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Bondstrand PID

Bondstrand

Bondstrand was Ameron's line of corrosion-resistant pipes and fittings, designed to be a cost-competitive alternative to stainless steel pipes.¹

There were several series of Bondstrand pipes, but only the 4000 and 5000 series contained asbestos. Both contained crocidolite.

Bondstrand 4000 and 5000 series were first manufactured by Ameron's subsidiary Amercoat, Inc. and then later by Ameron's Corrosion Control Division.²

Years Produced

Several primary source documents indicate that the 4000 series began production in 1953, including advertisements and engineering guides from the 1950s. Ameron and its corporate representatives have given conflicting dates of when Bondstrand was first produced. Rog answers state that it was produced during the 1960's and up through the 1970's.³

Corporate representative Ralph "Rocky" Friedrich testified that Ameron began manufacturing Bondstrand in the late 1950's/early 1960's.⁴ More recently he testified that Ameron licensed Young Development Labs in 1953 for the process of filament winding, but that it didn't produce its first Bondstrand pipe until 1955.⁵ Initially, Ameron had development issues with the pipe, and Friedrich claimed that the first successful production didn't happen until about 1960.⁶ Another corporate representative, Dalt Bordner, confirmed Ameron's rog answers, testifying that Bondstrand was first sold to the public in the early 1960's.⁷

¹ Deposition testimony of Dalt Bordner (6/17/2003) 13:10-15

² Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC\IL 2012 06 08 MFG AROG-ADOC (#14). *See also* \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 134)

³ GO 129 am resp POS 12-7-04 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

⁴ Deposition testimony of Ralph Friedrich (6/6/2003); 39:23-40:2

⁵ Friedrich (3/24/2011) 98:19-24

⁶ Friedrich (3/24/2011) 99:7-22

⁷ Bordner (9/23/2003) 23:13-24:2

Friedrich testified in 2003 that Bondstrand did not contain asbestos during the 1950's and that it was added sometime later.⁸ Bordner also testified that asbestos was first added on an experimental basis sometime in 1960 or 1961.⁹

Friedrich testified that Ameron removed asbestos from Bondstrand in approximately 1975.¹⁰ Another testified that it was 1978.¹¹ Official correspondence indicates that it was late 1979.¹² **Even after Ameron removed asbestos from Bondstrand, it continued to sell remaining asbestos-containing inventory until it was used up.**¹³

Bondstrand 4000

Bondstrand 4000 pipe products were fiberglass-reinforced epoxy resin pipes designed for use in severe chemical services and corrosive environments, with operational temps ranging as high as 300F.¹⁴

The RP-6A adhesive used for the 4000 series was also asbestos-containing and produced by Ameron.¹⁵

A Bondstrand advertisement stated that the 4000 series had been used in many varied industries since 1953.¹⁶ An engineering guide for the product confirmed that it had been in production in a variety of industries since that time.¹⁷ In 1979, an edition of *Ameron News* gave an overview of the history of Bondstrand, stating that Amercoat acquired a patented process for tubular filament winding in 1953.¹⁸

Bondstrand 5000

⁸ Friedrich (10/3/2003); 57:7-18

⁹ Bordner (9/23/2003) 21:14-22:1

¹⁰ Friedrich (6/6/2003); 56:8-22

¹¹ Bordner (9/23/2003) 115:3-11

¹² \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (pgs. 186-188)

¹³ Deposition testimony of Neil Lambly, 6/15/2011 (93:21-95:12)

¹⁴ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 205). *See also* Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

¹⁵ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

¹⁶ SC-AIC-1550 (p. 3)

¹⁷ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 205)

¹⁸ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Documents from Cheryl White - PHH 1 Docs\GIES 1778 - 2254.pdf @ AM-GIESK-01984

Bondstrand 5000 products were fiberglass-reinforced polyester resin pipes designed to handle oxidizing agents and highly corrosive solutions that were generally beyond the capability of epoxy-lined pipe.¹⁹

The RP-105 adhesive used with the 5000 series was asbestos containing and produced by Ameron (see below).²⁰

Advertisements indicated that Ameron began manufacturing the 5000 series around 1963. The advertisement described the 5000 pipe as a product that combined all the benefits of both epoxy and polyester resins in one single unit. It also stated that it was available in matching fittings, from 2 in. to 12 in.²¹

Other Bondstrand Lines

Ameron claims that only the 4000 and 5000 series contained asbestos; however, specification sheets for the Bondstrand 1000 and 2000 series calls for fittings to be lined with c-veil and overwrapped with resin-impregnated asbestos mat. Molded fittings could be used if they were found suitable for the pressure and chemical service requirements.²²

Product Description²³

For the Bondstrand 4000 and 5000 series, Ameron used crocidolite asbestos because of its longer fiber length and its better chemical resistance.²⁴

Ameron did not make custom Bondstrand pipe for its customers. Pipe products were manufactured to standard specifications, although Friedrich could not rule out that Ameron never made custom asbestos-containing Bondstrand pipe for its customers.²⁵

Crocidolite asbestos liner:

¹⁹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 215). See also Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

²⁰ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

²¹ SC-WPC-0300 (p. 330)

²² sc-aic-1860; sc-aic-1861; sc-aic-1870

²³ See the following: Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses; GO 129 am resp POS 12-7-04 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses; Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC\IL 2012 06 08 MFG AROG-ADOC (#29); Friedrich (6/6/2003); 63:9-14; 67:2-69:11; 79:3-7; 99:5-6

²⁴ Bordner (9/23/2003) 33:15-34:9

²⁵ Friedrich (11/7/2007) 30:24-32:3

- The crocidolite interior liner had a blue/black appearance.
- It consisted of 40% blue asbestos and 60% resin.²⁶
- It was around 0.050” to 0.060” thick²⁷
 - Specification sheets for the 4000 series described the liner as “0.05-inch resin-impregnated asbestos specially produced by Ameron for this purpose.”²⁸
 - During the later years that Bondstrand contained asbestos, the 4000 series liner was a combination of both asbestos and C-veil (C-veil was a chemically-resistant glass).²⁹
 - Specification sheets for the 5000 series described it as a “resin-rich liner reinforced with C-veil and crocidolite asbestos fibers. The liner shall have a nominal thickness of 0.050-inches.”³⁰
- Depending on the time frame, it was either a felt-like (described as a mat material) or paper material (see below for more details).³¹
- The mat material was supplied by Special Electric; the paper material was supplied by Mead.
 - NAAC supplied the blue asbestos for both (see below).
 - Cellulo also supplied the crocidolite mat material.
- During the process of eliminating asbestos, Ameron switched from the felt material to the paper material. This would have been around the early or mid-1970’s.³²
 - Elsewhere Ameron claimed that it switched to paper material for automation reasons; the blue asbestos mat could not be automated on the multi-mandrel machinery.³³
 - The paper came on rolls and were 18-20” in diameter.
- The liner was encased in either a thermoset epoxy or polyester resin.

²⁶ Bordner (9/23/2003) 81:2-18. See also SC-AIC-2485

²⁷ Bordner (9/23/2003) 49:5-21

²⁸ SC-AIC-2485. See also \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (pgs. 205; 261-262)

²⁹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1856 thru AMRN150-2092.pdf @ AMRN150-1927

³⁰ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 213)

³¹ Bordner (9/23/2003) 43:13-23; 200:2-11

³² Bordner (9/23/2003) 49:5-21

³³ Friedrich (10/3/2003); 27:12-21

- Below are pictures of the crocidolite asbestos mat material:





Exterior appearance:

- The exterior color of the pipe was black/gray.
 - Bordner testified that originally the pipe was manufactured as a golden color, and that it would change to black after environmental exposure. Sometime later the pipe color was changed to black.³⁴
- Pipe ends were coated yellow (after 1977)
- The structural walls of the Bondstrand pipes and fittings were filament wound.³⁵

³⁴ Bordner (9/23/2003) 83:15-84:3

- o 26% resin and 74% fiberglass³⁶
- The trademark “Bondstrand” was stamped on Bondstrand pipes.³⁷
- Friedrich testified that Ameron also stenciled 4000 or 5000 onto the outside of the pipe.³⁸
- Per Ameron rog answers, “Bondstrand pipe also had warning and/or caution labels for certain years.”³⁹ See Warning Labels below.
- Bondstrand specification sheets stated that pipes and fittings should be marked with the manufacturers’ name, trade name, series, diameter and date of manufacture. The markings were to remain legible during normal handling and installation practices.⁴⁰
- For pictures, see below.

Fittings:

- Produced in various configurations, including toes, elbows, tapered body reducers and flanges.
- Bondstrand fittings were compression-molded and also contained asbestos.⁴¹
 - o There were also filament-wound fittings that were made in a similar fashion as the pipe. These were also made out of crocidolite asbestos.⁴²
 - o According to both Friedrich and Bordner, loose crocidolite asbestos mixed with resin was used to make the molded fittings.⁴³
 - o Bondstrand asbestos-containing fittings were always manufactured with crocidolite asbestos as long as Bondstrand piping contained asbestos.⁴⁴

³⁵ SC-AIC-2485

³⁶ Bordner (9/23/2003) 49:5-21

³⁷ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#38) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

³⁸ Friedrich (3/24/2011) 275:22-276:9

³⁹ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC\IL 2012 06 08 MFG AROG-ADOC (#29)

⁴⁰ sc-aic-2485; sc-aic-2500

⁴¹ Friedrich (8/30/2004) 80:4-14

⁴² Friedrich (6/6/2003); 75:24-89:9. See also \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0782; \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Documents from Cheryl White - PHH 1 Docs\GIES 850 - 1318.pdf @ AM-GIESK-00910

⁴³ Friedrich (11/7/2007) 55:20-56:10. See also Bordner (6/17/2003) 21:15-23:8

⁴⁴ Bordner (6/17/2003) 23:13-24:4

- o **The molded compound for fittings consisted of 40% crocidolite asbestos and 60% resin.**⁴⁵
- The Bondstrand 4000 engineering guide stated that the 4000 series utilized Series “E” fittings, which were epoxy-asbestos lined.⁴⁶
 - o For steam condensate lines, the Bondstrand Series 2000 was recommended; however, the 4000 asbestos-containing pipes and fittings could be used interchangeably with the 2000 fittings.⁴⁷
- The Bondstrand 5000 engineering guide stated that the 5000 series used Series “P” fittings, which were produced using the same polyester lining as the pipe, described as a “resin-rich liner reinforced with C-veil and crocidolite asbestos fibers.”⁴⁸
 - o For 2”-12” pipe diameters, the Series “P” flanges were available in low-cost molded or custom-made glass filament reinforced.⁴⁹
- According to Bordner, the filament-wound lined fittings were made with asbestos mat because it could be formed to the odd shape of the fittings better than the paper could.⁵⁰
 - o **The mat was cut with a rug-cutter.**⁵¹
 - o **Filament-wound flanges were made in Brea’s Bondstrand plant throughout the 1960’s.**⁵²
 - o **A lathe was used to dress the outer edges of the filament-wound flanges, which created visible dust/shavings.**⁵³
- Bondstrand pipe and fittings were joined using either a Quick-Lock bonded joint or a flanged connection. Quick-Lock joints were assembled using a thermosetting adhesive.⁵⁴

⁴⁵ Bordner (9/23/2003) 81:7-8

⁴⁶ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 205)

⁴⁷ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (pgs. 457-459)

⁴⁸ Ibid., 215-222

⁴⁹ Ibid.

⁵⁰ Bordner (9/23/2003) 45:17-46:2. See also Exhibit #5 to deposition.

⁵¹ Ibid., 64:15-24

⁵² Ibid., 76:20-25

⁵³ Ibid., 77:1-9

⁵⁴ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1671 thru AMRN150-1854.pdf @ AMRN150-1729—AMRN150-1731

- Instructions for bonding joints and mounting flanges were included with every adhesive kit.⁵⁵ Instructions for bolting up flanges and for mounting saddles were included with each shipment.⁵⁶
- Bondstrand fittings engineering guide⁵⁷
 - o Note that the guide refers to an audio-visual training program that Ameron recommended for viewing by everyone assembling Bondstrand. Viewing of the film was arranged by the local Ameron sales office.
- Assembly instructions for Bondstrand flanges⁵⁸
- Description of how the fittings were manufactured, including the dust created from when rolls of asbestos mat were cut with large scissors or when the flanges were grinded.⁵⁹



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Dimensions:

- Product was produced in 2-12" diameters and up to 20ft in length.

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0244-0268

⁵⁸ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Bondstrand Brochure.pdf (pgs. 17-18)

⁵⁹ Russell Ladd (3/27/2002) pgs. 311-385

⁶⁰ Q:\ASBESTOS\LIABDOC\H - M\MARINE ENGINEERING\P&H\Log Books\1959\4 April 1959 ocr.pdf (p. 35)

- o Larger sizes were available upon special request.⁶¹
- o Note that Ameron claimed it didn't make custom Bondstrand pipe.
- The 2, 3, and 4" lengths were the most popular size Bondstrand pipe that Ameron produced.

Asbestos Content

The lining of the Bondstrand Series 4000 and 5000 was crocidolite asbestos embedded in either a thermoset epoxy or polyester resin. **The liner was 40% crocidolite asbestos.** It was approximately 0.050" to 0.060" thick.⁶²

The asbestos paper rolls were 4" wide and about 18-20" in diameter. The rolls had a 3" cardboard core at the center. The paper was 30-50 thousandth of an inch thick. The paper had a matte-like finish. Friedrich described it as resembling felt with visible fibers on its surface.⁶³

Elimination of Asbestos

An October 4, 1978 letter from Ameron to one of its customers stated that its plan was to eliminate asbestos from the Series 4000 and 5000 flanges by the first quarter of 1979, and pipe components thereafter. Ameron claimed that normal shaving of the pipe did not expose any asbestos fiber. In the letter Ameron also stated that it cannot provide a recommendation to its customers on ventilation because of the many different conditions that might exist on a jobsite, but it noted,

Based on tests conducted by an independent occupational health consultant at our factory and on jobsites, the asbestos dust which results from cutting or sanding our product, when cutting and sanding is done in accordance with our installation instructions, is within the limits established by OSHA.⁶⁴

This was also Ameron's official response it gave to customers who were concerned about the asbestos in its products.⁶⁵ With its response, Ameron also enclosed a copy of the Kerr-McGee Chemical Corp. study

⁶¹ Q:\ASBESTOS\LIABDOC\H - M\MARINE ENGINEERING\PUBLICATIONS\1959 VOLUME 64\1959 volume 64.pdf (p. 634)

⁶² Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

⁶³ Friedrich (8/30/2004) 63:4-65:6

⁶⁴ SC-AIC-3000.

⁶⁵ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0558

(see “Air Sampling” in Mindy’s Ameron outline), MSDS’s for Bondstrand 4000 and 5000, and a pamphlet titled “Dust, Fume and Mist Respirators.”⁶⁶

A 1983 letter confirmed that Ameron stopped producing Bondstrand with asbestos in 1979.⁶⁷ An August 31, 1979 letter stated that the process was on track to be completed in late fall of that year.⁶⁸

Documents produced by Ameron indicate that it didn’t start experimenting with substitute liners until the mid-to-late 1970’s.⁶⁹ Bordner testified that it was 1972.⁷⁰ A July 22 1976 memo stated the goal of the liner research program was to eliminate asbestos.⁷¹

A June 22, 1976 internal memo revealed that two of Ameron’s corporate representatives—Dalt Bordner and Gordon Robertson—felt that the asbestos liners were what gave Bondstrand pipes their performance advantage and that a significant portion of the Bondstrand business was a result of that advantage. As the memo notes, “It seems likely, therefore, that any nonasbestos substitute we might develop would have to perform about as well as asbestos in important types of service to be considered satisfactory.”

