, and they have -- they're not just plain benzene, but have other things, but they're sulfonated products.

And they're -- essentially could not be isolated and have no value and reduce the yield and create lots of the excess monochlorobenzene and so forth.

It also would attack the DDT molecule and probably leave a sulfonated radical on it,

Koved

which made it less pure and maybe not even an insecticide. I don't know.

Q. What other point in this process would have generated waste materials or other byproducts?

A. Well, let's go back -- okay. The reaction proceeded to a point where it was determined by a chemical test that all the chloral was reacted.

The monochlorobenzene being present in large excess was not a factor at all, but a quantity of chloral was being reacted, being the most expensive raw material.

At the point that the reaction was finished, we had two things. We had DDT in a monochlorobenzene solution, and an immiscible quantity of spent acid, okay.

The acid now is about a hundred percent sulfuric and not capable of much more dehydrating and loaded with chlorinated products and useless except for one thing, and that was to dehydrate the chloral at the front end of the plant.

And we would -- we would pump down an amount, a few hundred gallons, and that would be

part of the process of dehydrating the chloral. And both that spent acid that was used in the dehydrating and distillation operation, and that which was left over after the condensation, which was the creation of DDT, both of those went to the sewer in very high concentrations.

MR. RICHMAN: The final product which was DDT, I assume, was a solid?

THE WITNESS: Well, okay.

I'll just continue a little bit more so you'll understand.

MR. RICHMAN: Okay.

THE WITNESS: The DDT, after the spent acid was drawn off the bottom to the sewer, was in solution in the monochlorobenzene, and it was subjected to distillation to remove all the monochlorobenzene, and then as a solid run into panels that contained about 2,000 pounds of DDT. They were large (indicating), rectangular panels that were maybe six feet by ten feet, and the molten DDT was run into that and allowed to cool and became a big block.

Then the tank was ready -- didn't have

to be cleaned or anything. It was ready to be used again.

Now, the DDT -- the purest DDT that we could produce had a melting point of 91 degrees centigrade, but the industry called for a DDT that melted at 79 degrees centigrade.

Did I say 79? 89 degrees centigrade.

And the purity of DDT was measured by the melting point, and we made -- most of our DDT production had a melting point of about 90.1 or 90.2 degrees centigrade, which was equivalent to purity of -- I don't know -- somewhere between 95 and 98 percent. And what the rest of it was, I don't know.

MR. RICHMAN: So after it was in the pan, you went in -- someone went in, chipped it out of the pan?

THE WITNESS: Chipped it with -- you know, with choppers and made lumps.

MR. RICHMAN: And then what would you do, put it in --

THE WITNESS: Then it went into -- it took either one of two routes. One route, it

went into fiber drums that we used over and over again, and it was either ground to a powder and sold as a powder, or it went to another area, depending on the orders. We didn't stock anything. We produced for the order that we got.

And the other route was it went to a tank -- the fiber drums were lifted up to a manhole and dumped in, and then the solvent -- added like some proprietary solvent like Stoddart's solvent or toluene or whatever the customer wanted and turned into a solution --

MR. RICHMAN: Okay.

THE WITNESS: -- to which other ingredients were added, like emulsifiers.

A large part of our production went to the military.

MR. CONNOLLY: Were there residues in those pans when they were done, powder residues?

THE WITNESS: Well, there was some adherent which was dissolved in the next batch that was poured into the pan. There

was nothing that was clean because it wasn't necessary to clean it. You know, it was used for the same thing over and over again.

MR. CONNOLLY: Okay.

BY MS. HICK:

Q. I note from Exhibit 3 that you stated that Montrose manufactured benzene hexachloride?

A. That's correct.

Q. Just as a point of fact, is Lindane similar to benzene hexachloride?

A. Benzene hexachloride -- when benzene is chlorinated, and hopefully six chlorines added to each benzene molecule, it produces a variety of what we call isomers, each of which has six chlorines on a benzene. But because of this optical orientation or the angle of attachment to the benzene ring, it forms eight or more what's referred to as isomers.

Isomers have the same chemical formula but different activity, and no effort was made, at least not in our laboratory, to identify all of them. But what we did know was that the gamma isomer -- and it was alpha, beta, gamma, delta, so on -- epsilon -- eight of them. The gamma

isomer was the only one that had an insecticide propensity. It was the only insecticide. All the rest were valueless. And so we had -- we knew that the conditions that were developed in the laboratory, the maximum gamma isomer that could be produced was 14 percent. And so we chlorinated under the conditions that gave us 14 percent.

And then we could sell it in two different forms. One was with a great deal of effort, and using a method of recrystallization, we could isolate the 14 percent as pure gamma isomer, which was Lindane. But it took a great deal of effort, and consequently, was an expensive product. And for the usage, and that is spraying fields and so on, it makes no sense to isolate the Lindane.

Lindane was produced for people who wanted to put it into household products, so the greater quantity of BHC that was produced went into an agricultural grade.

Now, the agricultural grade was created by -- and this is an interesting point -- by, under the right conditions, encouraging one of

the isomers to separate by becoming a solid.

Under the conditions of 14-percent gamma, BHC dissolved in benzene were able to encourage, I would estimate, about 18 percent of the alpha isomer to separate as a solid, and that was filtered off and set aside.

And as a consequence of this conservation effort, we were able to produce a BHC that had 38- to 40-percent active insecticide ingredient, which was dark in appearance and smelled badly.

Q. Was it a solid, a granular --

A. Yeah, a solid. Lumps, yeah.

And that was either shipped in lumps in fiber drums or made into solution and sold as a solution.

The alpha that was separated was a waste and was put in drums and carried out to the yard where it was dumped on the ground until a large quantity accumulated, and then a scavenger was brought in with a front loader and it was hooked onto dump trucks and taken to the landfill somewhere, and that proceeded for a relatively long period of time until someone thought to give

some attention to the usefulness of the alpha BHC isomer, and probably did some literature research. And then with the information that was given to the research laboratory, it was determined that if alpha BHC, which is a powder, were mixed with a strong alkali solution, under conditions that were in the vicinity of 90 degrees centigrade -- I'm not absolutely certain -- the alpha isomer would be transformed into trichlorobenzene.

Now, what you have here is an alkaline hydrolysis, removing three chlorines from the benzene ring, which our research chemist was of the opinion that it might be a route to dioxin.

Q. Over how many years was benzene hexachloride in its various isomers produced at Montrose?

A. I -- I don't know.

If I had to guess, I'd say two to three years, and I am not certain of the time period either.

Q. How about DDT, over what time period was that manufactured?

A. I'd say five to six years, but again,

it's a guess, and I couldn't even begin to estimate the time period.

