
HB
63

COMMITTEE REPORT

HOUSE

2/14

(7)

FURTHER: Rules

1/16/85

Date: Feb. 1, 1986

The Committee on Labor and Commerce has had HB 63

"An Act relating to the plumbing code."

under consideration and recommends:

[ ] do pass [ ] do not pass

[ ] do pass with attached amendments(s)

[X] replace with CS for HB 63 (L&C) [ ] same title [X] new title

and recommends do pass

[ ] AND attaches a "Letter of Intent" [ ] New Fiscal Note [X] Zero Fiscal Note Attached

[ ] reports it back without recommendation

[ ] referred to the _____ Committee

MEMBERS SIGNING
DO PASS

Mike Hanna

D. A. Brackin

MEMBERS HAVING
OTHER RECOMMENDATIONS:

Mike Hanna
CHAIRMAN

Original sponsor: Rules/Governor

IN THE HOUSE

BY THE LABOR AND COMMERCE COMMITTEE

CS FOR HOUSE BILL NO. 63 (L&C)

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to the plumbing code; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.705 is amended to read:

Sec. 18.60.705. PLUMBING CODE. The following publications are adopted [DEPARTMENT OF LABOR SHALL ADOPT,] as the official minimum plumbing code for the state: [,]

(1) the Uniform Plumbing Code, 1985 [1979] edition, adopted at the 54th [49TH] Annual Conference, September, 1983 [1978], International Association of Plumbing and Mechanical Officials, chs. 1 - 13 and appendices, Useful Tables, and Installation Standards, but excluding Part I, Administration, pages 1a - 6a, and subject to AS 18.60.710 - 18.60.740 and the changes specified in (b) of this section;

(2) the Uniform Solar Energy Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials, chs. 1 - 9 and appendices, but excluding Part I, Administration, pages 3 - 9; and

(3) the Uniform Swimming Pool, Spa and Hot Tub Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials, chs. 1 - 5, but excluding Part I, Administration, pages 1 - 9.

* Sec. 2. AS 18.60.705 is amended by adding a new subsection to read:

(b) The 1985 edition of the Uniform Plumbing Code adopted under (a)(1) of this section is adopted with the following changes:

(1) on page 37, chapter 4, Drainage Systems, section 401, Materials, subsection (a), sub-subsection (1), all material is excluded and the following language is adopted:

"(1) Galvanized wrought iron, galvanized steel, ABS, or PVC pipe may not be used underground and must be kept at least six (6) inches above ground."

(1) ~~(2)~~ on page 37, chapter 4, Drainage Systems, section 401, Materials, subsection (a), sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction."

(2) ~~(3)~~ on page 45, chapter 5, Vents and Venting, section 503, Materials, subsection (a), sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction."

(3) ~~(4)~~ on page 75, chapter 10, Water Distribution, section 1004, Materials, subsection (a), the second sentence is not adopted. The third sentence of subsection (a) is excluded and the following language is adopted:

"CPVC and PP water pipe and tubing may be used for hot and cold water distribution systems within a type VN residential building."

* Sec. 3. AS 18.60.740(1) is amended to read:

(1) "code" means the 1985 editions of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 EDITION], adopted at the 54th [49th] Annual Conference, September, 1983 [1978], International Association of Plumbing and Mechanical Officials, as modified and adopted in

AS 18.60.705;

* Sec. 4. Notwithstanding secs. 1 - 3 of this Act, the installation of a plastic pipe, made from a substance permitted under the code as amended by this Act, in a plumbing or drainage system before the effective date of this Act may not be held to violate the code as amended by this Act.

* Sec. 5. This Act takes effect immediately in accordance with AS 01.-10.070(c).

SOUTHEAST ALASKA ICBO CHAPTER
Task Force on Legislative Affairs
February 10, 1986

RE: An Act relating to standards for electrical safety and the Uniform Plumbing Code.

BACKGROUND: The attached Bill causes the State of Alaska, through the Department of Labor, to adopt the most recently published edition of both the Electrical and Plumbing code. This Bill makes future legislation unnecessary for such adoption. Amendment to these codes would be through the processes of regulation governed by the Administrative Procedures Act (APA).

ISSUE STATEMENT: Some communities have adopted recent editions of the National Electrical and Uniform Plumbing Code. The State of Alaska operates from older code editions. Design professionals, contractors, banks, and local Building Officials currently must design, build, finance and enforce practices based on conflicting code editions. The result is confusion within the industry, higher cost of construction, conflict between state and local officials, and an inability to use most advanced materials and technologies allowed by current code editions.