During the 1970’s, Bondstrand liners were made with a combination of C-veil and asbestos. Eventually, C-veil completely replaced asbestos.⁷²

Bondstrand Application

Bondstrand was used in the following industries⁷³:

- Chemical
- Paper
- Mining

⁶⁶ Ibid. See also \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (pgs. 168-171)

⁶⁷ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (pgs. 186-187)

⁶⁸ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 188)

⁶⁹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Docs produced in Speicher\Bonstrand Products Internal Price List.pdf. See also \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150-1856 thru AMRN150-2092.pdf @ AMRN150-2032; Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150-2093 thru AMRN150-2608.pdf; Friedrich (8/30/2004) 55:9-23

⁷⁰ Bordner (9/23/2003) 119:5-19

⁷¹ Exhibit #9 to Bordner (9/23/2003)

⁷² \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Docs produced in Speicher\Bonstrand Products Internal Price List.pdf @ AMRN150-1909; AMRN150-1923—AMRN150-1928

⁷³ SC-AIC-1550 (p. 5)

- Petroleum Production
- Oil Refineries
- Food-related industries
- Marine applications⁷⁴
- Electrical
- Water/Sewage
- Condensate lines
- Nuclear Energy

Bondstrand's suggested applications were fresh/salt water lines, tanker vent lines, product pumping lines, gaging tubes, sea water pumping lines and handrails.⁷⁵

Logos



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⁷⁴ Q:\ASBESTOS\LIABDOC\H - M\MARINE ENGINEERING\PUBLICATIONS\1959 VOLUME 64\1959 volume 64.pdf (p. 634)

⁷⁵ Q:\ASBESTOS\LIABDOC\H - M\MARINE ENGINEERING\P&H\Log Books\1959\4 April 1959 ocr.pdf (p. 35)

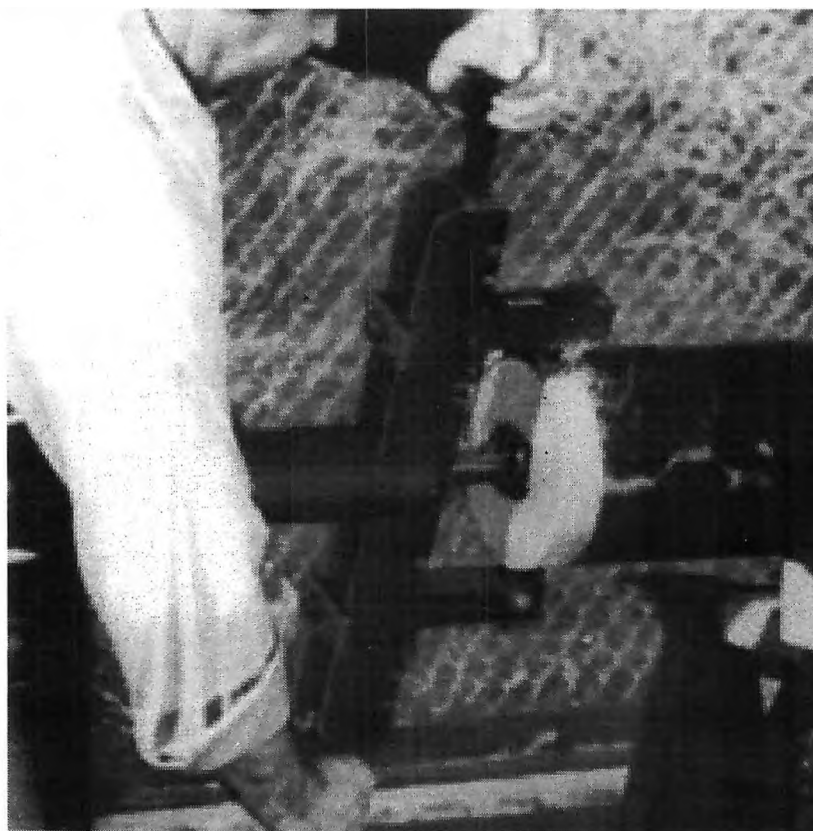
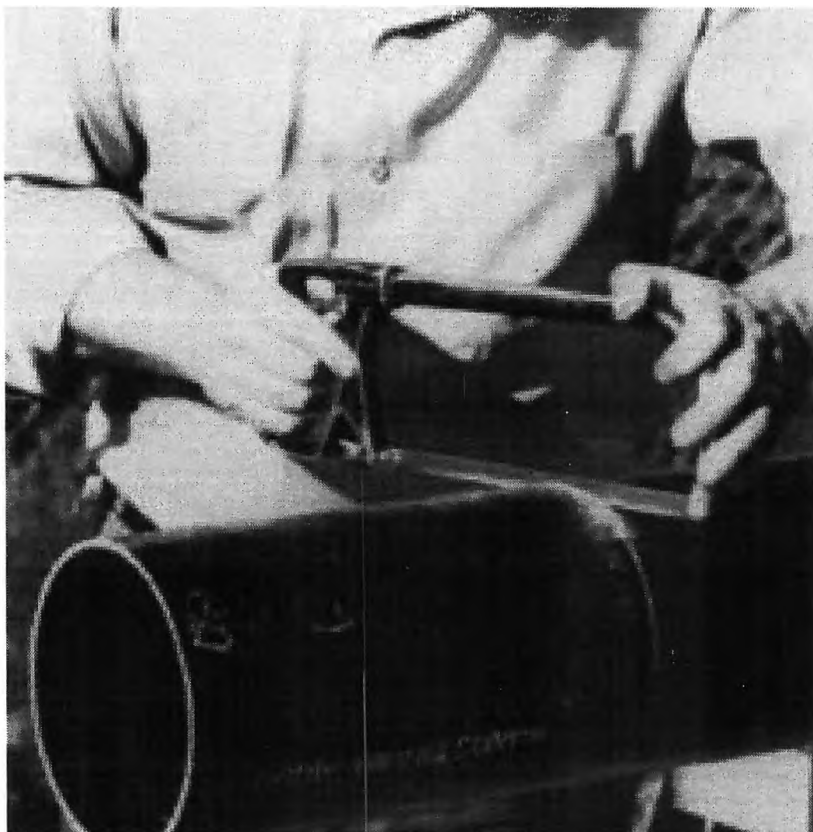
⁷⁶ SC-AIC-1550

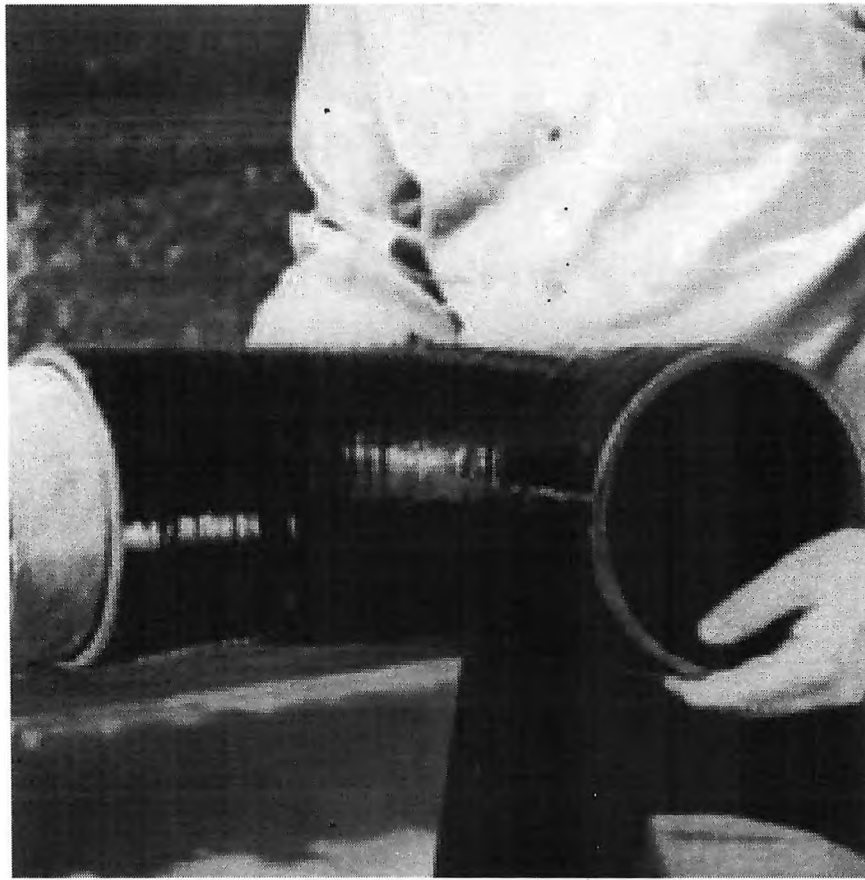
⁷⁷ SC-AIC-2425

Pictures⁷⁸



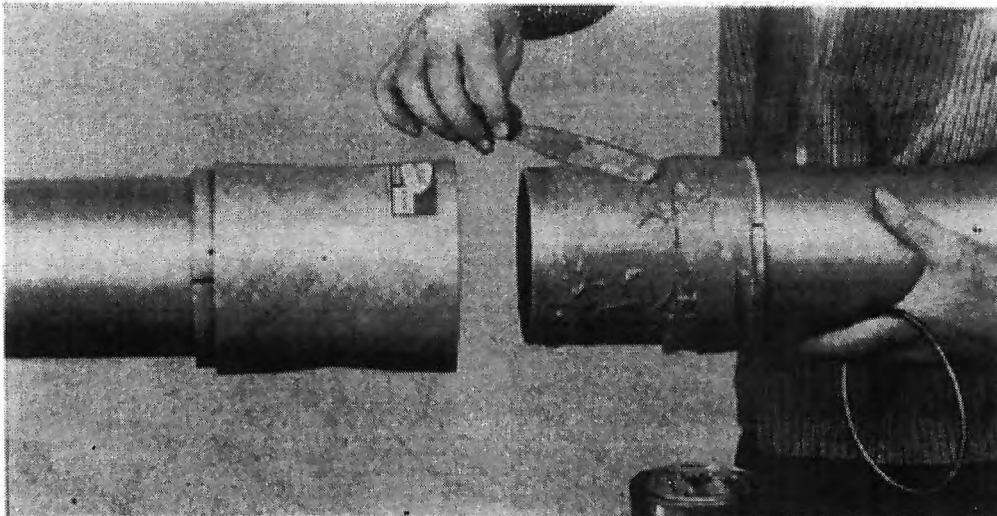
⁷⁸ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Bondstrand Photos from ESL visit. See also Ameron photos from brochures @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Brochures from Old Ameron Site



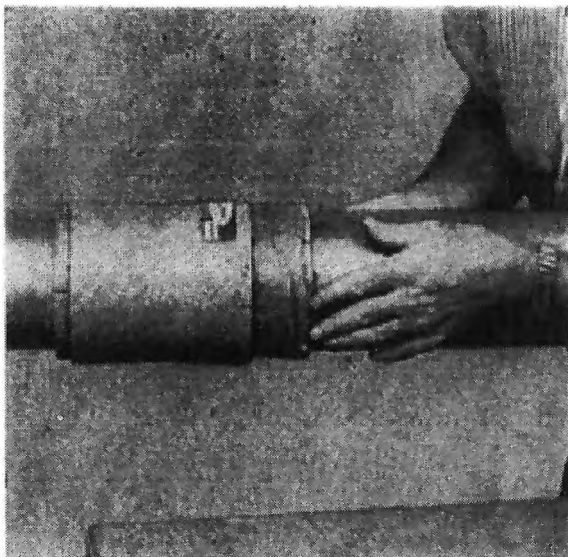


LOCKING WEDGE slid over pipe and covered with special epoxy adhesive. O-ring then goes on end of pipe



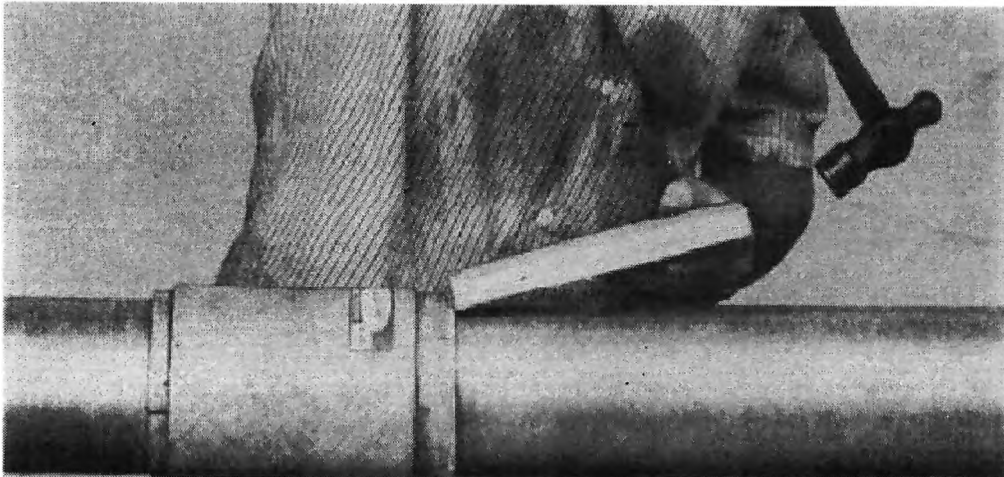


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PIPE INSERTED into fitting and pressed firmly so that end of pipe contacts bottom of socket. Same principle is used for elbows, tees and other locking-wedge fittings

⁷⁹ \\simmons\scanned\ASBESTOS\LIABDOC\H - M\MARINE ENGINEERING\PUBLICATIONS\1959\9 September 1959 ocr.pdf (p. 106/108)