Q. You wouldn't then estimate whether it was before 1950 or after 1950 for either DDT or benzene hexachloride?

A. Oh, DDT started, I think I mentioned something like --

Q. When you came back --

A. 1946, yeah. Thereabouts. And proceeded for many years.

If I said five or six years, it's probably much longer than that. Eight, ten, twelve years.

Trichlorobenzene -- benzene hexachloride, I'd say something like 1960-ish. Precisely when and for how long, I don't know, but it was not a short period of time. It had to be a number of years.

Q. Do you remember approximately when the chemists determined that trichlorobenzene could be made?

A. Well, I would say it was probably about one-half the period of time that we first started making BHC and finished it.

Koved

In other words, 50 percent of the time was -- the alpha isomer was carted off to the landfill, and the rest of the time we created another compound from it.

Q. Okay.

Now, we're going to change direction a little bit and talk about waste storage and disposal systems. We've touched on that a little bit in the questions.

A. I got the waste storage. What was the other word?

Q. Disposal.

A. Okay.

Q. You stated earlier that there were several processes at the facility where waste or byproducts were stored prior to off-site disposal.

Could you just fill us in just a little bit about that?

A. Sure.

They were dumped in a specified area of the yard until the pile got large enough to be a nuisance, and then they brought in a scavenger to cart it away to a landfill.

Koved

Q. Now, that's in regard to the alpha isomer waste?

A. Every waste.

MR. RICHMAN: Every --

A. We had different piles.

Q. Every solid waste?

A. Solid waste.

MR. RICHMAN: What about liquid waste?

THE WITNESS: Liquid waste went into drums and was stored in the yard with everything else.

Q. Were there any lagoons or --

A. No, no. No pits, no lagoons. Nothing of that nature.

MR. CONNOLLY: Was the solid waste exposed to the elements?

THE WITNESS: Yes.

MR. CONNOLLY: Was it stored -- how was it stored? Was it stored on concrete?

THE WITNESS: Well, initially the yard was entirely dirt and gravel. Of course, nothing grew there. Of course, it was like a wasteland.

But the yard would get muddy in heavy

rain, and so to accommodate the weather, they paved it over so they could still use the yard, you know. So it was -- it was blacktop, as I recall. You know, it wasn't anything fancy like concrete. It was minimal expense.

Q. Do you recall approximately when it was paved?

A. Well, I'd say about 1950. 1950 or 1955. They suffered with it as long as they could without spending money, and the handwriting was on the wall.

The amount of waste, the amount of stored drums, cresol empty drums, the amount of stuff that had to be stored out there kept growing, so that it had -- something had to be done with the surface.

Q. You mentioned in your previous testimony that the alpha isomer was stored outside, that HCL was stored outside, that cresol was stored outside, phosphorus oxychloride was.

Can you think of any other compounds just off the top of your head that were stored outside?

A. No.

At one time, they built a huge reactor, which was located in the yard, and it was used principally for making esters, and those were listed in the Subpoena as Dimethyl-isophthalate, Dioctyl-phthalate and others that were made in that reactor. But other than that, the yard was used for constructing equipment that was used in manufacturing. We needed a lot of space for that, for building platforms, walks, special equipment, supporting condensers or reactors, stairways, you know, and that kind of thing. So they needed a lot of room for that, and all the welding was done out there.

Q. Were there any underground storage tanks?

A. Yes, there were three. I think they were 10,000-gallon capacity each. They were -- if you're familiar with the location -- with the layout of the plant, they would be in what would be considered the front yard of the office building, the office building being a small building closest to Lister Avenue. And there was enough space to put three horizontal tanks right

in front of the office building. And there was a pump and a manifold so that you could pump from any one of these tanks to the process area.

Exactly what was stored in those tanks, I do not recall, but I would certainly believe that since we use large quantities of monochlorobenzene, and that I don't recall any other storage for monochlorobenzene, that they were stored -- that liquid was stored in those tanks or at least in one or more.

The dedication for storage for those tanks varied according to what needed to be stored, so that it was not dedicated to any particular compound, but whatever the requirements were at the time. But it wasn't changed that often.

MR. RICHMAN: Do you know what condition those tanks were in? Were they used continuously?

THE WITNESS: Yes.

MR. RICHMAN: Were they ever excavated?

THE WITNESS: No, not in my time.

MR. RICHMAN: Okay.

Koved

BY MS. HICK:

Q. You said earlier that there were discrete piles for the different wastes.

Were they in any way covered?

A. No.

Q. You stated earlier that some of the containers or one of the raw materials, I believe, had been known to leak?

A. Yes.

They were stored on pallets stacked, I think, two high. Like four drums on top of four drums.

Q. And you had observed on different occasions leakages in a variety of drums?

A. Um hmm.

MR. CONNOLLY: Was there any containment --

THE WITNESS: Uh-uh.

MR. CONNOLLY: -- around anything?

THE WITNESS: No.

Q. Did you ever notice any soil discoloration in this area?

A. Well, that would be difficult to say because the soil was always black, as I recall,

and it would be difficult to detect any discoloration.

Q. Okay.

MR. CONNOLLY: Did you observe any kind of pools of liquid that weren't water?

THE WITNESS: No, there were not pools of liquid, but there was obvious liquid contamination.

In other words, in the sense, greasy or -- there were greasy or obviously organic contamination.

In other words, the sheen of an organic contamination is different than from water. Water more or less glistens. This stuff was dull. So, you know, it was obvious where it was. And it was odoriferous. Smelled, the cresol.

Q. Do you recall any instances where raw materials or waste products were spilled in the buildings themselves?

A. If it happened, and I will say that it happened on occasion, but it was minimal. It was essentially minimal.

Q. You stated earlier that production

people were responsible for cleaning those spills up?

A. Yeah.

Well, basically what happened was when the floor got too icky, they would take a hose and hose it down to the troughs. By icky I mean that DDT was tracked all over the place. I mean it adhered to the soles of the shoes, and then when you'd walk other places, so there was like a layer of DDT everywhere in the plant. In essence, there was no concrete visible, but there was like a gum everywhere. And when it got to an annoying amount, then it would be scraped and washed down.

Q. Now, using your example of DDT, how did the DDT get on the floor? Was that just a result of cracking it out of the pan?

A. No. Well, possibly. But basically there was a grinding operation, and that scattered powder mostly everywhere. There were no containment efforts made for the grinding, you know. It was a very rudimentary form of grinding.

MR. CONNOLLY: Were there spills of

cresol or chemicals where you were doing the drumming operations?

THE WITNESS: Well, wherever there was a drumming operation, there had to be some very, very minor spills. In the form of drips, you know. And if you're trying to quantify it, it would be very difficult. But under ideal conditions, there's always some spills, and I couldn't begin to quantify.

Q. Do you recall any instances where raw materials or wastes were spilled on the outside of the property, for example, in transferring some raw material to a holding tank?