BENEFITS: Passage of this bill would result in the following benefits:

1. Minimize conflict between codes and code officials in Alaska and make the system easier for private sector interests to work within thus keeping construction costs lower.
2. Greater predictability about code requirements meaning design professionals, contractors and suppliers can more accurately assess construction (materials and labor) costs.
3. Provides a position of leadership on the part of the State from

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BENEFITS: Passage of this bill would result in the following benefits:

1. Minimize conflict between codes and code officials in Alaska and make the system easier for private sector interests to work within thus keeping construction costs lower.
2. Greater predictability about code requirements meaning design professionals, contractors and suppliers can more accurately assess construction (materials and labor) costs.
3. Provides a position of leadership on the part of the State from

which local governments can act.

4. Consumes less legislative time dealing with technical industry issues and more appropriately assigns this responsibility to the department level.

IN SUPPORT:

Southeast Alaska International Conference of Building Officials (ICBO) Chapter
Southcentral Alaska ICBO Chapter - Anchorage
Interior Alaska ICBO Chapter - Fairbanks
American Institute of Architecture (AIA) - Southeast Chapter

IN THE _____ BY _____

BILL NO. ____

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to standards for electrical safety and the Uniform Plumbing Code."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.580 is amended to read:

Section 18.60.580. MINIMUM ELECTRICAL STANDARDS. The latest [1984] published edition of the National Electrical Code (ANSI/NFPA) approved by the American National Standards Institute [ON AUGUST 5, 1983] and the latest [1984] published edition of the National Electrical Safety Code [ANSI C2-1984] approved by the American National Standards Institute [ON JULY 15, 1983], constitute the minimum electrical safety standards of the state.

* Section 2. AS 18.60.580 is amended by adding a new subsection to read:

(b) The department may by regulation adopt amendments to the minimum electrical safety standards of the state that are set forth in the latest published editions of the National Electrical Code and the National Electrical Safety Code under (a) of this section.

* Section 3. AS 18.60.590 (a) is repealed.

* Section 4. AS 18.60.705 is amended to read:

Section 18.60.705. PLUMBING CODE. The Department of Labor shall adopt, as the official minimum plumbing code for the State, the latest published edition of the code, [UNIFORM PLUMBING CODE, 1979 EDITION, ADOPTED AT THE 49TH ANNUAL CONFERENCE, SEPTEMBER, 1978, INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, CHS. 1-13 AND APPENDICES, BUT EXCLUDING PART I, ADMINISTRATION, PAGES 1a-6a, AND] subject to AS 18.60.710 - 18.60.740.

* Section 5. AS 18.60.705 is amended by adding a new subsection to read:

(b) The department may by regulation adopt amendments to the code.

* Section 6. AS 1860.740(1) is amended to read:

(1) "code" means the latest published edition of the Uniform Plumbing Code [,] approved and issued by [1979 EDITION, ADOPTED AT THE 49TH ANNUAL CONFERENCE, SEPTEMBER 1978,] the International Association of Plumbing and Mechanical Officials.

SECTIONAL ANALYSIS OF HB 63

Sec. 1 18.60.705

(1) Adopts the 1985 Plumbing Code, excludes Part I Administration pp.1a-6a and provides for changes, infra.

NB: the letter (a), following the words PLUMBING CODE, will be added by the revisor after the bill is passed. This is an editorial drafting omission.

(2) Adopts the 1985 Solar Energy code, excludes Part I Administration, pp. 3-9

(3) Adopts 1985 Swimming Pool, Spa and Hot Tub code, excludes Part I Administration, pp. 1-9.

Sec. 2 Amends 1985 Plumbing Code
Allows ABS or PVC pipe to be used in waste and vents systems in type VN (type 5 nonrated = 8 plex) residential construction.

(4) Allows for CPVC and PB pipe to be used in type VN residential construction for hot and cold potable water carrying within the building. The omitted sentence 2 allowed CPVC and PB to be used outside the building as well.

Sec. 3 defines code, as modified by the above amendments.

Sec. 4 Is a grandfather clause, allowing buildings built in violation of the former code and of the 1985 code as amended by this bill to be left in noncompliance. The grandfather clause is good until the effective date of the Act.

Sec. 5 effective date is immediate.