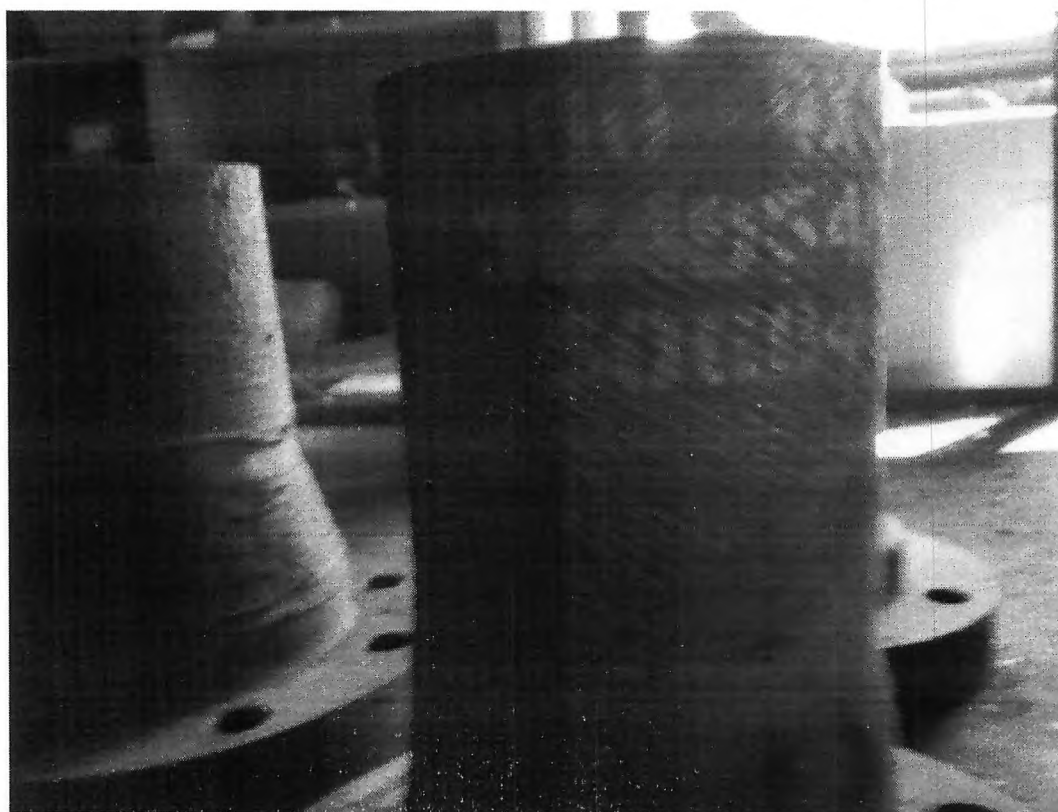
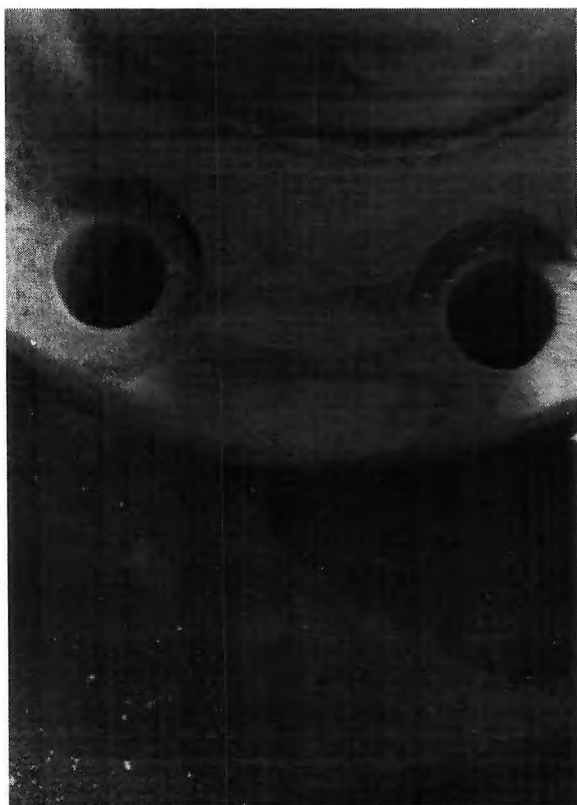
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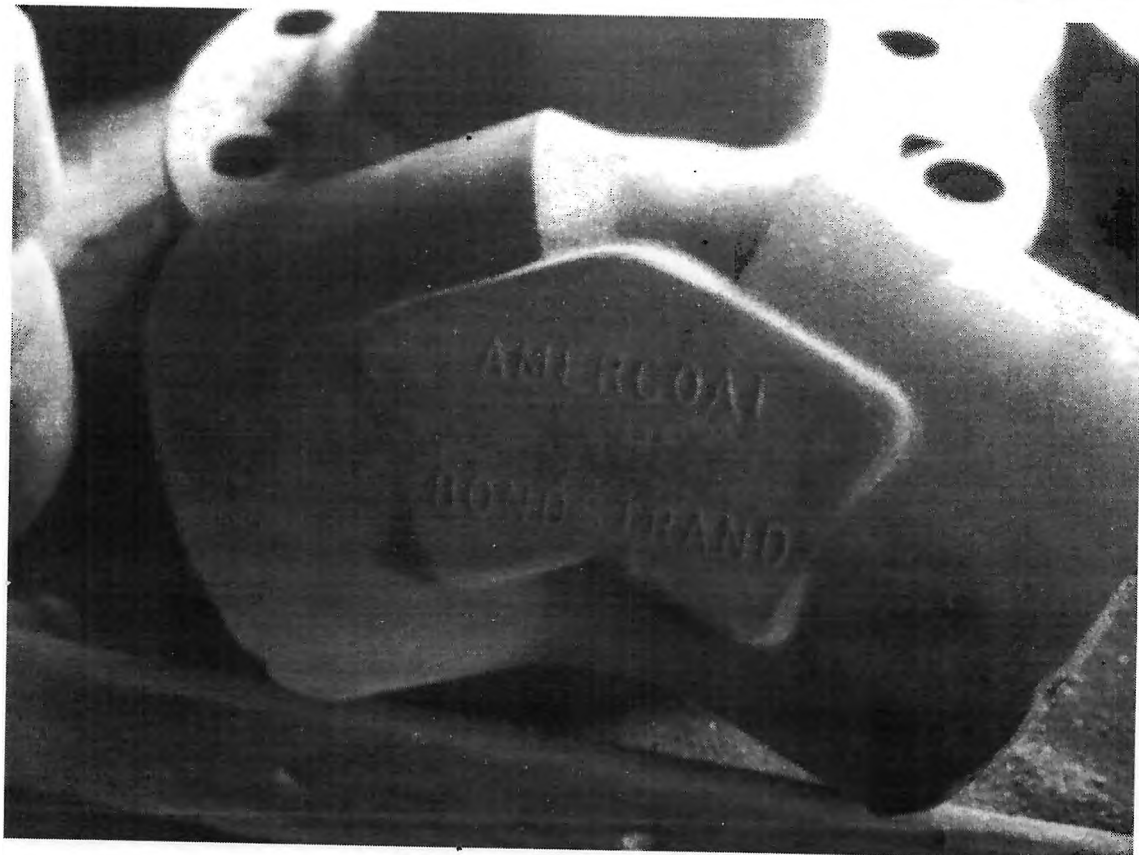


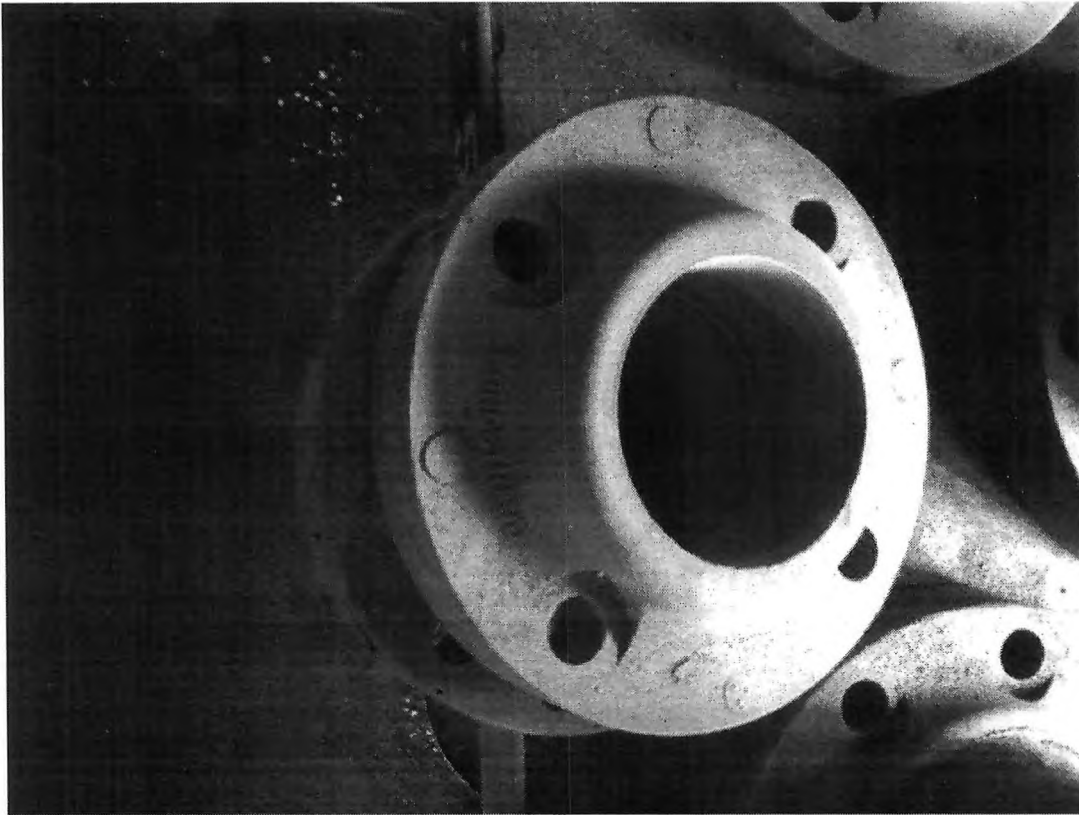
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⁸⁰ Ibid.

⁸¹ Q:\ASBESTOS\LIABDOC\N - U\POWERPOINT PRES\Asbestos Contaning Product Identification 11-24-09[1] by Placitella.pdf (p. 280)



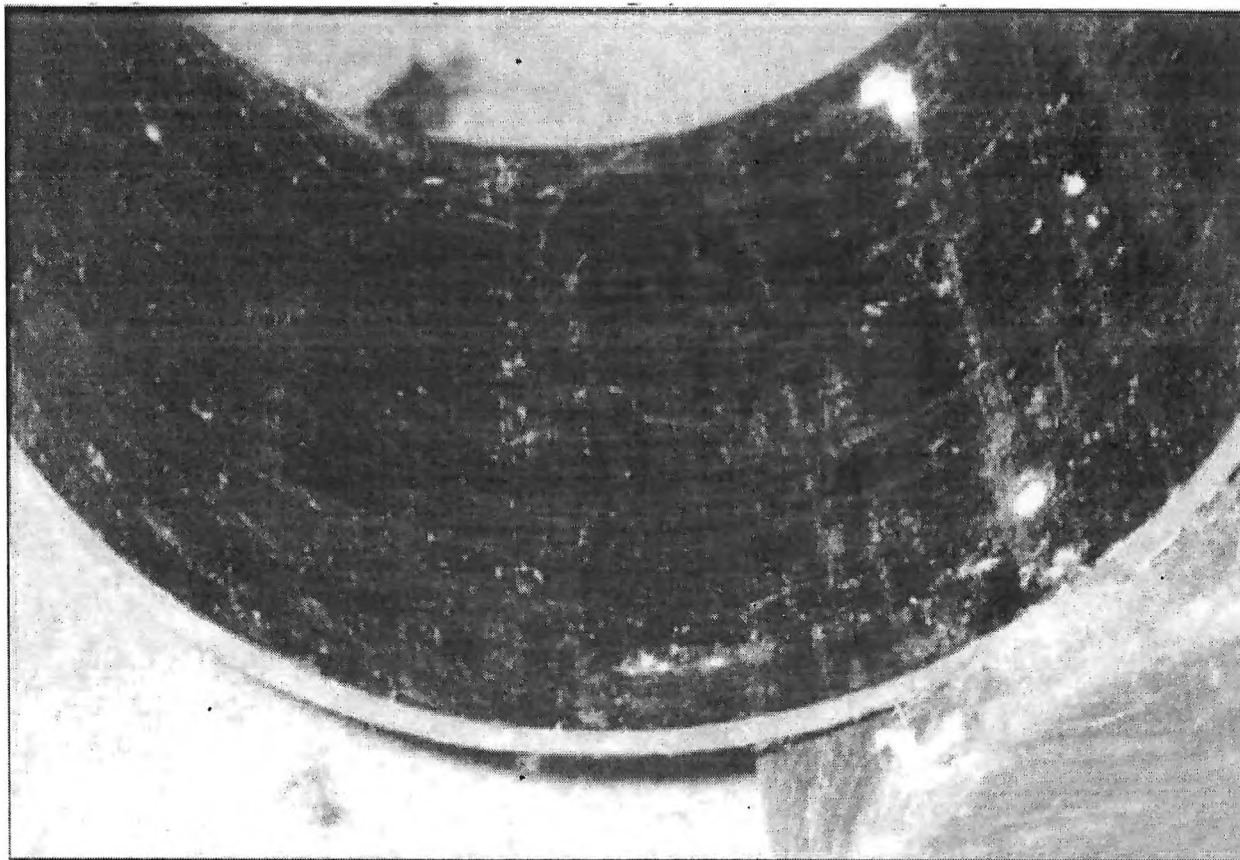






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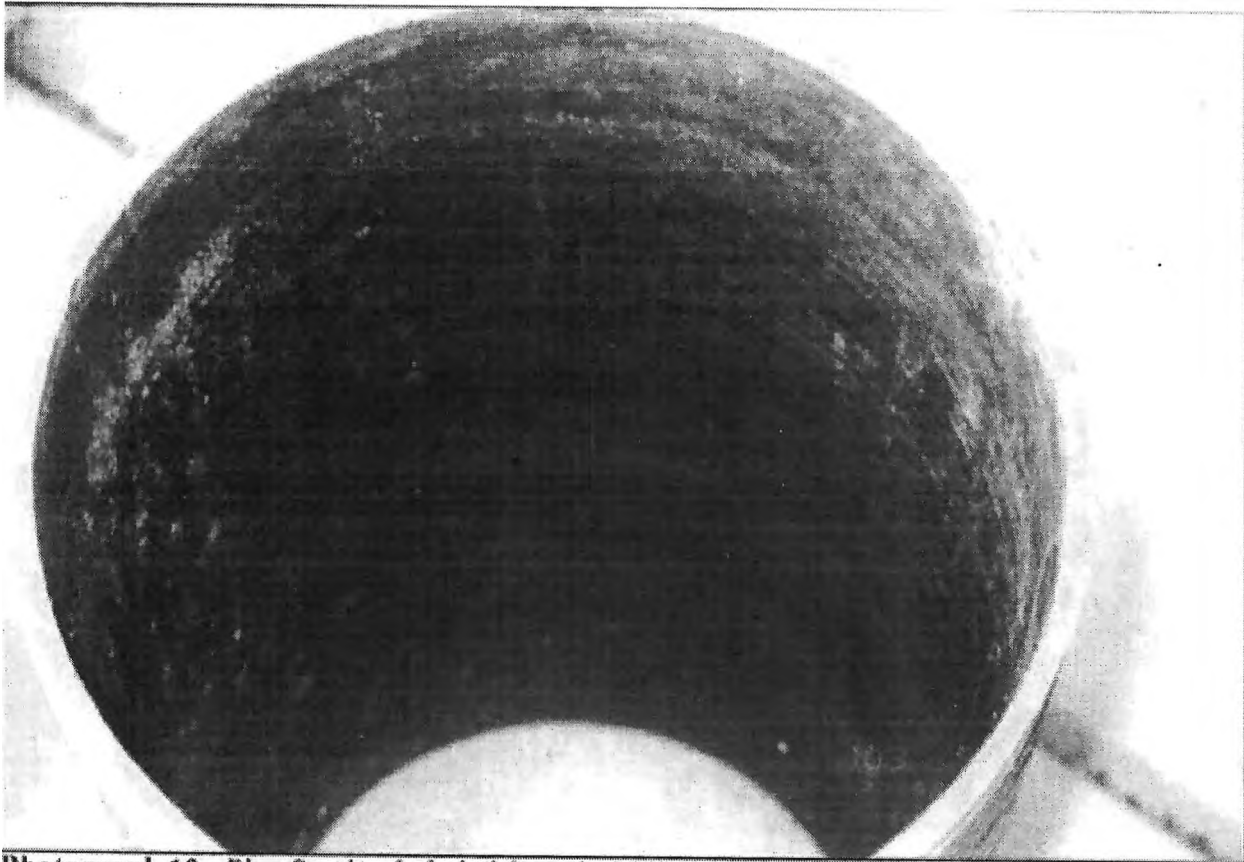
⁸² Q:\ASBESTOS\EXPERTS_ P Experts_Longo-Hatfield-MAS\2011 11 00 Bondstrand Pipe Cutting, Sanding and Cleanup\REPORT