A. I would say rarely, if at all, because transferring from a tank wagon or a tank car is relatively simple. For instance, where the connection was made, a five-gallon bucket was hung, and if there were any leaks or drips, they would drip into the bucket.

I can't say what happened to the contents of the bucket. It was a choice of the guy who was doing it, and did he want to be annoyed by carrying it to the tank where it was being transferred and dump it, which under some

Koved

circumstances would be difficult because he'd have to climb twenty feet to get to the top of the tank. So I can't say what happened to the drip that went into the bucket.

MR. CONNOLLY: Is there another outside tank that held cresol, a tank in the yard someplace?

THE WITNESS: I think all the cresol was stored in the building in tanks.

We had a number of tanks in the area where the 2,4-D was manufactured. We had four 5,000-gallon tanks and another one that was about 5,000 gallons, so it was all in the storage except for the cresol that came in in drums, and that was stored in the yard.

MR. CONNOLLY: Okay.

Q. You referred earlier in your testimony to troughs --

A. Yes.

Q. -- that went through.

Did those go through the process area inside of buildings?

A. Yes.

Q. And then they also went outside of the

buildings, so that there were --

A. Well, the troughs, when it came to a point where they had to continue to the outside of the building, it generally went underground, but the distance underground was not that great, perhaps twenty feet.

MR. RICHMAN: What were these troughs made of, or they were just --

THE WITNESS: Well, they're essentially part of the floor, and part of the floor was excavated and then a concrete cast in the form of trenches.

Trenches were either at various times, depending on I don't know what -- sometimes they were covered with plates to bring it to ground level, steel plates which had holes burned into them so that any liquid on the floor would get into the trough, or they were covered with grating.

MR. RICHMAN: Grating?

THE WITNESS: The grating had an advantage of seeing what was in the trough or going through the trough, but it also had the disadvantage of deteriorating rather quickly.

So then when you get tired of replacing the grate, they put a steel plate in, and then go back to grates, whatever.

Q. You said earlier that the processes -- you said that some process waters went into the troughs, but spills also went into the troughs?

A. Yes, and so did -- so did cooling water go into the troughs.

Cooling water came from condensers or cooling reactors or whatever. Or condensation of steam. That's where a lot of water came from.

So when I say that spent acid went to the sewer via the troughs, there is always enough cooling water in it to dilute it from 100 percent to 30 percent, 20 percent, 10 percent.

In other words, it traveled through the plant in troughs, and -- in a less dangerous condition.

Q. When you say that processed wastes went into the sewer, do you mean that they went into the troughs?

A. Yes.

Q. And then went into the sewer?

A. Yes.

Q. It sounds as though there was water in these troughs at all times essentially?

A. Well, at one point or another the troughs drained, so if there was not water entering the trough for a particular reason like process waste or there was not a condenser operating, then there could be periods when there was nothing in the trough. It was not that well drained that there was nothing in the trough. There was always a little bit of water laying in the trough.

Q. The troughs all converged on the sewer box that you --

A. Yes.

Q. -- referred to previously?

Did you have any job responsibilities relating to these troughs?

A. Not anymore so. I know that in the Affidavit it was stated that one of my responsibilities was to check these sewers for obstruction and collapse. That's something else.

The sewers of the facility were open channels covered with grates. Process waste at the facility is poured directly into -- it reads

sewers, but should be troughs, and then went to the sewers.

I would like to clarify some other part of the paragraph.

Q. Why don't we get to that when we get --

A. Okay.

Q. I have another set of questions about sewers.

A. Okay.

Q. Okay.

So you really didn't have any specific responsibilities dealing with those troughs?

A. Well, no more than anybody else. As I said, if there were leaks, we were expected to repair the leaks as soon as they were detected, and the same is true of the troughs, that the gratings or the coverings were secure, in that it wouldn't collapse on someone or a foot would go into it. It wasn't that deep. It was three inches deep, maybe. That there was no obstruction.

In other words, if a person saw that the troughs were backing up or the sewers or whatever, then it was his responsibility to try

to analyze the condition that caused the problem and call it to the attention of the management, if that was required.

Q. Do you recall any instances where the troughs backed up?

A. Not really, but I would not say categorically it never happened. Sometimes a rag or, you know, something got in and got hung up and first thing you know, the water starts to back up, but nothing of a serious nature.

Q. You said that essentially at the building boundary the troughs went underground?

A. Yes.

Q. And then traveled approximately twenty feet underground to the sewer box?

A. Yes, twenty-five feet.

Q. And you indicated -- no, actually you indicated earlier that the sewer from the sewer box went off towards Lister Avenue?

A. Right.

Q. Could you just look at Exhibit 2 here on which you drew the Montrose facility, and just plot on here, if you would, the approximate location of the sewer box?

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(Ms. Hick handing to the witness.)

A. The sewer box, and I'll indicate it by an "S" was approximately here (indicating).

Now, this is a very poor map for doing what you request.

Q. Okay.

A. It's too small to be accurate.

Q. If you wouldn't mind, could you perhaps draw something on that piece of paper?

(Ms. Hick handing to the witness.)

A. Okay.

This is Lister Avenue, and this is Esther, E-S-T-H-E-R, Street (indicating).

This is Lister. This is the driveway that goes to the river (indicating).

This is Lockwood Street (indicating).

Q. Why don't you just put "driveway" here to label that?

A. Sure.

Lockwood, driveway.

And the property -- and this is very rough -- extended on the other side of the driveway, but it was not manufacturing. It was storage of liquid chemicals. And there was a

warehouse and another plant was built out here, which was malonitrile, which I think is not of concern because it was very carefully engineered so that -- so there would be minimal impact on the environment, okay.

The reason for that is that we handled very dangerous chemicals, including cyanide, and we just didn't want to kill ourselves or anybody else, okay.

Q. So now where --

A. All right. Just a minute.

Now, the railroad came along here (indicating), has a track that was very close to the curb of Lister Avenue, and a spur swung in this way and ran to the property in the back of Montrose.

And this was a spur that I indicated -- that I mentioned that went this way (indicating) on which the chlorine tank cars run.

This spur (indicating) was on this side of the driveway, okay, and it crossed the driveway, and then the spur was here, okay.

Now, the office building was here (indicating), and again, I'm in trouble with the

scale. And the underground storage tanks were here (indicating) underground. Underground tank.

And there was other storage here (indicating) that was ethyl alcohol for making chloral.

This was the office building (indicating).

Q. Why don't you just put an "A" here for ethyl alcohol?

A. Okay, ethyl alcohol.

And there was a wall built here (indicating), and there was the yard to which I referred where the chlorinations took place. And then there is a wall of the building and the building continued this way (indicating). And in this area was DDT grinding, and this building continued down here (indicating).

And in this area was 2,4-D manufacture reactions, and this area was the chlorination vessels (indicating).