Sid Billingslea
Committee Aide, HL&C

ALASKA STATE AFL-CIO

2501 Commercial Dr.
Anchorage, Alaska 99510
907-338-6284

819 11th Ave.
Fairbanks, Alaska 99701
907-456-2030

February 1, 1986

Representative Marco A. Pignalberi
P.O. Box V
Juneau, AK 99811

Dear Marco:

I offer the following in an attempt to respond to any justification that ARCO Alaska might have for placing ads in outside newspapers for positions that could be filled by bona-fide Alaska residents:

1. The argument that there are not enough qualified Alaskan residents is patently false and absurd for anyone to believe. State DOL statistics will indicate the number of qualified out of work residents.

2. The argument that there are qualified union residents, but that they will be fined or in some way punished by the unions is not true. In fact, many of our members are truly suffering financially. Many are losing their homes and automobiles and are going through extreme financial hardships because there are few jobs available in some of these particular skill areas.

Some unions have sent people to oil fields in attempts to organize--many have been fired when they were discovered. The NLRB is pursuing against VECO at this time. VECO is notoriously non-union. Realistically, is ARCO so humanitariar that they don't want to put an Alaskan union resident in a bind with his union? Ridiculous!

Because of this, many local unions encourage the members to go to work, even if it is non-union, to prevent family economic disaster.

Some unions have even restructured the hiring hall procedures, recognizing the reality that there is not enough union work for the membership. I do think a legitimate fear that ARCO might have is that the unions would attempt to organize non-union workers by having qualified Alaskan resident union members comprise a majority of the work force. I am the first to admit that this is a legal organizing method that would be used, but it certainly is not a justification for ignoring the unemployed in this state. These people not only possess the necessary skills, but many have also worked in arctic conditions, requiring little or no acclimation to the harsh conditions. The unions would be more than willing to work with ARCO and any other company to settle any supposed disagreements and the discrimination now taking place against unemployed Alaskans.

The argument used by Harold Heinze that ARCO can request non-union sub-contractors to hire Alaskan residents, but is prevented by union rules from doing this is the silliest argument I have ever heard from a person as knowledgeable as Harold Heinze. He knows that the hiring hall rules are one of the negotiable items in any union contract. To dispel any rumors, the unions of Alaska <u>have</u> negotiated and <u>are</u> willing to negotiate additional language mandating local hire. It is legal for unions to assure that qualified residents are hired first, but this takes a joint effort, since ARCO provides the work (and most recently, the rhetoric, regarding their poor record with regard to sub-contractors hiring locally).

I would be able to verify any of the foregoing, including testimony from many of our members who are distraught over the economic difficulties they now face. The members are asking us if they should go to Denver in order to get a job in Alaska.

One thing for your committee to remember: The unions in Alaska have maintained a truthful, consistent position for having a good local hire law. We admit that we are not perfect, but we are striving to make sure our hiring rules give resident preference. We have never asked for your help in organizing non-union workers, only in providing an atmosphere which encourages jobs for ALASKANS. The unions in Alaska have never lied to you. The ads placed in outside newspapers speak for themselves about the integrity of ARCO Alaska in their past presentation to you. If I can answer any questions about this, I am readily available.

Sincerely,

Mano Frey
Executive President
Alaska A.F.L. C.I.O.

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

DEPARTMENT OF LABOR

P.O. BOX 1149
JUNEAU, ALASKA 99802
PHONE: (907) 465-2700

OFFICE OF THE COMMISSIONER

March 11, 1985

The Honorable Mike Navarre
Chairman
Labor and Commerce Committee
House of Representatives
Pouch V
Juneau, AK 99801

Dear Representative Navarre:

Re: House Bill 63, "An Act relating to the Plumbing Code".

The Department needs to amend two provisions in House Bill 63, as follows:

Section 1. Line 20 needs to be amended to read:

of Plumbing and Mechanical Officials, chs. 1--9 and appendices, but excluding Part I, Administration, pages 3--9; and

Section 1. Line 23 needs to be amended to read:

International Association of Plumbing and Mechanical Officials, chs. 1--5 but excluding Part I, Administration, pages 1--9.

We did not have copies of the 1985 codes when we drafted our bill, so were not aware that the Solar Energy Code and Swimming Pool, Spa and Hot Tub Code both contained an Administration section. This section is comparable to the Administration section in the Plumbing code itself, which Alaska has never adopted.

Thank you for your help with these amendments.