Photograph 4: Pipe Section Labeled Sample 0191-01, Close-up View of Inner Surface

83

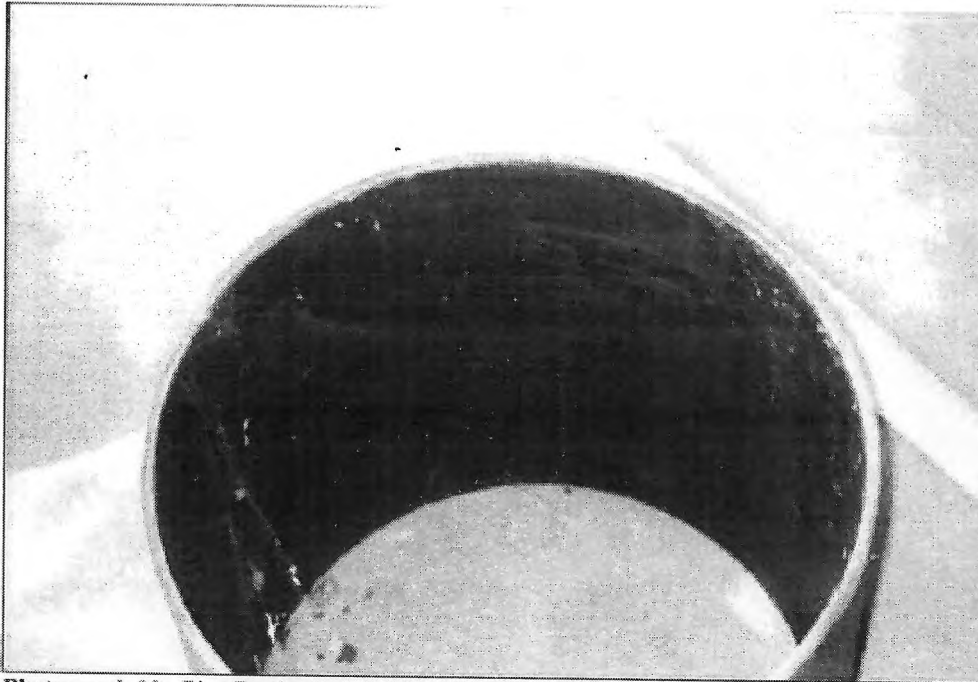
⁸³ Ibid.



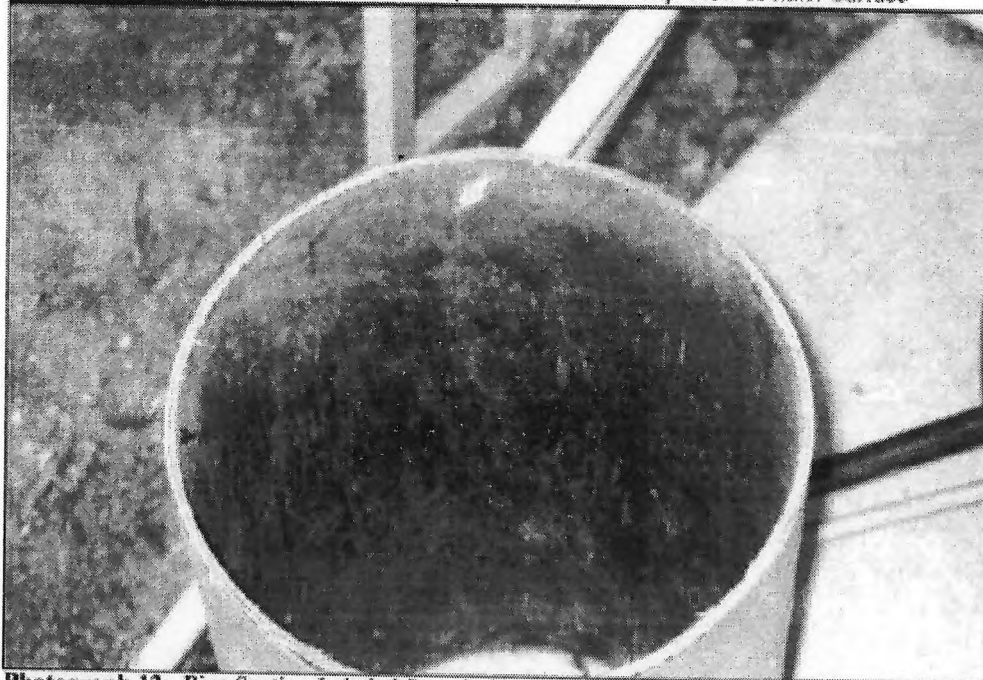
Photograph 10: Pipe Section Labeled Sample 0191-04, Close-up View of Inner Surface

84

⁸⁴ Ibid.



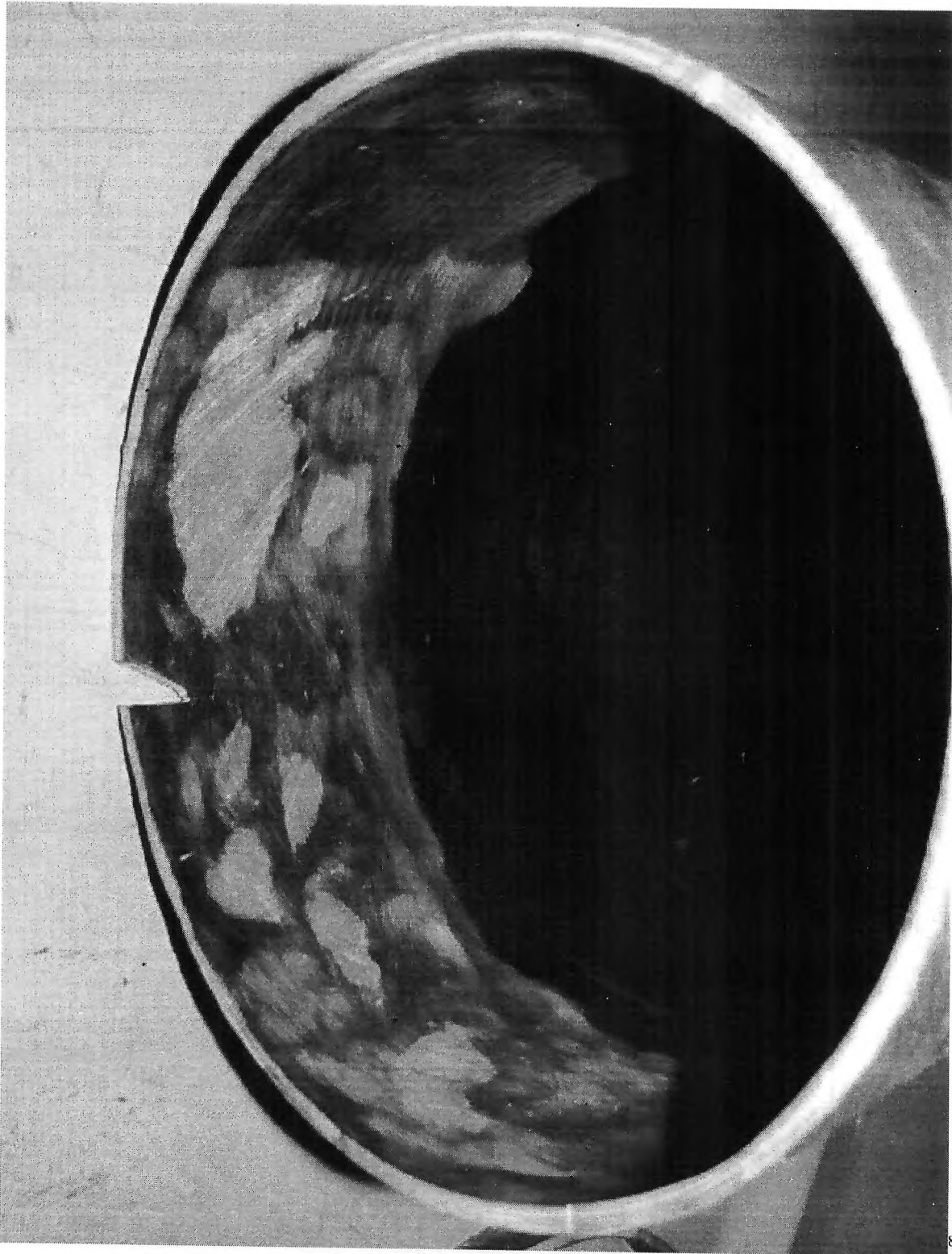
Photograph 11: Pipe Section Labeled Sample 0191-05, Close-up View of Inner Surface



Photograph 12: Pipe Section Labeled Sample 0191-06, Close-up View of Inner Surface

85

⁸⁵ Ibid.



86

⁸⁶ Ibid.

RP-6A Adhesive

The RP-6A and the RP-105 adhesives were manufactured to be used with the asbestos-containing Bondstrand pipes and fittings. The RP-6A adhesive was used with the 4000 series.⁸⁷

The adhesive was a black, chemically resistant epoxy formulated for use with Bondstrand pipe up to a maximum service temperature of 200F.⁸⁸

RP-6A contained 5% asbestos.⁸⁹ It was manufactured with JM 7TF-1 asbestos.⁹⁰ The technical sheet that Ameron supplied with this product did not contain a warning about asbestos.⁹¹

It was available in 3 and 6-oz kits.⁹²

RP-105 Adhesive

The RP-105 was a polyester adhesive that was used with the Bondstrand 5000 series pipes, fittings and flanges. The adhesive consisted of two components, the resin base and the catalyst powder, which were mixed only after the pipe and the fittings were ready to be assembled.⁹³

The amount of asbestos in this product is not known, although Ameron claims that it was a very minor percentage.⁹⁴

The resin base was beige, the catalyst powder was gray and the mix was black. The kits were available in 6-oz. or 3-oz., depending on the diameter of the fittings and the pipes being joined. The contents were added to a large container and stirred carefully and thoroughly for at least 1 minute, or until uniform and the mix had turned black.⁹⁵

For assembly instructions, see SC-AIC-2731.

⁸⁷ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

⁸⁸ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0194

⁸⁹ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

⁹⁰ Bordner (6/17/2003) 27:1-10; 32:4-11

⁹¹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0194

⁹² Ibid.

⁹³ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses. *See also* Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Bondstrand Brochure.pdf (pgs. 19-20)

⁹⁴ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#31) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

⁹⁵ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Bondstrand Brochure.pdf (pgs. 19-20)

The instruction manual for this product had a caution warning about breathing dust, but no indication that it contained asbestos.⁹⁶

Use of Asbestos Material in Bondstrand Flanges

The instructions for the RP-48 Epoxy Adhesive, which was used in the bell and spigot assembly of Bondstrand pipe and fittings, calls for a blanket of asbestos material or fiberglass insulation for the flange mounting. A rolled blanket material was inserted into the pipe. The space inside the rolled blanket was filled with the asbestos material to insure that the blanket remained snugly against the inside of the joint surface.⁹⁷

Insulated Bondstrand Pipeline

The Bondstrand 2000 series pipe (non-asbestos) was used for steam condensate transfer lines. Either the 2000 fittings or the 4000 fittings (asbestos-containing) could be used. The technical data sheet for this product stated that the pipes could be insulated or not insulated depending on the service requirements.⁹⁸

Asbestos Suppliers for Bondstrand

Asbestos Mat (Felt)

During the years when Ameron used an asbestos-containing mat in the Bondstrand pipe, Bordner testified that Special Electric was the only supplier of the mat material. Special Electric purchased the raw asbestos fiber used to make the mat material from NAAC.⁹⁹

However, the minutes of the special meeting of NAAC directors on December 11, 1958 indicate that a company called Plastics and Fibers, Inc. out of South River, NJ made the asbestos mat for Ameron. The minutes of the meeting also indicate that Plastics and Fibers, Inc. was in the process of being sold or merged with another (unnamed) company. The asbestos fiber used for the mat was supplied by NAAC.¹⁰⁰

⁹⁶ Ibid.

⁹⁷ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1671 thru AMRN150-1854.pdf @ AMRN150-1834

⁹⁸ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Bondstrand Brochure.pdf (pgs. 185-187)

⁹⁹ Bordner (9/23/2003) 47:5-9; 59:22-60:11; 183:5-25; 237:14-23; sc-aic-1710

¹⁰⁰ \\simmons\scanned\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\GALIH\27 CDs from Galiher from Jim Walker\NAAC 68B\Johns Manville Corp Civil Action\Johns Manville Corp Civil Action_OCR.pdf (pgs. 308-310).