Q. Am I correct if I say that this is outside essentially?

A. Yes. Yes, it's a yard.

Q. Was this also where hazardous -- or the

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waste materials were stored?

A. No, no.

Q. Okay.

A. That's a different yard. That's the yard out here, okay (indicating).

And this building (indicating) continued to the end of the property.

Now, this building (indicating) had a number of levels, the reason being that --

Q. "This building" means the DDT, the one that included the DDT?

A. The grinding.

This (indicating) was ground level, but this level was three feet higher because this had doors for loading and unloading trucks, and for a truck to back in, the level had to be higher, so -- and then it gradually sloped down in this direction (indicating).

And this (indicating) is the area where the DDT was manufactured and the BHC and --

Q. On the ground level or on a higher level?

A. Well, that was a higher level. That was the three-feet --

Q. Okay.

A. -- elevation, but then the passage going down to the building, this part of the building, was a gradual incline.

And this (indicating) is the area where the TCP wash tanks were, and this (indicating) is the vicinity of the TCP reactor.

Q. Now, that is outside of the building?

A. Yes.

There's another building here. That was used mostly for storage. And this is the area where we had phosphorus oxychloride stored for the TCP reactor.

Q. Now, do you remember the configuration of the troughs within this building?

A. Yeah, approximately, but let me finish. I started out for this reason, to show you the location of the sewer box, which was right about here (indicating), and there is a fence here (indicating), a chain link fence.

Q. And you have marked the sewer box as "SB"?

A. Yes.

Q. Approximately what point on the

building did the troughs --

A. Okay.

Q. -- converge or --

A. Okay. There was a trough here (indicating). I'll indicate by parallel lines. And there was a wall here (indicating), and it came down like this and joined another trough that was here. And there was a trough in this building (indicating). Of course, we had a tank here (indicating) for making DDT solutions, and there was a trough along this wall (indicating) and a trough on the other side of the wall, and these passed through a shed that was sort of like -- this (indicating) is the shed, which was essentially opened, but it had a roof, and we kept some equipment in there and occasionally used it for pilot plant work, but it went through the shed.

And this (indicating) adjoined like that, and then it -- at this point, it would go underground -- at this point it went underground, and my dimensions are a little off, but the underground portion ran to the sewer box like this (indicating).

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Actually, there were two -- it's out of proportion --

Q. That's okay.

A. -- because there were two lines that entered the sewer box.

This (indicating) contained sanitary and some of this process waste. I'll put it down over there.

And this one (indicating) contained the rest -- the remainder of the process water, and it entered the sewer box.

Q. So why don't we identify this -- this would be -- the lower one adjacent to the shed --

A. This would be the major one.

Q. And that would be the process water only?

A. Um hmm.

Q. Why don't you just label that?

A. (The witness complied.)

Q. And then this one, how did the office sanitary waste and this waste from the chlorination process converge?

A. No, they converged underground.

Q. Okay.

A. They were underground.

Q. Do you know approximately where this came out of the building, where did this go underground, I guess?

If the office -- this (indicating) being the chlorination process, if the chlorination process trough and the office trough converged underground --

A. There was no office trough.

Q. I mean -- yes.

A. Okay. We sat at tables when we ate.

Q. I understand. I'm sorry.

The office pipes went underground?

A. Right.

Q. I guess that wouldn't be apparent?

A. It was never visible.

Q. How about for the chlorination process, did that go underground?

A. In a general way. I couldn't be exact, and I don't think it's of major consequence really, because it all went to the same place, whatever the route.

But I might add at this point that this underground line was of different materials at

different times, and this area of the yard --

Q. Being primarily the process waste?

A. Yeah.

This area (indicating) of the yard was never paved because there are too many things there, so as a consequence, when the material of the sewer line, which was probably a ten-inch line, was made of either clay or steel or whatever, it would be corroded by the heavy acid concentrations that ran through it.

And the first time we detected this was in trouble was that the ground started to get soft and it was sinking, so they excavated it and found that the sewer line was deteriorated.

So they replaced it with a material different than what the original construction was, and after a couple of years, the ground began to sink again.

So when they dug it up, they found it was deteriorated, so they solved the problem by having a wooden pipe manufactured similar to a barrel or a vat, and they buried that, and that was never deteriorated.

MR. RICHMAN: Did the waste box ever

deteriorate?

THE WITNESS: No, it was wood.

MR. RICHMAN: Wood. It never --

THE WITNESS: No, it did well.

MR. CONNOLLY: Are there any other lines that ran from the plant directly to the river?

THE WITNESS: Directly to the river? I have no knowledge of that. No knowledge whatsoever.

MR. RICHMAN: There were no troughs or any other kind of device along this driveway?

THE WITNESS: This driveway?

MR. RICHMAN: That's correct.

THE WITNESS: No.

I cannot say categorically that there was not something underground, because one thing I vaguely recall, manholes. For whatever reason they were. Might have been utilities, but I don't know.

And in this vicinity the company built a new office building when they had that many people -- they had originally the top floor of this (indicating) office building, and

they found it was getting cramped, so they built a new office building here (indicating), and they had to have sanitary waste, and it had to go somewhere. Where it went, I don't know.

Q. Approximately what year did they build that building; do you know?

A. Um, 1960. Guess.

Q. Could you just label that maybe office 2?

A. The second office building?

Q. Yes.

A. To answer your question, the property line, let's say, went out to this point (indicating), and this is the yard that was for a long period of time unpaved, and it was in this vicinity that trash was collected and waste and scrap metal in discrete piles, and whatever needed to be gotten rid of, and when a pipe got to the dimensions when it was a nuisance, it was carted away.

I might add that there was a gate here (indicating). There was a chain link fence, and there was a driveway that ran along this margin

(indicating). That serviced the vermiculite building in the back. And it was along this driveway that the tank wagon would drop and collect the hydrochloric acid which was absorbed here and stored here.

Q. And you've just been speaking about the driveway on the Lockwood Avenue side of the map?

A. Yes. Yes.

MS. HICK: I guess I would have the stenographer mark that as Exhibit 4, so we could attach that.

(Whereupon, Exhibit 4, hand-drawn map, one page, marked for identification.)

Q. Just as a wrap-up on the discussion related to sewers, do you have any ideas what amounts of liquid waste went into the sewers in, say, a normal day?

A. The answer is no.

Q. Okay.

MR. RICHMAN: Do you have a rough idea or did you know the colors that you would see in those wastes?

THE WITNESS: Well --

MR. RICHMAN: Were they --

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THE WITNESS: The wastes were essentially not -- it depends on the time of day and what was happening, but let's say ranged from colorless when there was only plain water running to possibly off-color light tan to a cloudy appearance.

Now, the reason for the cloudy appearance is that some of the raw materials that were dissolved and being discharged might be cloudy in and of themselves, but not -- not very much of it.