Sincerely,

Jim Robison
Commissioner

cc: Bob Bacolas, Director, LS&S

07-G9LH

Introduced: 3/18/85
Referred: Labor & Commerce

IN THE SENATE

BY THE LABOR AND COMMERCE COMMITTEE

SENATE BILL NO. 238

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the plumbing code."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.705 is amended to read:

Sec. 18.60.705. PLUMBING CODE. The following publications are adopted [DEPARTMENT OF LABOR SHALL ADOPT,] as the official minimum plumbing code for the state,

(1) the Uniform Plumbing Code, 1985 [1979] edition, adopted at the 54th [49TH] Annual Conference, September 1983 [,1978], International Association of Plumbing and Mechanical Officials, chs. 1 - 13 and appendices, Useful Tables, and Installation Standards, but excluding Part I, Administration, pages 1a - 6a, and subject to AS 18.60.710 - 18.60.740 and the changes specified in (b) of this section;

(2) the Uniform Solar Energy Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials; and

(3) the Uniform Swimming Pool, Spa and Hot Tub Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials.

* Sec. 2. AS 18.60.705 is amended by adding a new subsection to read:

(b) The 1985 edition of the Uniform Plumbing Code adopted under (a)(1) of this section is adopted with the following changes:

(1) On Page 37, Chapter 4, Drainage Systems, 401, Materials, Subsection (a), Sub-subsection (1), all material is excluded and the following language is adopted:

"(1) Galvanized, wrought iron, galvanized steel, ABS, or PVC pipe may not be used underground and must be kept at least six (6) inches above ground."

(2) On Page 37, Chapter 4, Drainage Systems, Section 401, Materials, Subsection (a), Sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction of not more than 35 feet in stack height. ABS and PVC pipe may not be less than schedule 40 (IPS) standard steel pipe thickness."

(3) On Page 45, Chapter 5, Vents and Venting, Section 503, Materials, Subsection (a), Sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction of not more than 35 feet in stack height. ABS and PVC pipe may not be less than schedule 40 (IPS) standard steel pipe thickness."

(4) On Page 45, Chapter 5, Vents and Venting, Section 503, Materials, Subsection (b), all material is excluded and the following language is adopted:

"(b) A person shall use cast iron, galvanized malleable iron or galvanized steel, lead, copper, brass, ABS, PVC, or other approved materials for vent fittings, and galvanized malleable iron, galvanized steel. ABS or PVC may not be used underground and must be kept at least six (6) inches above ground."

(5) On Page 75, Chapter 10, Water Distribution, Section 1004, Materials, Subsection (a), the second and third sentences are not adopted.

(6) On Page 75, Chapter 10, Water Distribution, Section (e) is not adopted.

* Sec. 3. AS 18.60.740(1) is amended to read:

(1) "code" means the 1985 editions of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 EDITION], adopted at the 54th [49th] Annual Conference, September 1983 [1978], International Association of Plumbing and Mechanical Officials, as modified and adopted in AS 18.60.705;

AMENDMENT TO
HOUSE BILL NO. 63
IN THE LEGISLATURE OF THE STATE OF ALASKA
FOURTEENTH LEGISLATURE - FIRST SESSION
A BILL

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(2) the Uniform Solar Energy Code, 1985 edition, adopted at the Annual Conference, September, 19[illegible], International Association of Plumbing and Mechanical Officials; and

(3) the Uniform Swimming Pool, Spa and Hot Tub Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983 International Association Of Plumbing and Mechanical Officials.

* Sec. 2. AS 18.60.705 is amended by adding a new subsection to read: (b) The 1985 edition of the Uniform Plumbing Code adopted under (a) (1) of this section is adopted with the following changes:

(2) On Page 37, Chapter 4, Drainage Systems, Section 401, Materials, Subsection (a), Sub-Subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC DWV Piping installations shall be limited to residential construction."

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August 1985
65th Year

REEVES JOURNAL

PLUMBING • HEATING • COOLING •

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Anti-Plastics Forces Bring Out Hired Guns in LA A-40 Session

by Larry Dill

UNIVERSAL CITY, Calif. — It was only fitting that the American National Standards Institute's A-40 Committee on Safety Requirements for Plumbing hold its latest meeting at the Universal Sheraton Hotel here July 23-25.