The minutes of a February 22, 1962 meeting note that the plant in Mundelein, IL was being used to make the asbestos mats for Amercoat in California. This was the plant's primary function and business.¹⁰¹ A September 18, 1964 internal NAAC memo indicates that a plant was established in Mundelein, IL to produce the asbestos mats for Amercoat. The memo also notes that this business will end soon because Amercoat planned on changing its pipe process in early 1965 from the use of blue asbestos mat to an extruded composition of its own manufacture, which would include blue asbestos.¹⁰²

According to Dalt Bordner, Ameron eventually bought the equipment from Special Electric to make the mat itself. This was possibly in the late 1960's.¹⁰³ The notes of the annual Special Electric meeting on May 28, 1966 indicate that Amercoat of Brea, CA purchased the blue asbestos felt plant from NAAC.¹⁰⁴

The May 23, 1970 minutes of the annual meeting of directors of Special Asbestos Co., Inc. note that Amercoat was the prime producer of blue felt in the United States, and consequently, charged an inflated price for the product.¹⁰⁵

Sales from Special Electric to Amercoat/Ameron

- See Exhibits #11, 15, and 15 to Robert Carlson deposition (9/30/2003)
- \\simmons\scanned\ASBESTOS\DEPOS\1P&L DEPOS\Exhibit A - P & L Transcripts for DE disclosure 2012 01 20 - Frary\SPECIAL ELECTRIC\HEIDER, FREDERICK 2003 10 01\Exhibits\2.pdf

Cape Asbestos

On July 18, 1972, Ameron sent a letter to Cape Asbestos stating that the blue asbestos fiber mat used in the production of Bondstrand had previously been manufactured at Ameron's plant in Ardmore, OK. Since the plant had recently been sold, Ameron could no longer get that product. Ameron inquired if Cape could supply annually 20K-30K lbs. of crocidolite asbestos to be delivered to its plants in Brea, CA and Buffalo, NY.¹⁰⁶

¹⁰¹ Ibid., pgs. 313; 329-331. See also \\simmons\scanned\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\WALKER LF\ORIGINAL NAAC BOXES (WLF)\NAAC Documents\Complete\Images\Box027\Dir01\NAAC-SF-0005131.pdf (pgs. 2-4)

¹⁰² Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\LIABILITY OUTLINES\Chemical Pipe Fiber Suppliers (Summary by Karoline). See also \\simmons\scanned\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\GALIHIER\27 CDs from Galiher from Jim Walker\NAAC 64A\Business Procedures File\Business Procedures File_OCR.pdf

¹⁰³ Bordner (2/23/2007) 41:20-42:14

¹⁰⁴ \\simmons\scanned\ASBESTOS\EXHIBITS\TEXT SEARCHABLE\N-Z\SPECIAL ELECTRIC COMPANY\SC EXHIBITS\SC-SEC-2540\Bates Stamped Documents SIRA 9659 - 014302\Special Electric documents produced in Sira 07-07-2009 BATES# SIRA 12401 - SIRA 13625.PDF @ SIRA 13066-69

¹⁰⁵ \\simmons\scanned\ASBESTOS\LIABDOC\N - U\SPECIAL ELECTRIC\P&H\Sira Docs\Pertinent MSJOP Exhibits as Individual Files\40-QQQ. Minutes SE Shareholders 1970.pdf

¹⁰⁶ \\simmons\scanned\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\GALIHIER\27 CDs from Galiher from Jim Walker\NAAC 64B\General Amercoat Corporation 1972\General Amercoat Corporation 1972_OCR.pdf (pgs. 12-14)

JM

The mat material has also been described as felt. In 1973 JM supplied Ameron Pipe Coatings Division with pipe line felt pallets. Some of the invoices are for blue flag. It's not clear if these were asbestos-containing.¹⁰⁷

Cellulo

A material procurement sheet produced by Ameron, dated May 1973, has Cellulo as a supplier of Asbestos mat.¹⁰⁸

North American Asbestos

According to NAAC invoices, Ameron purchased several thousands of tons of blue asbestos fiber between the years of 1963-1978. See "Ameron NAAC Invoices" in liability documents.

NAAC documents show that Amercoat purchased blue felt (Noramite) and was considered one of NAAC's high volume customers.¹⁰⁹ An Amercoat promotional article (year is redacted) indicates that Ameron used NAAC Noramite crocidolite in the manufacture of Bondstrand 5000 series. The plant showcased in the article (also redacted) was a chlorine and caustic soda plant.¹¹⁰ A similar promotional article from *Plastics World* in October 1963 describes how 2200' of Bondstrand 4000, 12" in diameter, was installed as a continuous section in Shell Chemical Company's Woodbury, NJ plant. This article also states that Ameron's Bondstrand pipe was made with NAAC's Noramite asbestos fibers.¹¹¹

NAAC documents also show that Ameron purchased several thousand pounds of blue asbestos yarn during the 1970's.¹¹²

¹⁰⁷ Q:\ASBESTOS\LIABDOC\H - M\JOHNS MANVILLE\INVOICES &-OR SALES\JM SALES\JM US Fiber Sales 2011 05 25\CRMC Denver Files - MT-KAZAN-FIBER-000001-151977\CRMC Denver MT-KAZAN-FIBER-022125-079041\MT-KAZAN-FIBER-038776-MT-KAZAN-FIBER-038991.PDF (pgs. 139-147)

¹⁰⁸ sc-aic-2120; sc-aic-2180

¹⁰⁹ Special Electric documents produced in Sira 07-07-2009 BATES# SIRA 12401 – SIRA 13625.pdf (SIRA 13314-15) @ Q:\ASBESTOS\LIABDOC\N - U\SPECIAL ELECTRIC\KAZAN MCCLAIN\2010 01 CD

¹¹⁰ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf (p. 159)

¹¹¹ CON 0380

¹¹² sc-aic-2150. See also the following: \\simmons\scanned\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\WALKER LF\ORIGINAL NAAC (WLF) Scanned by Mayer Brown 2013 09\005\0029229.pdf; \\simmons\scanned\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\GALIHHER\27 CDs from Galiher from Jim Walker\NAAC 58B\Garlock Inc\Garlock Inc_OCR.pdf (pgs. 552-554); Q:\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\GALIHHER\27 CDs from Galiher from Jim Walker\NAAC 63A\Japanese Yarn and Cloth Customers\Japanese Yarn and Cloth Customers_OCR.pdf; Q:\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\WALKER LF\ORIGINAL NAAC BOXES (WLF)\NAAC Documents\Complete\Images\Box102\Dir03\NAAC-SF-0043805.pdf; Q:\ASBESTOS\LIABDOC\N - U\NORTH

Blue asbestos was also shipped to Ameron's Irwindale, CA and Azusa, CA facilities.¹¹³

Crocidolite Paper

When Ameron switched to the paper material for the Bondstrand liner in the early 1970's, it purchased the asbestos paper from Mead, and like the mat material, the paper also contained crocidolite asbestos.¹¹⁴ Mead purchased fibers from Special Electric, NAAC and JM.¹¹⁵ The crocidolite paper that Ameron used was 100% blue asbestos.¹¹⁶

The former operations manager of Mead declared in an affidavit that the Specialty Paper Division of Mead manufactured an asbestos-containing pipe liner paper on a special order basis exclusively for Ameron in Brea, CA, beginning in late 1972 and ending in 1977. This paper was used to line the interior of certain Bondstrand pipes, although it was not used in pipe elbows, joints, and other bends.¹¹⁷

According to Mead's corporate representative Dirk Krouskop, the crocidolite paper that was sold to Ameron came on small rolls—almost like toilet paper rolls, although the actual width of the product was much wider. The rolls came in widths of 3.6" and 5.7". The paper was shipped to Ameron in cartons, with several rolls in each.¹¹⁸

However, purchase documents between Ameron and Mead show that the paper Mead shipped to Ameron was much bigger than toilet paper rolls. These documents show that the paper was more like 25" wide.¹¹⁹

The following is a summary of the available correspondence between Mead and Ameron¹²⁰:

- 8/16/1972- Mead memo regarding Ameron's request of sample rolls similar to the samples that Mead made for NAAC. Ameron requested rolls with a fiber content of 100%¹²¹

AMERICAN ASBESTOS CORP\WALKER LF\ORIGINAL NAAC BOXES (WLF)\NAAC Documents\Complete\Images\Box123\Dir01\NAAC-SF-0077751.pdf; Q:\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\WALKER LF\ORIGINAL NAAC BOXES (WLF)\NAAC Documents\Complete\Images\Box123\Dir01\NAAC-SF-0077785.pdf; Q:\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\WALKER LF\ORIGINAL NAAC BOXES (WLF)\NAAC Documents\Complete\Images\Box123\Dir01\NAAC-SF-0077786.pdf; Q:\ASBESTOS\LIABDOC\N - U\NORTH AMERICAN ASBESTOS CORP\GALIHER\27 CDs from Galiher from Jim Walker\NAAC 74A\PO 2873\PO 2873_OCR.pdf

¹¹³ SC-DH-0250 (p. 21)

¹¹⁴ Bordner (9/23/2003) 55:23-56:4; 58:11-59:2; 59:10-13

¹¹⁵ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\LIABILITY OUTLINES\Chemical Pipe Fiber Suppliers (Summary by Karoline)

¹¹⁶ Deposition testimony of Dennis Hankey (3/2/2011) 37:4-11

¹¹⁷ Q:\ASBESTOS\LIABDOC\H - M\MEAD WESTVACO CORP\AFFIDAVIT\HANKEY, DENNIS DECLARATION

¹¹⁸ Deposition testimony of Dirk Krouskop (5/30/2014) 362:3-365:10

¹¹⁹ SC-AIC-2605

¹²⁰ Unless otherwise cited, see Q:\ASBESTOS\LIABDOC\H - M\MEAD WESTVACO CORP\AFFIDAVIT\HANKEY, DENNIS DECLARATION

- 11/21/1972- Trial request from Ameron for 5000 lbs. of asbestos paper
- 11/29/1972- Memo regarding the trial run
- 12/13/1972- Correspondence regarding specifications for the paper¹²²
- 12/21/1972- Internal Mead memo noting that Ameron is satisfied with the asbestos paper product¹²³
- 1/3/1973- As a result of successful trial evaluations by Ameron, it placed a 5,000-lb order for 100% blue asbestos paper from Mead.¹²⁴
- 1/18/1973- Mead declines to produce asbestos mat material for Ameron¹²⁵
- 1/23/1973- Letter from Mead to Dalt Bordner of Ameron stating that Mead will attempt to produce Ameron's 10,000-lb order of crocidolite asbestos paper as closely as possible to the 5,000-lb order Ameron placed earlier that month.¹²⁶
- 3/7/1973- Mead memo regarding Ameron's request for another 20,000-lbs of blue asbestos paper.¹²⁷
- 4/9/1973- Letter from Mead to Dalt Bordner re test results of 100% blue asbestos paper using Ameron's specifications.¹²⁸
- 1/9/1975- Correspondence between Ameron and Mead about new binder for use with the crocidolite asbestos paper¹²⁹
- 4/14/1975- Mead responds to Ameron's request for MSDS's for asbestos paper. According to Mead, the forms that Ameron was requesting were not applicable for description and status of paper materials. Instead, Mead issued a statement claiming that its products were manufactured in compliance with OSHA standards.¹³⁰
- 4/12/1976-11/23/1977- Other purchase documents between Mead and Ameron regarding the sale of asbestos paper.¹³¹

¹²¹ Exhibit #13; #14 to Dennis Hankey (3/2/2011); sc-aic-1950

¹²² sc-aic-2010

¹²³ sc-aic-2020

¹²⁴ Exhibit #29; #30 to Dennis Hankey (3/2/2011)

¹²⁵ sc-aic-2045

¹²⁶ sc-aic-2055

¹²⁷ Exhibit #39 in Dennis Hankey (3/2/2011)

¹²⁸ sc-aic-2095

¹²⁹ SC-AIC-2375

¹³⁰ SC-AIC-2415

¹³¹ SC-AIC-2605

There are several other correspondence documents and invoices referenced in a Panatier deposition of Mead's corporate representative taken on 5/30/2014¹³²:

- 3/6/1973- Telephone order from Ameron for 10,000-lbs of three and three-fifth inch crocidolite paper and 10,000-lbs of five and seven-tenths paper.
- 11/7/1973- Mead is confident that it can produce crocidolite per commercially if Ameron is able to achieve successful results with the product.¹³³
- 1/21/1975- Ameron ordered 4,956-lbs and 12,279-lbs of crocidolite paper.
- 3/30/1974- Ameron ordered 8,600-lbs of crocidolite paper.
- 1/21/1975- Ameron ordered 17,397-lbs and 7820-lbs of crocidolite paper.
- 1/28/1975- Order for Ameron for 1,692-lbs of crocidolite paper.
- 2/18/1975- Two orders for Ameron—one for 10,000-lbs and one for 20,000-lbs.
- 12/15/1975- Letter from John Nolan of Mead to Phil Forbes of Ameron stating that Mead will buy 25,500-lbs of crocidolite asbestos from Ameron if Ameron purchases the corresponding poundage of paper.
- 4/13/1976- Mead document indicating Ameron ordered 10,000-lbs of crocidolite paper.
- 4/16/1976- 10,000-lbs each for two different widths of crocidolite paper.
- 7/29/1976- Three different orders for crocidolite paper totaling 22,667-lbs.
- 4/21/1977- Ameron received 13,393-lbs of crocidolite paper.
- 6/30/1977- Ameron ordered 15,000-lbs of crocidolite paper.

Ameron was the only customer that Mead produced the crocidolite asbestos paper for.¹³⁴

Bondstrand Manufacturing Process¹³⁵

To assemble Bondstrand pipe, Ameron workers performed the following steps:

- Crocidolite asbestos felt liner was rolled over a 20x4 table.

¹³² Dirk Krouskop (5/30/2014) 370:3-388:7

¹³³ sc-aic-2210

¹³⁴ Dennis Hankey (3/2/2011) 77:4-16

¹³⁵ Friedrich (6/6/2003); 75:24-89:9

- The material was saturated with an epoxy resin.
- 4-5 workers rolled the finished material onto a steel mandrel.
- A crane transported the mandrel to a winding station, where fiberglass roving was helically wound on the outside of the liner material.
- The pipe was then moved again by a crane to a cure oven. Curing the resin in the pipe gave it its rigid structure.
- The pipe was then hydraulically stripped. **During this process, a wet-saw was used to cut off the ends. Bordner testified that the ends were cut with either a carbide or diamond blade spinning at high velocity and going around the pipe to cut off the ends. He testified that Ameron used water during this particular operation to keep the dust levels down.**¹³⁶
- After the pipe was tested, one end of it was mechanically shaved in preparation for bonding in the field. The other end was sand-blasted. **Friedrich testified that the crocidolite liner was sandblasted in the female bell area of the pipe to prepare for bonding.**¹³⁷
 - **He also testified that prior to the addition of c-veil, if the felt material was sanded, asbestos fibers were released. This would have been prior to 1973.**¹³⁸

In order for the felt-material to fit to the dimensions of the pipe, it would have to be cut. **Note that once Ameron switched to a more efficient mandrel machine, it switched from the mat to asbestos paper because the paper could be automated.**¹³⁹

Friedrich testified that the blue asbestos paper would be loaded onto a carriage that ran the paper through a resin bath, if the paper wasn't already pre-saturated. **Once the paper was saturated with resin, it was then cut to fit the dimensions of the pipe by breaking the paper on the machine and tearing it by hand.** The c-veil was first wound onto the pipe and then the layer of asbestos paper, which was then cut to fit the length of the pipe. The glass roving was then wound on the outside for structural reinforcement.¹⁴⁰ For detailed testimony of how the pipe was made by a former Ameron worker, see the deposition testimony of Russell Ladd (3/27/2002) 390:23-397:13. According to Ladd, all the workers along the line were exposed to asbestos dust when another worker would cut/grind the pipe during the manufacturing process.

Ameron had the capacity of making around ten pipes per hour.

¹³⁶ Bordner (9/23/2003) 78:11-79:12

¹³⁷ Friedrich (10/3/2003); 152:4-9

¹³⁸ Friedrich (4/4/2005) 125:3-126:5

¹³⁹ Friedrich (8/30/2004) 62:13-63:3

¹⁴⁰ Friedrich (8/30/2004) 66:10-71:5

Bondstrand filament wound fittings were made in a similar fashion as the pipe. Some fittings were also compression molded. These were also made out of crocidolite asbestos.