But the fact that they may have contained dissolved byproduct or waste, and which in the concentrations that the wastes were created would be clear but possibly off-color, but when diluted with water would precipitate out some of the waste because the concentration had changed and the solubility was no longer the same.

MR. RICHMAN: So you end up with --

THE WITNESS: You could end up with cloudy waste, and the cloudy waste, no matter what the color of the original solution or the water, was generally white, because

cloudiness necessarily is white because of the refraction of the light, and you couldn't really tell what color the fundamental liquid was.

BY MS. HICK:

Q. Would you think of any processes that you would characterize as producing a milky waste?

A. Yeah, that's what I said. Not a specific process, but rather the mixture of liquid that entered the -- and mixed in the trough or the sewer.

Q. I think you said earlier that you didn't believe that any of the wastes were treated prior to discharge; is that correct?

A. No, that's incorrect.

Q. Okay. I'm sorry.

A. I would say categorically they were not treated.

Q. Okay.

I also believe you said earlier you didn't have occasion to go down to along the bulkhead of the Passaic River?

A. Never. Not once.

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Q. I also believe you said earlier that you didn't know for certain that the sewer lines leaving the sewer box were connected to the city source, but they were heading off in the direction of Lister Avenue; is that correct?

A. I could answer by saying a sewer line would have to take a U-turn not to go to Lister Avenue, which was very unlikely.

Q. Do you recall any flooding of the plant caused by sewer backups?

A. Well, there was one incident, and it probably occurred around 1950 when there was a hurricane, and probably in the fall -- when there was a hurricane and which had severe onshore winds, and it was high tide, and it drove the tide even higher, and there was torrential rain, and all of the plant from the river to halfway up Esther or Lockwood Street was under water, substantial amount of water. And as a consequence, it shut down the plant for a number of days because all the motors sat on the ground -- the pump motors -- electric pump motors sat on the ground and they all got wet, and they had to be disassembled and dried before we could

start up. And I would say about three days -- it caused a three-day shutdown.

Now, was it sewers? Well, the rain from higher ground was running down towards the river, and -- but it had no place to go because there was already water there, so was it sewer water or was it river water? Was it rain? It was all of the above.

MR. RICHMAN: But you recollect that occurring around 1950?

THE WITNESS: I would say. It's a guess, but I'm sure examining the newspapers, you would find out the exact date. It happened only once. One time. And there are probably pictures in newspapers of people rafting on Lister Avenue. It's true. They made the best of it. They created rafts of the empty steel drums and they were rafting around because there was no work to do, you know.

Q. I think you said earlier that you didn't recollect any explosions or production accidents at the facility; is that correct?

A. No, I didn't say that.

Q. Okay.

A. Because there was an explosion.

Q. Okay.

A. And there was an accident that resulted in a fatality. Two different incidents.

Q. Why don't you tell us about those then?

A. Well, I'll tell it as quickly as I can.

The fatality accident happened in the chloral still, which was located in that little yard (indicating), and --

Q. The one that is outside?

A. Right, between the office building and the plant building, and it was the site of chlorination and distillation of chloral.

Q. That's on Exhibit 4?

(Ms. Hick handing to the witness.)

A. Yes. I'm trying to orient myself. Yes.

There is an open yard between the north side of the office building and the south side of the plant.

There was a wall on the driveway side that prevented intrusion and provided security, and close to that wall was a still that was used

for distilling and purifying chloral, as I described earlier.

I also indicated that the drying and distillation process spent acid, and while the tank was constructed of Monel, which presumably was not attacked by sulfuric acid, it indeed happened.

And as a result, a leak occurred between the inside of the still and the jacket -- the steel jacket that heated it.

So when that leak was found, instructions were left for the night shift to all night long fill that tank with water and empty it, fill it with water and empty it, and thereby remove any traces of acid or organic compounds that were in the tank.

The day following, the plant manager and the welder entered the tank through a manhole, and the tank was a size that maybe it held two people crouched, and they examined the internal surface of the tank and found what they believed was the source of the leak, which was a point of weld between the jacket on the outside and the wall of the tank. And about the time

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that they were ready to start welding to effect a repair, the plant manager received a telephone call. Somebody stuck his head in the manhole and told him he had a telephone call. So he got out of the tank and told the welder to wait until he came back. The welder got impatient and started to weld, which welding produces a rather strong electrical discharge.

There was an explosion caused by the fact that the acid had leaked from the tank into the jacket. The jacket was steel. Reaction between acid and the steel shell produced hydrogen, and the hydrogen exploded, and the welder was dragged out of the tank with severe internal injuries and died a few hours later in a hospital.

MR. CONNOLLY: When did this occur? Do you remember what year that was?

THE WITNESS: 1955. Something like that.

It was investigated. This was prior to OSHA and the accident was the purview of the Labor Department in Newark. Whether it was the city labor department or the county or

the state, I don't know, but it was investigated and no responsibility was assigned.

BY MS. HICK:

Q. Can you think of any other accident?

A. Well, there was an explosion that occurred in this building (indicating), which was referred to as a three-story building. This is back here. It's on the north side of the wall against which the phosphorus oxychloride tanks were located, and I'll label it as the three-story building. And it was a building that had one tank, as I mentioned, that we used for dissolving DDT, to make DDT solutions.

This (indicating) is the DDT solution tank, and they put one reactor in here, which was a utility reactor and wasn't dedicated to any particular manufacture, but was there in the event we needed one.

And that was located, let's say, here (indicating), and the rest of the building was a maintenance shop and a storage of empty drums, empty fiber drums and maybe bagged raw material.

And it was three stories high, but only

the ground had a floor, and the rest of it was all catwalks, and it was relatively useless for our purposes at that time.

What occurred was another company asked us to make -- you might call them short run of some chemicals that they especially needed. And we did that for a number of firms. We did it for Dupont and International Flavor and Fragrance and a number of firms who needed an esoteric chemical that was not in regular production but was required by them as an intermediate for making something else, and it was -- would be too much of an effort and too costly for them to set it up in their own plant inasmuch as it was not a permanent thing. They just needed a quantity, whether it was a few hundred or a few thousand gallons.

And it came to Montrose, as a number of companies did, and said, we want this material made and we will give you the raw material, and we will give you the process, and we'll give you the drums or containers to put the finished product in, and the fee was decided upon to do the work, which is referred to in the industry as

toll work, T-O-L-L. And we did it a number of times. We made intermediate rocket fuel for Thiokol, T-H-I-O-K-O-L.

Q. And this incident that occurred, what product was being manufactured; do you recall?

A. I don't know, but I'll describe it the best I can.

What they gave us was a number of drums of toluene derivative. I don't know exactly what it was, but I would say it was similar to toluene, but instead of a metal group, it had an isopropyl group. It had, I believe, an isopropyl group. And they gave us some nitric compounds to -- to use to attach a nitrate to that derivative, okay. And they gave us the temperature conditions and so forth, and we made a batch and shipped it back to them. It was satisfactory and several months later they came back to us and said, would you make another batch, and since we had the experience, we said we would.