Overlooking the Universal Studio lots, soundstages and outdoor arenas used for western stunt shows and the like as part of the studio's tours, the hotel was the perfect site for an old fashioned shootout between the advocates and opponents of plastic piping materials. The only trouble with the shootout, however, was that it was as one-sided as Custer's debate with Sitting Bull. If it was a fight, it would have been stopped on cuts in the third round.

While the majority of the three-day exercise was dominated by tedious reviews of the A-40 Committee's Table 3.1.3 (Standards for Materials, Equipment, Joints and Connections) and discussions regarding the chapters pertaining to such products in the developing model code being formulated by the committee, the liveliest session took place on the opening afternoon when it was announced that there would be a 90-minute discussion on permeation of plastic piping materials, providing 45 minutes for both advocates and opponents of plastic pipe to speak, to be followed by a 10-minute question-and-answer session.

The first speaker called to the podium was Jack Lancaster, spokesman for the Plastic Pipe and Fittings Association (PPFA). Lancaster briefly outlined PPFA's position on the issue of pipe permeation and reviewed two documents — a review of the plastics industry's position on permeation (which had the joint letterheads of the Plastic Pipe Institute, the Vinyl Institute, the Uni-Bell PVC Plastic Pipe Association and PPFA) and a copy of PPFA's position that characteristics of water and soil should be considered when making materials selections.

The former document listed the advantages of using plastic piping materials and the latter stressed that proper evaluation of soil and water conditions would lead to responsible selection of materials. The conclusions of the second document stated that "in order to maintain a viable supply of potable water, thought must be given to the installation of affected materials in known or suspect soil and ground water conditions which may cause permeation, corrosion or structural failure of the pipe, tubing or fittings."



Jack Lancaster, Plastic Pipe and Fittings Association, reviews PPFA's position on pipe permeation.

The point of Lancaster's presentation, it appeared, was that all piping materials are subject to failure or permeation and leaching under particular circumstances.

Lancaster's statement was concluded in approximately six minutes and he sat down with nearly 40 minutes still alotted to him. The shortness of Lancaster's presentation was surprising to many of the committee members present at the session, including one who candidly told **Reeves Journal**, "I went to the bathroom and when I got back Jack was sitting down."

Opponents Speak

After Lancaster concluded his remarks and left the podium, chairman Vincent Doyle, representing the Mechanical Contractors Association of America as part of the joint committee with the National Association of Plumbing-Heating-Cooling Contractors as joint secretariats of the committee, called for the other speakers to step forward.

If Lancaster's presentation appeared to be surprisingly short and light to the committee members, what was to follow was a grand performance.

The committee members next witnessed a very organized, polished, professional and dynamic presentation by Raymond J. Leonardini, the attorney who has represented the California Pipe Trades (consisting primarily of United Association interests) in its legal battles with the International Association of Plumbing and Mechanical Officials (IAPMO) during the last three years over the addition of certain plastic pipe products to the Uniform Plumbing Code. He was followed by Marc Lappe, PhD and the chief consultant to the California Pipe Trades on matters concerning its charges that plastic pipe contains toxic materials which are hazardous to the health of the public.

Leonardini, in his best courtroom manner, delivered a moving presentation blasting plastic piping products and their usage in plumbing systems. He also called for the A-40 Committee members to use their own judgment to keep plastics from their model code document. Lappe followed with supporting statements from a health policy consultant's viewpoint, before Leonardini delivered the closing summation.

Toxic Spills

Addressing the subject of permeation, Leonardini cited statistics that estimate 300 toxic waste spills in California every three months. "You don't know where those spills are going to be," he said, "so the idea of analyzing permeation and saying not to put them (plastic pipes) in areas where there are known toxins" is similar to "closing the corral after the horses are out."

"How are you going to know where there is going to be a toxic spill?" Leonardini asked, labeling the committee members "public policy makers and public health officials."

The attorney then pointed out that while efforts are made to determine locations that were once the sites of hazardous wastes, several cases pop up each year where housing tracts have been found to be built on waste sites three or four years after their construction.

One of Leonardini's strongest contentions was that research performed by the American Water Works Company revealed that toxic vapors, particularly from gasoline products, can permeate plastic piping as well as liquids.

"Now where are you going to put pipe to avoid infiltration and permeation by vapors?" he asked.

Leonardini went on to discuss a recent lawsuit filed in the San Jose region concerning polybutylene piping system failures. Submitting a deposition on the issue for the record, Leonardini called the failure rate of PB "time dependent."