Bondstrand Assembly/Installation

Bondstrand was assembled in the following manner¹⁴¹:

- The desired length was measured and scribed using a pipe fitter's wrap-around.
- Pipe was cut using a standard hacksaw or abrasive wheel.
- The cut end of the pipe was shaved prior to bonding.
- The spigot ends, prepared at the factory beforehand, were re-sanded before assembly.
- Fittings and sockets were also sanded prior to assembly.
- Sanded sockets and spigots were wiped with a clean, dry cloth to remove dust particles from the sanding operation. **Instructions emphasize that it was essential that all dust be removed.**
- Bondstrand adhesive was mixed thoroughly.
- A thin layer of adhesive was applied to the surface of the socket, including the pipe stop.
- Adhesive was liberally applied to the entire spigot surface and a thin layer to the cut edge of the pipe. Adhesive was thoroughly worked into the shaved surface of the spigot with a troweling action.
- Pipe was inserted slowly into the socket until the spigot end rested firmly against the pipe stop.
- Assembly was examined for proper alignment and seating.
- Joints were cured before pipe was placed into service.

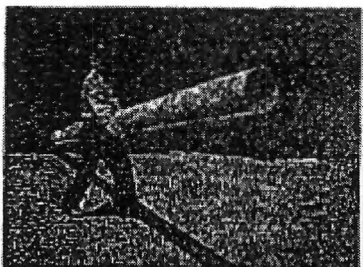
Later instructions were modified to include a sabre saw to cut the pipe.¹⁴² A September 1959 advertisement in *Marine Engineering* noted that the pipe was easily cut and joined in the field, requiring no special tools.

¹⁴¹ SC-AIC-1980

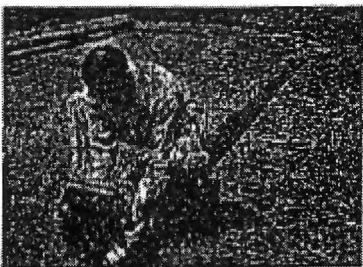
¹⁴² SC-AIC-2425

The following Bondstrand advertisement illustrates how easy and economical it was to install Bondstrand piping:

THE SURPRISING ECONOMICS OF BONDSTRAND



A 20-ft length of 6" Bondstrand weighs only 60 pounds. One man lifts and carries to cutting racks.

Reducer and flange assembly is self-aligning. Bondstrand is leveled in seconds.



Bondstrand is cut with an ordinary hacksaw. Preheating is not required.




Reducer and flange assembly correctly sealed with the use of an ordinary hammer and two-by-four.



Adhesive is mixed and applied.

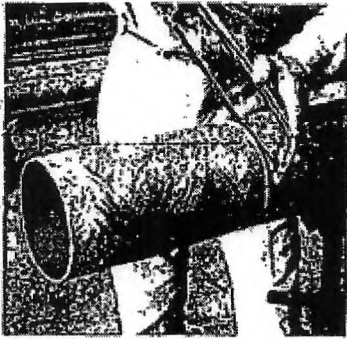



Bondstrand is ready for use, can be easily carried to assembly point to speed completion of the entire piping system.

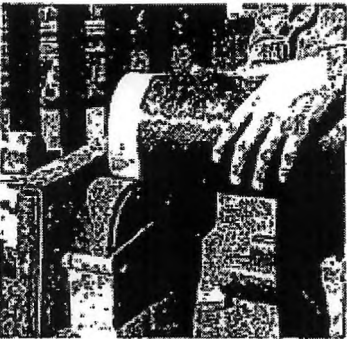
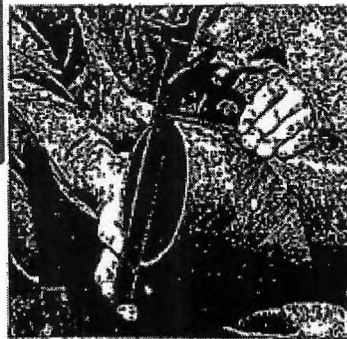
143

¹⁴³ See the following: sc-aic-1980 and \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL

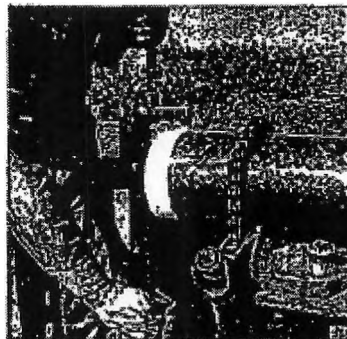
ASSEMBLE BONDSTRAND PIPE AND QUICK-LOCK FITTINGS IN THE FOLLOWING MANNER.



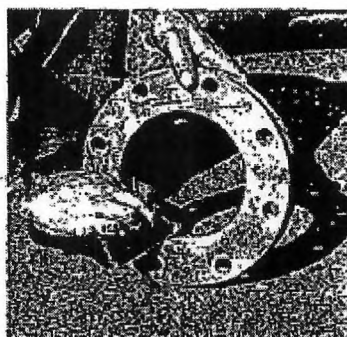
1 Cut the pipe squarely after measuring desired length. Use either a standard hacksaw or abrasive wheel for cutting. No pre-heating is required.



2 Remove glossy surface resin from pipe area to be bonded. Sand pipe ends evenly all around until the pipe will enter all the way to the pipe stop in the flange, fitting or coupling. Use Amercoat's manually-operated hand sander or electric power sander; or an ordinary small belt sander equipped with a dust collector.



3 Sand the sockets of all fittings thoroughly using medium grit sand paper.





**Bondstrand is cut with ordinary
hacksaw. Preheating not re-
quired.**

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Bondstrand was marketed as a cost-saving alternative with an assembly process that would “result in substantial savings in installation costs” for its customers. One of these cost-saving measures was that the “pipe was simply cut to size on the job using an ordinary hacksaw.” A promotional brochure claimed that this time-saving technique allowed the job of installing Bondstrand to be made in one-fourth the time as ordinary steel pipe.¹⁴⁵

The following instructions and pictures are taken from manuals written after asbestos was removed from Bondstrand, but they nevertheless give a good idea of how the product would have been used/manipulated by end users:

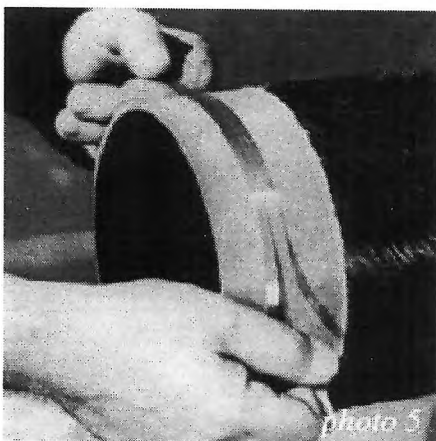
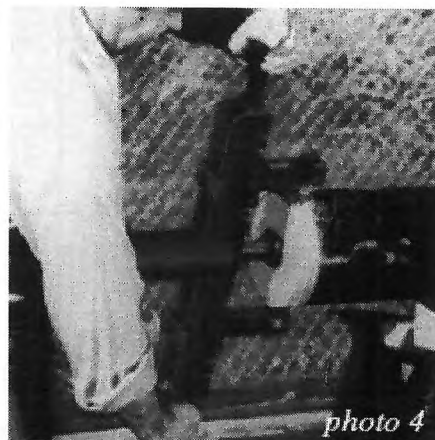
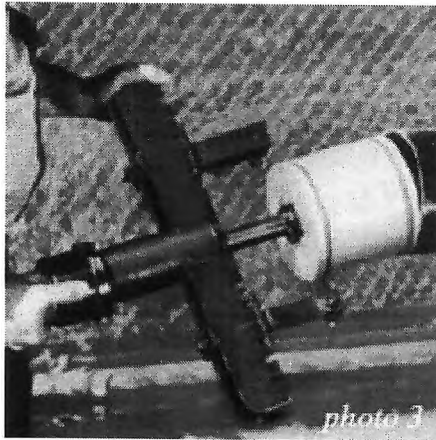
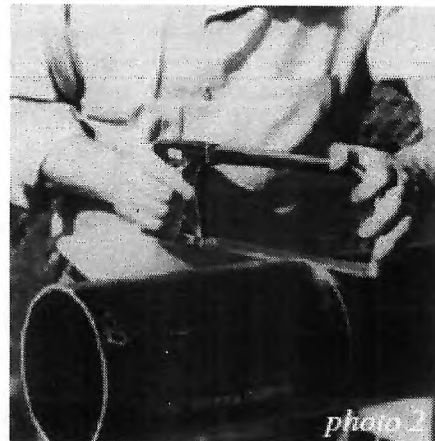


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¹⁴⁴ Ibid., p. 149

¹⁴⁵ sc-aic-1550 (p. 4)

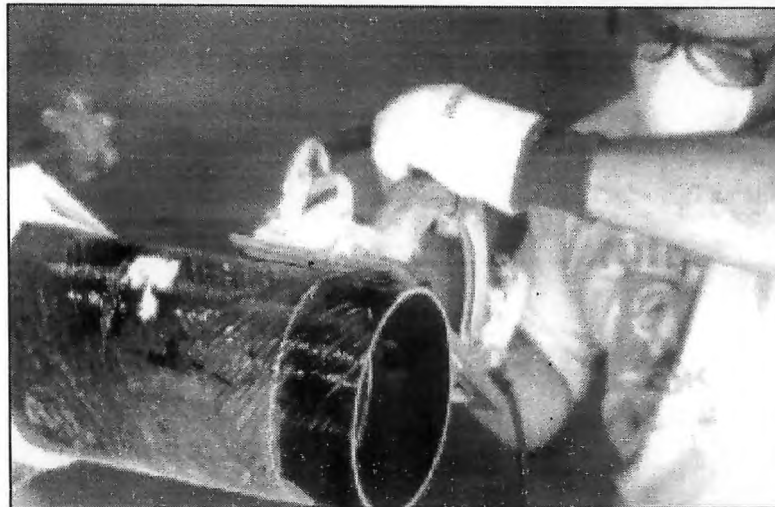
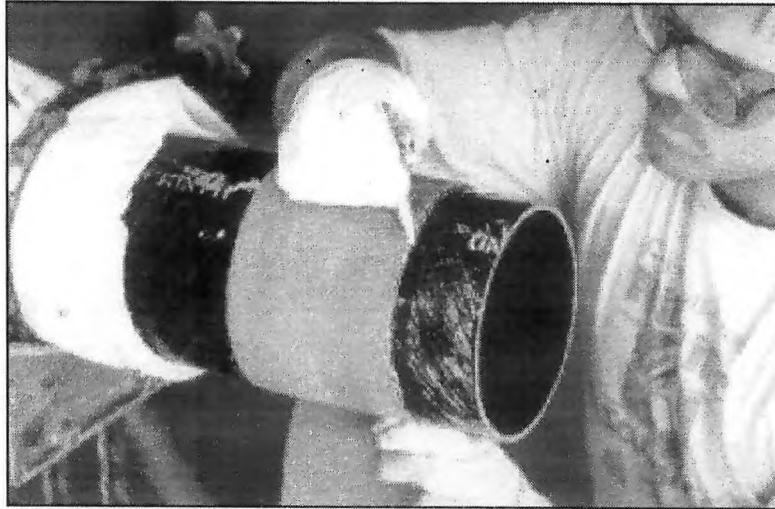
¹⁴⁶ FP170A @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Brochures from Old Ameron Site



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¹⁴⁷ Ibid.

Danger! Do not inhale dust produced by cutting and grinding. Provide adequate ventilation or wear OSHA-approved dust mask.



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An article titled “How About a Ph.D. in BONDSTRAND” printed in a 1974 edition of Ameron’s *The Bondstrand Pipeline* explained that Bondstrand training sessions were regularly held for customers to make the installation of Bondstrand as easy as possible,

To make sure Bondstrand customers know the proper steps for assembling and installing our pipe, we regularly conduct training sessions at many customers’ plants for their workmen. These sessions are designed to show the workmen how to correctly assemble FRP pipe and fittings and how to make reliable, fail-safe joints.

¹⁴⁸ FP170F @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Brochures from Old Ameron Site

¹⁴⁹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0288-0293

Star-Kist Foods, Inc., located near Long Beach, California, was the site of a recent Bondstrand training session. Eight men from Pipefitters Local #250 spent more than two hours learning the Bondstrand method for installing FRP pipe. All facets of installing Bondstrand were demonstrated including such fine points as how to adjust the shaving tool for proper tolerances and how to properly use the heating blanket when curing joint adhesives.

The session was conducted by our Los Angeles Bondstrand distributor, Harrington Industrial Plastics. Bill East, the Harrington salesman was in charge of the session. After demonstrating all the proper procedures, Bill helped all the "trainees" actually perform the assembly and joining steps themselves.¹⁵⁰

The picture that accompanied the article showed several men standing around a Bondstrand pipe while it was being shaved. While it's unclear if the actual shaver is wearing a mask, the men standing directly next to him are not:



Bill East (r.) of Harrington Industrial Plastics and Bondstrand "trainees" look on in a demonstration of the use of Bondstrand Pipe Shaver.

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Ameron recommended its customers a Bondstrand Pipe Shaver, which it also sold. The shaver was a tool that shaved the outside of the pipe at the spigot end to match up with the female bell.¹⁵² In July 1976 Ameron sent an interoffice memo noting that the operating instructions to the shaver were revised to include caution statements,

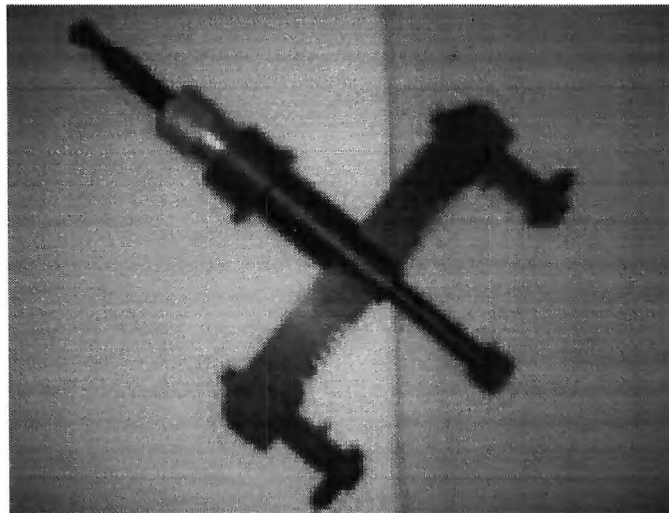
¹⁵⁰ SC-AIC-2240

¹⁵¹ Ibid.