And one fine afternoon, someone not from the regular production department but, in fact, was Seymour Shiffman who ran the shipping

and receiving and had some technical knowledge, was put in charge of it because he had the time to do it, and what happened was the reaction didn't go as expected or as it went the first time, but it got out of the control and it started -- the tank started to emit a brown smoke, which is indicative of nitrate -- nitrous oxide, and it alerted the people in the vicinity, and everybody got out of the building. And about two minutes later, the whole thing went boom and destroyed the building.

MR. RICHMAN: Was that the only building destroyed?

THE WITNESS: Yes. That building, yes.

MR. CONNOLLY: Was that released, that liquid or whatever it was they were making?

THE WITNESS: It ended up on all the cars in the parking lot. You know, it was like a frappe. Everything was covered with black gum. You know, all the cars were ruined. Concrete blocks --

MR. CONNOLLY: Do you remember the name of the company that you were dealing with?

THE WITNESS: It would be a guess, but

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I would say International Flavor and Fragrance.

MR. CONNOLLY: IFF?

THE WITNESS: Yeah, IFF.

BY MS. HICK:

Q. Can you think of anyone that was employed by Montrose at the time that could identify for sure who that company would be?

A. Ben Rothberg.

Q. Let's talk about personnel then.

MS. HICK: Do you have one more question?

MR. RICHMAN: No.

Q. Let's talk about personnel.

During what years was Benjamin Rothberg employed? You said, I think, he was there when you came?

A. (Witness nodding.)

Q. And he was there when you left?

A. Exactly.

Q. And he was -- what position did he hold?

A. Well, I can't say that I know absolutely because I never saw a document with

his name and title, but as the company was constituted, he was vice president in charge of production.

Q. And you indicated that he would occasionally participate in the production?

A. No, he just walked through the plant and made sure everybody had their nose to the grindstone.

Q. But he presumably would have knowledge of the products that were manufactured?

A. Absolutely.

Q. Okay.

What about the name Samuel Rotrosen (phonetically)?

Does that ring a bell for you?

A. Sure.

Q. Was he at the company when you were employed?

A. Yes, but he joined the company, let's say, about five years after I did because he married Ben Rothberg's sister.

Q. He was there when you left the company?

A. Yes.

Q. Would he have a knowledge of the

processes?

A. I doubt it.

He was an accountant and wound up as the secretary/treasurer.

Q. You said earlier that Oscar Randall may have worked for you at one point?

A. Yes.

Q. Does the name Kelly Brown (phonetically) ring a bell?

A. Yes.

Q. How about Thelb Cameron (phonetically)?

A. I was trying to think of his name for a long time.

What's his first name?

Q. Thelb?

A. It wasn't Thelb, but it was something that is not common, and I once said to him, "That's a hell of a name to grow up with." He said, "Yes." And I said, "What's your son's name," and it was the same as his.

Q. Did he hold the same type of job that you did or was it --

A. No, he was a chemical operator. We had -- he -- the company had grown to a point

where a kind of structure evolved, and we had the shift foreman, of which I was one, but permanent shift -- and no shift -- and performed in a general nature, and each shift had two foremen and three or four chemical operators that were in three grades, A, B and C: A, being capable of working unsupervised, B, with some supervision, and C, completely supervised, and Oscar Randall, I believe, was a C.

Q. What about Thelb Cameron?

A. He was probably a B.

Q. And Kelly Brown?

A. Was a foreman.

Q. One more name, and that's Pincus Rothberg?

A. He was the president of the company, and for the first three or four or five years he took an active part in the operation of the company, and then he didn't retire, but he stopped coming to work, and he probably moved to Florida, though I can't say for certain. And he would come in once or twice a year to open his mail, which is essentially advertising, and sit -- they reserved an office for him in the

office building, and out of deference to his -- to his status, and he would come in for a short period, open his mail, ask questions which weren't too pertinent, and then leave.

MS. HICK: Okay.

Well, I'd like to thank you for coming in to talk to us about this information.

Why don't -- if I could just take a short break, and then we will come and wrap up.

THE WITNESS: May I say on the record, thank you for inviting me.

MS. HICK: Okay. Why don't we just take a brief break?

(A brief recess was taken at this time.)

MS. HICK: Okay.

Now, what will happen from here on out is that the stenographer will generate a record of today's discussions, and I will send to you, Mr. Koved, a copy of that transcript which you should review for inaccuracies or misspellings and sign and then send back to me with the markings of

Koved

those errata, and I think that that's all we need to do.

Thank you again, and it's been a very productive day.

(Time noted: 5:07 p.m.)

_____
Solomon H. Koved

Subscribed and sworn to before me
this day of 1994.

----------I N D E X----------

----------E X H I B I T S----------

C E R T I F I C A T E

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

I, Mindy Perlish, a Notary Public within and for the State of New York, do hereby certify:

That SOLOMON H. KOVED, the witness whose deposition is hereinbefore set forth, was duly sworn by me and that such deposition is a true record of the testimony given by such witness.

I further certify that I am not related to any of the parties to this action by blood or marriage, and that I am in no way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 6th day of April, 1994.

Mindy Perlish

Mindy Perlish, C.S.R., R.P.R.

LAWYER'S NOTES

Page	Line	

Sol Koved

EDUCATION

Montclair State College - M.A. in Education
City College of New York - B.S. in Chemistry (ChE minor)
Rutgers University extension courses: Industrial Wastewater Treatment, Loss Prevention Control, Industrial Safety, Pollution Control, and Toxicology

EXPERIENCE

ENSR CONSULTING AND ENGINEERING, Somerset, NJ -Environmental engineers

1988/Present — As Chemist and Field Technician participated in projects for

Ground water remediation, bioremediation, alternative solvents study, soil vapor extraction

STONE & WEBSTER ENGINEERING CORP., New York, NY - Consulting petrochemical and utility engineers

1987/1988 — As Senior Scientist developed radiological emergency response procedures for Philadelphia Electric Co. Peach Bottom Atomic Power Station

Prepared surveillance tests (equipment integrity/maintenance) for plant operations, change justification and NRC requirements

1981/1985 — As Nuclear Technology Scientist, planning section leader, in support of nuclear generating stations

Developed detailed evacuation plans, prepared litigation responses, and managed logistical emergency support for Shoreham (LILCO) Generating Station
Wrote emergency radiological procedures for Delaware State and counties. Prepared manuals and trained state/county personnel for response to Salem, NJ (PSEG) Generating Station emergency

EMERGENCY RESPONSE & PLANNING, Princeton, NJ - Emergency Planning consultant

1985/1987 — As Senior Associate Planner, performed lead function for customer service

Developed computerized programs for commitment tracking, mobility impaired population evacuation and ingestion pathway management for Carolina Power/Light Shearon Harris Plant
Evaluated/trained county agencies to decontaminate/shelter for Georgia Power/Light Plant Vogle.