"Because of the chemical development of that pipe (PB), if you wait long

enough that particular installation will fail," he claimed.

Leonardini concluded his opening remarks and called upon Lappe, a former official with California's Department of Health and the chief consultant in the lawsuit brought forward by the California Pipe Trades Council and the state's former director of the Department of Consumer Affairs, Richard Spohn, who lent his name to the IAPMO lawsuit under the banner of the Department of Housing.

"I want to thank this group for giving me the opportunity to speak, and the United Association for bringing me here," Lappe said in his opening remarks.

Lappe later explained that the quality of drinking water is generally measured at its source in public treatment facilities. "We assume that nothing happens to it to aid and abet any levels of contaminants in transit," he added, charging that contaminants are being picked up through plastic piping systems.

"We also know of contaminants from metal ions and we are assuming that they are not raising the level of lead, copper or arsenic above the levels that are permissible from the source."

Lappe pointed to three studies conducted by the Pipe Trades Council (under his supervision), the American Water Works Company and the Vinyl Institute.

"What each of these studies found was that there are differences as clear as day and night between plastic and metal," he said. "Plastic permeates certain organic chemicals of health concern. Metal absolutely unequivocally does not."

Leonardini Summarizes

Leonardini followed with a tight, passionate conclusion that hit home with a number of emotional charges and pleas to the committee members.

The attorney challenged IAPMO (which has successfully defended its position on plastics against the Pipe Trades Council, et al in the courts, largely from a judge's ruling that no sufficient evidence has been produced to show any health hazards from plastic piping) and its 1982 UPC additions of plastics. He also questioned the validity of the National Sanitation Foundation which presented key testimony in IAPMO's California lawsuit.

Noting that IAPMO relies upon NSF testing, Leonardini said, "NSF 14 is an inadequate standard for the evaluation and analysis of leaching characteristics in plastic pipe.

"Can you trust EPA? EPA is talking about relying on NSF. EPA has not developed drinking water standards for any of the chemicals that are involved."

Leonardini concluded by stating that all of the data is yet to be received and that it would probably take at least another year and a half to gather all information and comments on the conclusions.

"You have nothing to gain and everything to lose" by acting before governmental studies are completed, he said in closing.



John Woodward, Cast Iron Soil Pipe Institute, expresses his opinion during a discussion of the A-40 Committee's proposed product standards.

Confusion Begins

The polished presentation by Leonardini and Lappe was followed by Doyle's announcement that "in the interest of fairness to both sides and everyone who is on the committee," a 10-minute question-and-answer period would follow.

Lancaster returned to the podium and began to comment on the remarks made by the other two speakers by first acknowledging that he, indeed, represented PPFA and that the other speakers were employed to represent the interest of the United Association.

Lancaster's remarks were quickly met with an objection from Edward Brabec, executive vice president of the United Association. This was followed by Doyle's announcement that the remaining time would be limited to questions from the floor, not rebuttal statements.

Lancaster protested the procedures and then left the podium where Leonardini and Lappe proceeded to answer several questions from the committee members regarding their statements.

Very Convincing

To the members of the audience, it must have appeared as though the anti-plastic speakers clearly presented a very convincing argument for their case, while the plastic concerns failed to prove any of their contentions.

When confronted with the question of why Lancaster had failed to make a more comprehensive and prepared statement, PPFA attorney Robert Creamer and Lancaster both charged that they had no prior knowledge that speakers were going to be given 45 minutes each nor were they informed of the type of presentation Leonardini and Lappe were going to make.

While the plastics representatives claimed that they had not been contacted directly by the committee, but that a message was delivered through a third party, chairman Doyle told **Reeves Journal** that he did speak to Lancaster personally by telephone. William Abernathy, committee secretary, George Kauffman, co-chairman, and at least two A-40 members told **Reeves Journal** they had been told that PPFA was notified of the anti-plastics concerns' plans to appear at the meeting more than a month prior to the sessions.

Creamer told **Reeves Journal** that PPFA did not have any plans of making a similar presentation before the committee because the organization did not feel it was the proper venue to air such testimony.

"This group, regardless of what they call themselves or how they self-anoint themselves, is not competent to make these kinds of decisions, and we are not going to engage in a debate before the A-40 Committee on scientific and technical matters.

"The union can bring in people to talk about whatever they want, but we are not going to do anything that would imply that this committee is competent enough to make those kinds of judgments.