¹⁵² Friedrich (4/4/2005) 103:6-13

On approval, these will be printed on adhesive labels and added to all new shavers prior to shipment. A supply of caution labels will also be furnished to Bondstrand field service and sales personnel for application to shavers now in use by customers. **We do not propose to make the major effort required to identify all owners and locate all shavers for this purpose.** A letter with labels to all catalog holders is possible.¹⁵³

In a promotional article on Bondstrand, Ameron claimed that the customer “will need Bondstrand’s pipe shaver for shaving pipe ends to correct joint diameters.”¹⁵⁴ The pipe shaver was called the Bondstrand M74 Pipe Shaver.¹⁵⁵

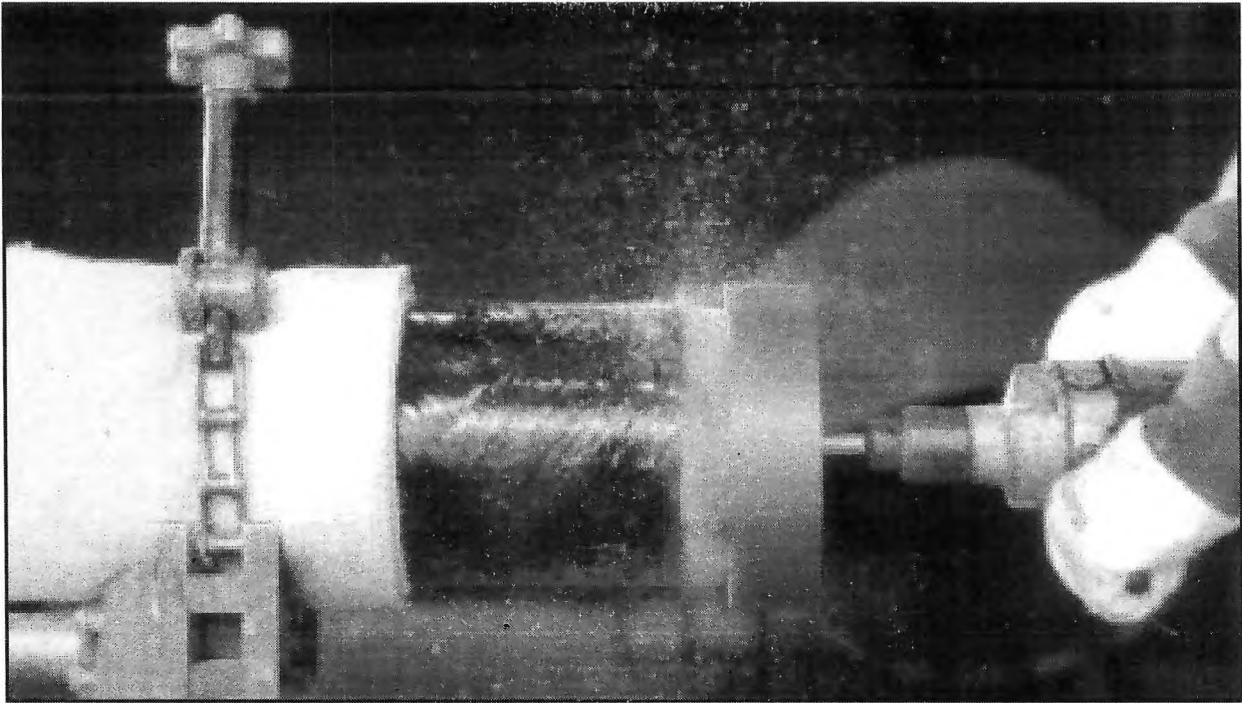


Even though the picture below is taken from a more recent installation manual after Bondstrand no longer contained asbestos, note the amount of dust created:

¹⁵³ SC-AIC-2670

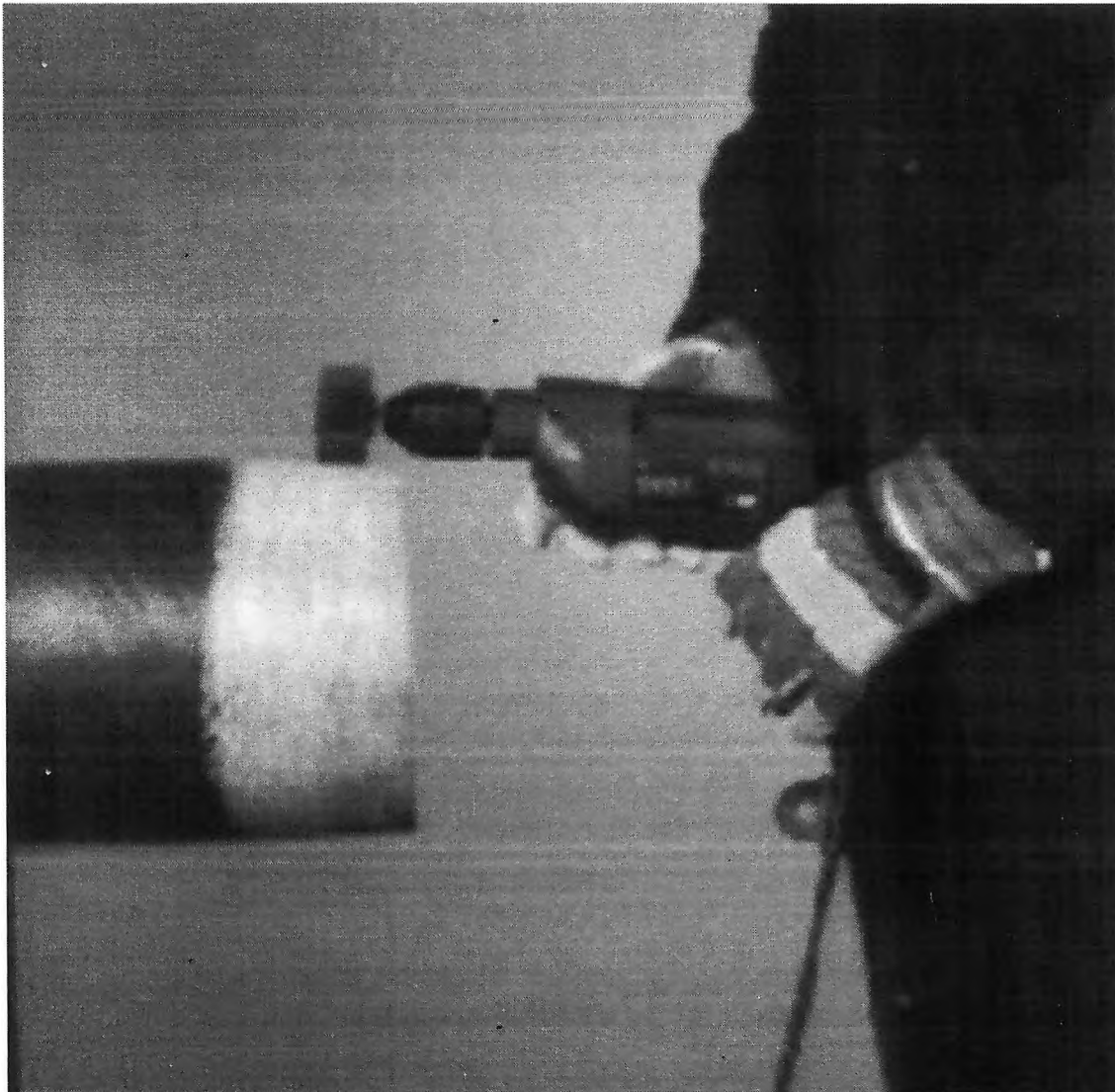
¹⁵⁴ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOÇ (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0213

¹⁵⁵ Ibid., @ AMERON 0240-0243. See also \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1671 thru AMRN150-1854.pdf @ AMRN 150-1839-AMRN 150-1842 and FP696A@ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Brochures from Old Ameron Site



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¹⁵⁶ FP170F @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Brochures from Old Ameron Site



Preparing for bonding

Sanding of spigot

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¹⁵⁷ Ameron photos from brochures @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID\Brochures from Old Ameron Site

In some situations, Ameron provided field service technicians for the installation of Bondstrand piping.¹⁵⁸ Ameron issued a Bondstrand technical service agreement to its customers whereby Ameron would provide a field service technician. The technician provided technical advice and instructional services. The agreement required the owner/contractor/installation sub-contractor to indemnify and hold Ameron harmless from any and all liabilities which may arise by virtue of furnishing of such Field Service Representative's rendering of advice.¹⁵⁹ Friedrich testified that field-service technicians could be hired by the customer to go onsite and provide training on Bondstrand installation. This was to ensure that Bondstrand pipe was installed properly.¹⁶⁰

A former Ameron sales manager testified that, upon the purchase of any Bondstrand product, Ameron offered free technical service for job start and proper instruction for the workers installing the pipe. Included in the free technical service was a practical demonstration on how to install a pipe on-site that was led by an Ameron employee while the Bondstrand customer was present. He testified that in terms of documenting the process, the technical service representative and the Bondstrand customer would both sign off on a document indicating that they both were present on-site during the demonstration. These records were kept by Ameron.¹⁶¹

In 1975 Ameron created a Bondstrand certification program designed to "provide a higher level of competence in those who install Bondstrand in the field..." The program was specifically aimed to train workers to assemble Bondstrand joints.¹⁶²

Note: One particular guide for installing buried Bondstrand pipe noted that "These instructions are intended to be used as a guide and *should be amended and expanded to meet the requirements of the specific job.*"¹⁶³

None of the Bondstrand instruction guides during the time that the product contained asbestos had any warnings about asbestos.

Bondstrand Customers/Distribution

According to one of Ameron's corporate representatives (a former Bondstrand salesman), Bondstrand was only sold through industrial distributors. The authorized distributor in California was Harrington

¹⁵⁸ SC-AIC-2560

¹⁵⁹ SC-AIC-0028

¹⁶⁰ Friedrich (3/24/2011) 288:4-289:4

¹⁶¹ Lambly (6/15/2011) 89:7-91:8

¹⁶² \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1671 thru AMRN150-1854.pdf @ AMRN150-1794

¹⁶³ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0186; 0225-0234

Industrial Plastics. He testified that during the entire time that the Bondstrand product line contained asbestos, Harrington was the exclusive distributor for Ameron in California.¹⁶⁴ If a customer approached Ameron, Ameron would not make a direct sale to them, but would instead refer them to Harrington.¹⁶⁵

Ameron provided Harrington with standard Bondstrand trade literature, as well as samples of Bondstrand pipe products that were 2" in diameter and around 8" long.¹⁶⁶

The only way that a customer in California could get Bondstrand pipe products was through Harrington.¹⁶⁷

Bondstrand Installations

Bondstrand 4000 installations:

- Amalgamated Sugar Company (Nampa, ID)¹⁶⁸
 - Installed in 1963. Still in use in 1974
- R.D. Nixon Power Plant (Colorado Springs)¹⁶⁹
- Public Service Company of New Mexico (San Juan Station)¹⁷⁰
- Utah Power and Light (Huntington, UT)¹⁷¹
- McAlester Fuel Co. (Kirkland Junction, AZ)¹⁷²
- Holly Sugar (Brawley, CA)¹⁷³
 - Installed in 1964
- Pennsalt Chemicals Corporation (Wyandotte, MI)¹⁷⁴

¹⁶⁴ Lambly, 6/15/2011 (19:25-22:23)

¹⁶⁵ Ibid., 134:3-17

¹⁶⁶ Ibid., 23:21-25:4

¹⁶⁷ Ibid., 38:23-40:10

¹⁶⁸ SC-AIC-2240

¹⁶⁹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ 0583

¹⁷⁰ Ibid.

¹⁷¹ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1671 thru AMRN150-1854.pdf @ AMRN150-1787

¹⁷² Ibid., AMRN150-1790

¹⁷³ Ibid., AMRN150-1797

¹⁷⁴ \\simmons\scanned\ASBESTOS\LIABDOC\N - U\PLASTIC WORLD\PUBLICATIONS\Vol 23 Aug-Dec 1965\vol 23 aug-dec 1965.pdf (p. 52)

- o Installed throughout the early 1960's
- Shell Chemical (Woodbury, NJ)¹⁷⁵
 - o Installed sometime in the early 1960's

Bondstrand 5000 installations:

- Diamond Shamrock Oil & Gas Co. (Amarillo, TX)¹⁷⁶
 - o Installed in the late 1960's.
- Bunker Hill Company (Kellogg, ID)¹⁷⁷
 - o Installed in 1964
- Cincinnati Water Works (California, OH)¹⁷⁸
- Bluebird Mine (Miami, AZ)¹⁷⁹
 - o Installed in 1968

Note: Ameron produced detailed list of customers that gives information about the year, place, and type of Bondstrand product installed. This list includes military, federal and state government, chemical, petroleum and other installations. See Ameron Bondstrand List @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\PID

Bondstrand Assembly Film

Former Bondstrand salesman Neil Lambly testified that Ameron had a briefcase that contained a film strip with information about the Bondstrand product line including a description of the product and assembly instructions. Specifically, it showed how the product was fabricated and joined by using adhesive to bond the joints (note that asbestos-containing adhesive was used. See above). The film also demonstrated how the asbestos-containing fittings and flanges were assembled. A man was filmed demonstrating how to cut the pipe, although Lambly couldn't recall if he was wearing any respiratory protection. There was no caution or warning in the film about any potential hazards associated with asbestos-containing Bondstrand, nor was there any mention of asbestos. There also was no mention of

¹⁷⁵ Q:\ASBESTOS\LIABDOC\H - M\MODERN PLASTICS\PUBLICATIONS\MAGAZINE\VOL 41-1 SEPT 1963 - FEB 1964\VOL 41-1 SEPT 1963 - FEB 1964.pdf (p. 210)

¹⁷⁶ SC-AIC-2240

¹⁷⁷ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\AMRN150\AMRN150-1671 thru AMRN150-1854.pdf @ AMRN150-1795

¹⁷⁸ Ibid.

¹⁷⁹ Ibid., @ AMRN150-1797

necessary precautions to take, i.e., ventilation or respiratory protection. The entire film was about 20 minutes long. If Ameron customers wanted to see the film, Ameron showed it to them.¹⁸⁰

Bondstrand Warning Labels

Ameron placed warning labels on its pipe products, fittings and adhesives in the mid-to-late 1970's.¹⁸¹ A Bondstrand MSDS dated 1972 carried an asbestos warning about lung cancer.¹⁸²

Ameron also claims that it supplied MSDS's to its customers, which had asbestos warnings.¹⁸³ A MSDS for Bondstrand 4000 and 5000 pipe and fittings stated the following,

Bondstrand Series 4000 and 5000 Pipe and Fittings contain up to 5% crocidolite asbestos by weight. The limits of asbestos exposure permitted by government regulations are delineated in Section S208, Title 8 of Calif. Division of Industrial Safety Regulation.

The law requires employers to maintain asbestos dust exposure below OSHA limits. Because of the many different conditions which may exist on a job site, we cannot provide a recommendation for ventilation. However, based on tests conducted by an independent occupational health consultant at the factory, the asbestos dust which results from cutting or sanding our current product, when cutting and sanding is done in accordance with installation instructions, is within the limits established by OSHA.¹⁸⁴

MSDS's were sent to Ameron's distributors and customers "upon request."¹⁸⁵

Internal memos reveal that Ameron did not start placing warnings on its asbestos-containing products until the middle of 1977.¹⁸⁶ A May 1977 memo stated that asbestos-containing Bondstrand products had been labeled with the following,¹⁸⁷

CAUTION

¹⁸⁰ Lambly (6/15/2011) 40:11-48:12

¹⁸¹ Static copy of DEFDOC 043836 AMERON GO129 RSP ROGS1 (#37) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

¹⁸² sc-aic-0026

¹⁸³ GO 129 am resp POS 12-7-04 (#49) @ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\P&H\Defensive Discovery Responses

¹⁸⁴ sc-aic-1920

¹⁸⁵ Lambly, 6/15/2011 (70:6-18)

¹⁸⁶ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0558

¹⁸⁷ SC-AIC-3000

This product contains asbestos fibers impregnated with resin, the inhalation of which may cause lung or other injury. Cut or sand this product only with adequate ventilation and in strict accordance with installation instructions.