TIMMONS & CHARLES, INC., Linden, NJ - Marine boiler treatment consultant and manufacturer of equipment and chemicals

1978/1981 — As Customer Service Manager and Field Services Chief fulfilled these responsibilities to major petroleum corporations worldwide fleets

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Directed worldwide technical service operations to ensure boiler plAnt integrity, water purity, chemical efficiency and corrosion prevention. Designed technical training seminars, wrote advertising and test procedures, supervised foreign/domestic product inventories, prepared proposals for military, government and industrial contracts.

TANATEX CHEMICAL COMPANY, Lyndhurst, NJ - Manufacturer of bulk textile chemicals

1971/1976 As Production Manager was responsible for these assignments

Directed manufacturing, warehousing and shipping as well as production scheduling, quality assurance, inventory control. Provided raw material specifications and negotiated purchase. Managed security, safety and pollution monitoring.
Designed personnel/product safety and operations manuals. Directed OSHA/EPA regulations and municipal ordinances compliance. Promoted community relations and administered union grievances.

MONTROSE CHEMICAL COMPANY, Newark, NJ - Agricultural and intermediate organic chemical production

1943/1971 As Assistant Plant Manager and Production Supervisor in the synthesis of complex organics

Supervised a wide range of production operations involving extremely hazardous chemicals and solvents. Directed pilot plant operations to evaluate reaction parameters, equipment design, materials of construction. Supervised production quality control laboratory and new product research/development. Supervised new equipment installation and maintenance operations.

PUBLICATION FIRST DAYS - An international philatelic journal

1960/1992 Edited and published this award winning periodical, producing eight issues annually. Executed every aspect of magazine production including layout, advertising, illustration, subscriber fulfillment, mailing, et cetera.

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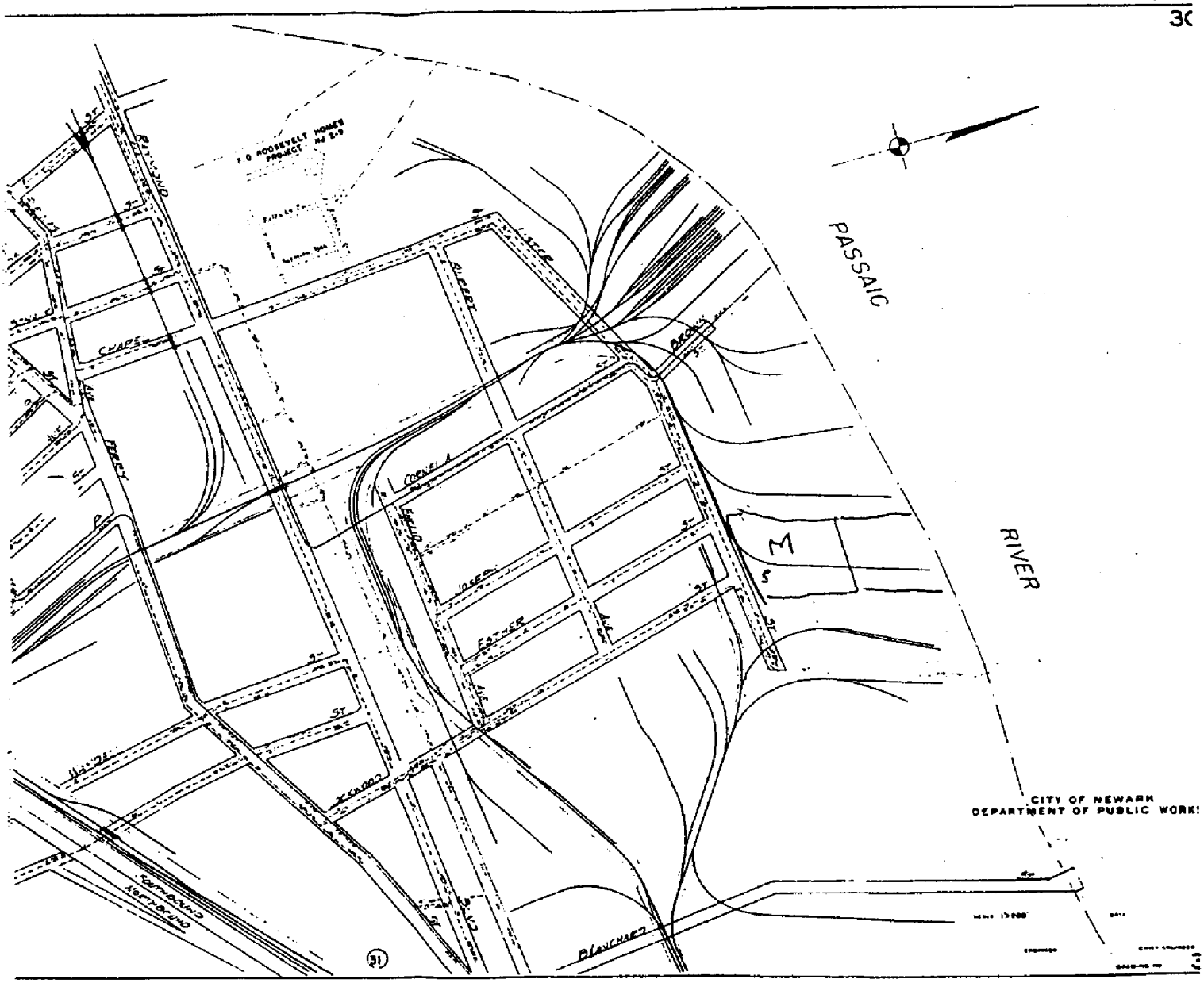
EXHIBIT
2
3/24/94 MF



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home
201-276-7213.

14 Samoset Road
Cranford, NJ 07016

June 9th 1983

Dr. J. Richard Goldstein, Health Commisioner
New Jersey State Department of Health
John Fitch Plaza
Trenton, New Jersey 08625

RE: DIOXIN INVESTIGATION IN NEWARK, NJ

Dear Dr. Goldstein:

As a chemist/cheical engineer of 33 years experience, with 28 years in chemical production management, I have new information relative to the above referenced incident.

The attention to and investigation of the Dioxin contamination at the former Diamond Shamrock plant (80 Lister Avenue) in Newark, NJ, is most commendable.

Be advised, however, that the Montrose Chemical Company site, just two doors down the street at 120 Lister Avenue, must receive even closer scrutiny. Montrose far exceeded Diamond's production in terms of years, tonnage, and number of different toxic chemicals manufactured.

Montrose Chemical produced a wide range of herbicides and insectcides during my 28 years employment with the firm. The emphasis was on chlorination and the products manufactured included 2,4-D and 2,4,5-T (as acids, salts, and esters), DDT, BHC (benzene hexachlride), Lindane, DDVP (dichloro divinyl propane), Dibrom, chlorinated tricresyl phosphate, and many others.

The firm ceased business several years ago — the property is now occupied by another company.

There are two immediate concerns: 1/ Investigate the 120 Lister Avenue site in its own right, not as an adjunct to the Diamond matter, to determine the extent of hazard to the community. 2/ Provide medical evaluation for the former long-term Montrose Chemical Company employees.

We trust that these disclosures will receive immediate attention and anticipate an early and positive reply.

Very truly yours,

S. H. Kovel

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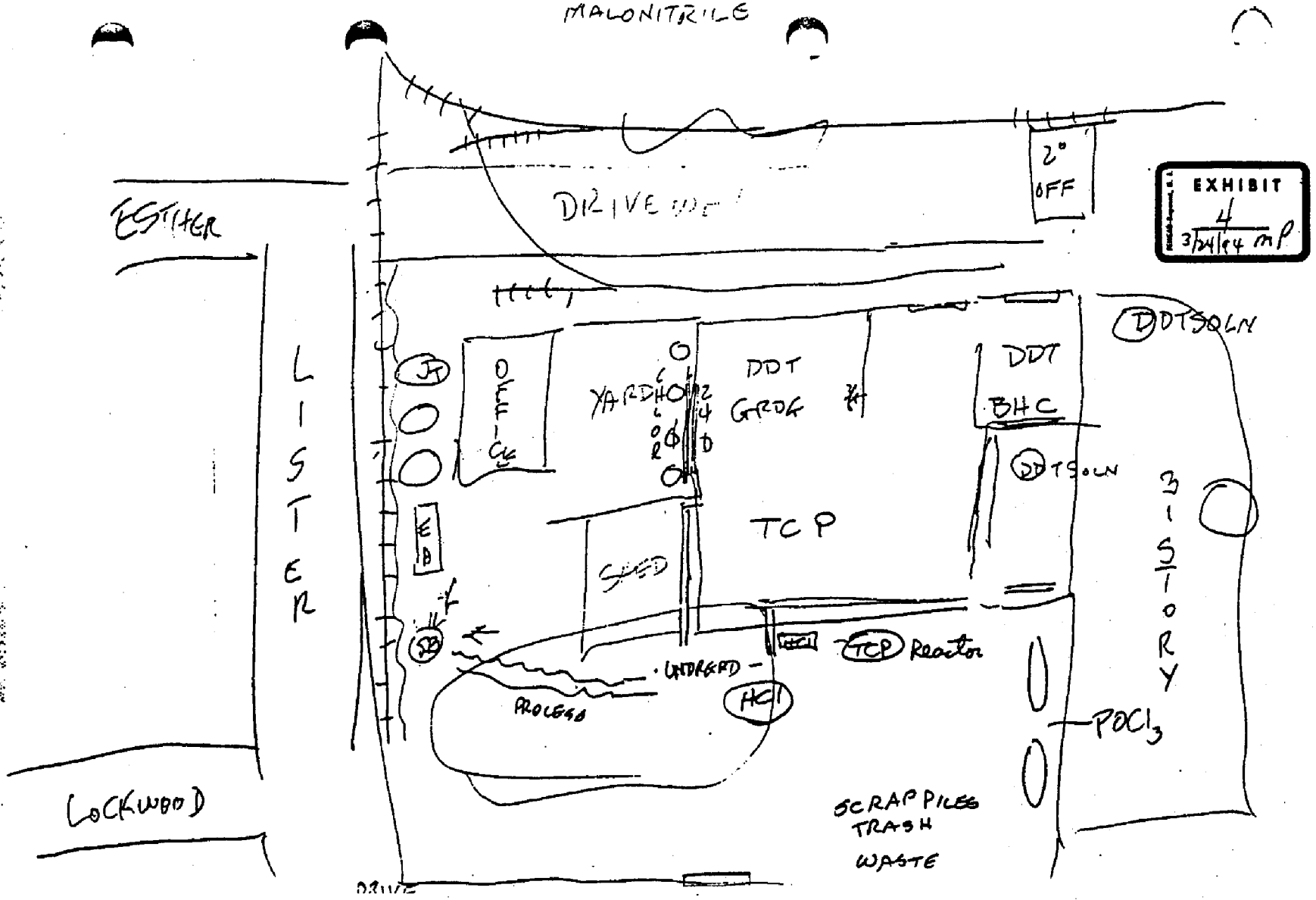
EXHIBIT A



14 Samoset Road
Cranford, NJ 07016

June 9th 1983

Dr. Richard Dewling, Deputy Administrator
Environmental Protection Agency, Region 2
26 Federal Plaza
New York, NY 10278

RE: DIOXIN INVESTIGATION IN NEWARK, NJ

Dear Mr. Dewling:

As a chemist/chemical engineer for 33 years with 28 years in chemical production management, I have new information which will be of value to the above referenced investigation.

The attention to and investigation of the Dioxin contamination at the former Diamond Shamrock plant (80 Lister Avenue) in Newark, NJ, is most commendable.

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The firm ceased business several years ago — the property is now occupied by another company.

There are two immediate concerns: 1/ Investigate the 120 Lister Avenue site in its own right, not as an adjunct to the Diamond matter, to determine the extent of hazard to the community. 2/ Provide medical evaluation for the many long-term Montrose Chemical Company employees.

We trust that these disclosures will receive immediate attention and anticipate an early and positive reply.

Very truly yours,

S. H. Kovel

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PASSAIC VALLEY SEWERAGE COMMISSIONERS

790 BROAD STREET
NEWARK, N. J. 07102

JAMES V. SEGRETO
Chief Counsel

February 1, 1972

City of Newark
Department of Public Works
City Hall
Newark, New Jersey

Attn: Samuel Friscia, Director

Gentlemen:

This will confirm the Commissioners' Inspector's telephone call to the Department of Sewers, made on January 24, 1972, informing them that samples taken from the Roanoke Avenue Storm Sewer and from the catch basins located at Lister Avenue near the Montrose Chemical Company, contained explosive vapors. I am enclosing copies of the laboratory reports of these three samples for your information.

It is imperative that this type of discharge to your storm sewers and thence to the river, which is not only polluting but dangerous, be halted at once.

Very truly yours,

PASSAIC VALLEY SEWERAGE COMMISSIONERS

S. A. Lubetkin
Chief Engineer

SAL/KI
Enclosure
cc: P.V.S.C.
Mr. Robert Van R[illegible] - City of Newark
[illegible]