IF YOU DO NOT COMPLETELY UNDERSTAND THESE INSTRUCTIONS OR ARE UNABLE TO COMPLY WITH THEM, CONTACT YOUR SUPERVISOR BEFORE USING THIS PRODUCT.

This warning was also on the Bondstrand 4000 and 5000 Series pipes and fittings MSDS's.¹⁸⁸

Bondstrand molded products and filament wound epoxy flanges were coated with yellow **after 1977** and also had a yellow warning label stating the following:

For the proper assembly of Bondstrand Quick-Lock joints, remove yellow coating from all bonding surfaces by sanding not more than two hours prior to assembly to remove surface oxidation and to obtain surfaces suitable for bonding. Do not sand through the light gray layer underneath the yellow coating.¹⁸⁹

Air Sampling

The test results done in June are not available, but in early May 1976, Health Science Associates collected the following sample results showing high levels of asbestos fibers in the air during the cutting and manipulation of Bondstrand pipe:

¹⁸⁸ sc-aic-1920

¹⁸⁹ Ibid.

LABORATORY REPORT

For: Mr. B. Bonar
AMERON CORROSION CONTROL DIVISION Report No.: E 1062 (continued)
 Date Received: May 10, 1976

Method of analysis: Phase contrast microscopy (450x)

Sample No.	Type	Analyzed for	Results (#/cc)*
BSL-245	Filter	Asbestos fibers	0.5
BSL-246	"	"	59.7
BSL-247	"	"	2.85
BSL-248	"	"	3.8
BSL-249	"	"	18.2
BSL-250	"	"	16.2
BSL-251	"	"	3.0
BSL-252	"	"	1.8
BSL-253	"	"	3.0
BSL-254	"	"	4.4
BSL-255	"	"	1.5

Remarks:

* fibers per cubic centimeter of air
 Results based on air sampling data supplied by Ameron

cc: M. Wyrembek

10941 Bloomfield St.
 Suite B
 Los Alamitos, CA 90720
 213/430-1031

By: J. Schenle
 Date: May 17, 1976

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The sampling also noted "excessive amounts of dust" when operations used portable saws and abrasive wheels.¹⁹¹

In addition, in October 1977, Health Science Associates conducted a test concerning manipulation of Bondstrand pipe at Kerr-McGee Chemical Corporation in California to determine, under field

¹⁹⁰ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\LIABILITY OUTLINES\Somastic Research (2.2014 Mindy)\Ameron\1976 - HSA - Amron sampling data 5-10-76.pdf

¹⁹¹ Ibid.

conditions, worker exposure to airborne asbestos during cutting and sanding operations on Bondstrand 4000 and 5000 series pipes and fittings. The Kerr-McGee report recommended the following: stationary saws should be equipped with local exhaust ventilation; lunch areas should be isolated from asbestos cutting areas; sanding operations had the potential for greater asbestos exposures during cutting operations; significant exposure was possible due to the flapper sanding at the edge of the spigot end and that hand sanding could reduce this.¹⁹² Ameron never issued any warnings regarding high-speed abrasive wheels or flapper sanders.¹⁹³ Former Bondstrand salesman Neal Lambly testified that Bondstrand 4000 assembly instructions recommended the use of flapper sanders.¹⁹⁴

The Kerr-McGee report determined that *with proper use*, the exposure levels were below the OSHA and CAL/OSHA limits.¹⁹⁵ Note: One particular guide for installing buried Bondstrand pipe noted that “These instructions are intended to be used as a guide and *should be amended and expanded to meet the requirements of the specific job.*”¹⁹⁶

The results of the Kerr-McGee report are as follows:

Stationary Abrasive Wheel
During Cutting of 3-inch Diameter Lined Pipe (4000 Series)
10/24/1977

Location	Sample No.	Duration	Asbestos f/cc
Personal Sample, first set	KM-1	2	0.72
Personal sample, first set	KM-2	2	0.72
Personal sample, second set	KM-8	1	1.43
Personal sample, second set	KM-13	1	1.43
Personal sample, third set	KM-11	2	4.69

¹⁹² Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC\IL 2012 06 08 MFG AROG-ADOC (#43). See also SC-AIC-2875

¹⁹³ Friedrich (3/25/2011) 414:8-11 and exh. #49

¹⁹⁴ Lambly (6/15/2011) 87:14-88:3

¹⁹⁵ Q:\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC\IL 2012 06 08 MFG AROG-ADOC (#43). See also SC-AIC-2875

¹⁹⁶ \\simmons\scanned\ASBESTOS\LIABDOC\A\AMERON INTERNATIONAL CORP\DISCOVERY\SC_CASE SPECIFIC\IL 2011 12 19 SALES SAROG-SADOC (SEARS)\IL 2011 12 19 SALES SAROG-SADOC (SEARS).pdf @ AMERON 0186; 0225-0234

Personal sample, third set	KM-12	2	2.14
Area sample: 10 ft from saw; 90 degrees to right of cutter	KM-4	8	0.72
Area sample: welder's table; 17 feet from saw, behind cutter	KM-6	8	0.53
Area sample: lunch area; 17 feet from saw	KM-7	8	0.23

Stationary Abrasive Wheel
During Cutting of 8-inch Diameter Lined Pipe (5000 Series)
10/24/1977

Location	Sample No.	Duration	Asbestos f/cc
Personal Sample, first set *cutting technique different from proper procedure	KM-10	7.5	1.33
Personal sample, first set *cutting technique different from proper procedure	KM-14	7.5	1.33
Personal sample, second set *proper cutting method used	KM-15	9	0.79
Personal sample, second set *proper cutting method used	KM-16	9	0.95
Area sample: 10 ft from saw; 90 degrees to right of cutter	KM-3	9.5	1.05

Area sample: welder's table; 17 feet from saw, behind cutter	KM-5	9.5	0.50
Area sample: lunch area; 17 feet from saw	KM-9	9.5	0.75
Area sample: 10 ft from saw; 90 degrees to right of cutter (second set)	KM-18	11	1.04
Area sample: welder's table; 17 feet from saw, behind cutter (second set)	KM-17	11	0.26
Area sample: lunch area; 17 feet from saw (second set)	KIM-19	11	0.78

TABLE III**Portable Abrasive Wheel**

At Kerr-McGee Corp., Tross, CA
October 24, 1977

Location/Description	Sample No.	Duration (minutes)	Asbestos (f/cc)*
Cutting 8 inch diameter lined pipe (5000 series); three cuts			
S. McCain, Cutter	KM-20	4	4.63
A. Dean, Assistant	KM-21	4	1.78
Cutting 3 inch diameter lined pipe (4000 series); three cuts			
S. McCain, Cutter	KM-22	1 1/4	2.85
A. Dean, Assistant	KM-23	1 1/4	4.75

* fibers, 5 micron or longer, per cubic centimeter of air.

TABLE IVSanding Operations

At Kerr-McGee Corp., Tross, CA
October 24, 1977

Location/Description	Sample No.	Duration (minutes)	Asbestos (f/cc)*	Remarks
Pipe sanding-both bell and spigot ends; bell end on inside diameter, spigot end on edge; used 3 inch flapper sander on 3/8" drill motor (c-2500 RPM)				
Test 1: B. McCain	KM-24	3	3.80	
Test 2: B. McCain	KM-25	3	4.75	
Flange sanding				
3 inch F/W flange (4000 series)				
B. McCain	KM-26	2	18.53	Had been sanded once before; oxidation removed. 3" flapper sander used.
4 inch F/W flange (4000 series)				
B. McCain	KM-27	2	5.55	3" flapper sander
6 inch molded flange (epoxy)				
B. McCain	KM-28	1 1/4	0.95	6" flapper sander
8 inch F/W flange (5000 series)				
B. McCain	KM-29	1 3/4	1.63	6" flapper sander No color on flange I.D.

* fibers, 5 micron or longer, per cubic centimeter of air.

Ameron sent this report to customers who inquired about the health hazards associated with asbestos-containing Bondstrand.¹⁹⁷

Dr. Longo Reports

5/2007

¹⁹⁷ Exhibit # 6 in Neal Lambly (6/15/2011)

Analysis of asbestos mat manufactured at Ameron's Ardmore, Oklahoma facility, in addition to one roll of small rope-like yarn purportedly used as a gap filler prior to gluing flanges together and two fiberglass-composite flanges.

The mat was 100% crocidolite; the light blue yarn was 100% crocidolite and the composite flanges were 40% crocidolite and 20% anthophyllite.

November 2011

Seven Bonstrand pipe samples were collected from a home. All samples contained a 30% layer of crocidolite paper,¹⁹⁸

The strategy used to measure the samples was to perform typical work activity that a worker would engage in when cutting then sanding the inside surface of the Bondstrand pipe.

There is also a video that shows what the pipe looked like when it was cut, as well as the excessive amount of dust it created. See Julie/Geri for a copy of the DVD.

¹⁹⁸ Q:\ASBESTOS\EXPERTS_P Experts_Longo-Hatfield-MAS\2011 11 00 Bondstrand Pipe Cutting, Sanding and Cleanup\REPORT

**Bondstrand Pipe
Cutting of Bondstrand Pipe With Skill Saw
Analytical Data Summary
M54152**

<u>Sample #</u>	<u>Location</u>	<u>PCM Fibers/cc</u>	<u>TEM 7402 Asbestos %</u>	<u>PCME Fibers/cc</u>
Background				
A-10-A		<0.002	0	<0.002
A-10-B		<0.002	0	<0.002
A-10-C		< 0.002	---	---
A-10-D		<0.002	---	---
Area Samples				
A-1-A		*	**	---
A-1-B		*	**	---
A-1-C		*	---	---
A-1-D		*	---	---
Personal Samples				
P-1-A (right)	IWA	2.6	---	---
P-1-B (left)	IWA	2.8	98.3	2.8
P-1-C (right)	IWA	3.0	---	---
P-1-D (left)	IWA	3.5	83.1	2.9
Field Blanks		<u>PCM Fibers Counted</u>	<u>TEM 7402 Asbestos %</u>	
FB-1-1		<7	0	
FB-1-2		<7	0	
Fabric Samples				
<u>Sample #</u>	<u>Location</u>	<u>Asbestos Structures/ft²</u>	<u>Asbestos Structures/cm²</u>	
FAB-1-1	Before (Background)	<263 thousand	<283	
FAB-2-2	After	53.1 million	57.2 thousand	

* Too heavily loaded to count

** Too heavily loaded with crocidolite fibers to count

**Bondstrand Pipe
Sanding of Inside Bondstrand Pipe
Analytical Data Summary**

		M54155		
<u>Sample #</u>	<u>Location</u>	<u>PCM Fibers/cc</u>	<u>TEM 7402 Asbestos %</u>	<u>PCME Fibers/cc</u>
Background				
A-20-A		<0.002	0	<0.002
A-20-B		<0.002	0	<0.002
A-20-C		<0.002	---	---
A-20-D		<0.002	---	---
Area Samples				
A-2-A		0.2	100	0.2
A-2-B		0.3	100	0.3
A-2-C		0.2	---	---
A-2-D		0.2	---	---
Personal Samples				
P-2-A (right)	IWA	0.9	---	---
P-2-B (left)	IWA	1.1	100	1.1
P-2-C (right)	IWA	0.9	---	---
P-2-D (left)	IWA	0.5	100	0.5
Field Blanks		<u>PCM Fibers Counted</u>	<u>TEM 7402 Asbestos %</u>	
FB-2-1		<7	0	
FB-2-2		<7	0	
Fabric Samples				
<u>Sample #</u>	<u>Location</u>	<u>Asbestos Structures/ft²</u>	<u>Asbestos Structures/cm²</u>	
FAB-2-1	Before (Background)	<438.5 thousand	<472	
FAB-2-2	After	95.3 million	102.6 thousand	
FAB-2-3	Dust Rag (before)	<309.5 thousand	<333.20 thousand	
FAB-2-4	Dust Rag (after)	669.9 million	721.1 thousand	

**Bondstrand Pipe
Sanding of Inside Bondstrand Pipe II
Analytical Data Summary
M54171**

<u>Sample #</u>	<u>Location</u>	<u>PCM Fibers/cc</u>	<u>TEM 7402 Asbestos %</u>	<u>PCME Fibers/cc</u>
Background				
A-30-A	IWA	0.002	0	<0.002
A-30-B	IWA	0.004	0	<0.004
A-30-C	IWA	0.005	---	---
A-30-D	IWA	0.002	---	---

Area Samples

A-3-A	IWA	2.2	100	2.2
A-3-B	IWA	2.2	94	2.1
A-3-C	IWA	2.1	---	---
A-3-D	IWA	2.5	---	---

Personal Samples

P-3-A (right)	IWA	8.4	97	8.2
P-3-B (left)	IWA	12.6	---	---
P-3-C (right)	IWA	16.1	98	15.8
P-3-D (left)	IWA	.	---	---

Field Blanks

	<u>PCM Fibers Counted</u>	<u>TEM 7402 Asbestos %</u>
FB-3-1	<7	0
FB-3-2	<7	0

Fabric Samples

<u>Sample #</u>	<u>Location</u>	<u>Asbestos Structures/ft²</u>	<u>Asbestos Structures/cm²</u>
FAB-3-1	Before (Background)	<250 thousand	<269.7
FAB-3-2	After	43.8 million	47.2 thousand
FAB-3-2	Dust Rag (after)	2.3 billion	2.5 million

*Sample voided-sampling tube came off sampling pump

Bondstrand Pipe
Cleanup After Cutting and Sanding of Bondstrand Pipe
Analytical Data Summary
M54176

<u>Sample #</u>	<u>Location</u>	<u>PCM Fibers/cc</u>	<u>TEM 7402 Asbestos %</u>	<u>PCME Fibers/cc</u>
Background				
A-40-A		0.003	11	0.0003
A-40-B		0.003	43	0.001
A-40-C		0.003	---	---
A-30-D		0.003	---	---
Area Samples				
A-4-A	IWA	0.9	100	0.9
A-4-B	IWA	1.2	84	1.0
A-4-C	IWA	0.6	---	---
A-4-D	IWA	1.1	---	---
Personal Samples				
P-4-A (right)	IWA	1.2	---	---
P-4-B (left)	IWA	1.3	88	1.1
P-4-C (right)	IWA	1.1	---	---
P-4-D (left)	IWA	1.1	100	1.1
Field Blanks		<u>PCM Fibers Counted</u>	<u>TEM 7402 Asbestos %</u>	
FB-4-1		<7	0	
FB-4-2		<7	0	
Fabric Samples				
<u>Sample #</u>	<u>Location</u>	<u>Asbestos Structures/ft²</u>	<u>Asbestos Structures/cm²</u>	
FAB-4-1	Before (Background)	<626.4 thousand	<673.3	
FAB-4-2	After	332 million	357.4 thousand	