"For us to bring in toxicologists would be, in effect, to submit this issue to this group; and it doesn't belong here. This may be a safety code in terms of traditional concern of plumbers for safety, in terms of what is a safe plumbing system, but I don't believe that makes this group competent to decide whether a particular kind of plastic pipe leaches or is permeable to

Continued on page 50

Final Arguments Presented In Calif. Suit Challenging AC Efficiency Rates

by Larry Dill

SACRAMENTO, Calif. — A Sacramento county superior court judge is expected to deliver a final decision in early October on the lawsuit pitting air conditioning manufacturers against the California Energy Commission (CEC) over the CEC's proposed 1988 and 1993 minimum energy efficiency standards.

Judge James I. Morris heard final arguments from attorneys on July 16, and agreed to allow both sides of the litigation to file final closing briefs within 15 days. Upon filing of the briefs, which will be limited to material presented during the July 16 court session, the parties involved in the suit will then have 30 days to file written responses. Upon review of the material submitted, Morris will then deliver his written decision, probably in early October.

The suit was filed by Lennox Industries, Inc., Bard Manufacturing Co., Heil Heating and Cooling Products and Borg-Warner Central Enviromental Systems, Inc.. In a related action, American Standard's Trane Division has petitioned the CEC to reconsider its decision to adopt a minimum seasonal energy efficiency ratio (SEER) of 8.9 — beginning in 1988. The SEER would raise to 9.9 in 1993. California's current minimum SEER is 8.0.

The majority of the July 16 season centered around closing arguments by attorneys Thomas Knox, who represents Lennox Et Al. and Bruce Dodge, legal counsel for Trane.

The plaintiffs' attorneys focused their attention on charges that the CEC staff was selective in its use of reference materials, particularly data from the Department of Energy, and claims that the proposed regulations would drastically increase costs while resulting in products and requirements that would not be cost effective for consumers.

"We're very optimistic about the outcome," David F. Lewis, director of marketing for Lennox Industries, told Reeves Journal. "We think that the regulations will end up costing the consumer a lot more money. The key is that we don't feel it will be cost effective for the consumer."

Lewis also pointed out that the manufacturers contend CEC reached its decision through the selection of data that would only support its position.

Knox outlined a number of points raised in previous testimony which are being challenged by the manufacturers.

While questioning the methodology used to evaluate such factors as feasibility of compliance, discount rates, maintenance costs and particularly the "design life of units," Knox zeroed in on his clients' contention that the CEC did not have sufficient evidence to develop its regulation. Knox contended that CEC used the wrong "baseline" to determine the cost efficiency of air conditioners that would be subject to the regulations.

"They used the wrong yardstick to measure the cost effectiveness of the 1993 standards," Knox said. "There is no evidence considered that states SEER 9.9 will be cost effective in 1999," he added.

A large portion of the final session was spent arguing the language used in the regulation. The primary question was whether units covered by the regulation should be classified as residential or commercial or single and triple phase air conditioners.

Dodge stated that no data was submitted on a commercial category and that there is no evidence to support the contention the proposed SEERs would be cost effective. He suggested that the regulation be sent back to the CEC staff to either add language specifying commercial air conditioners or that commercial units be exempted from the action.

Exemption would be more favorable, he argued, because of the projected difficulty in enforcing such distinctions, particularly in light of the possibility of units designated for commercial applications being used for residential installations.

In challenging the CEC's selection of data in its regulation formulation process, Knox contended that the CEC staff ignored workshop testimony and input from industry sources and instead selectively referred to data that only tended to back its position on SEER minimums, particularly information from DOE.

Alan B. Lilly, deputy attorney general representing the CEC and the State of California, responded that CEC didn't rely on testimony supplied by industry because it was "just the opinions of their engineers."

CEC has been joined in the defense of the proposed regulation by Carrier Corp. and the Natural Resources Defense Council.

A-40 Committee

Continued from page 10

such a point that it should not be used in plumbing systems.

"No one on that committee is competent to make those kinds of decisions, and it's ironic to note that through all of the procedures they have said they are incompetent to decide whether lead should be used. They have decided they aren't competent to decide whether certain kinds of asbestos products should be used in the code. They have said they are not competent to make judgments whether certain kinds of pipe assemblies are fire retardant. They have denied competence to determine all kinds of issues, but yet when it comes to these extremely complex, complicated and controversial issues about plastic pipe, then all of a sudden there is a group of people that is in there who deem themselves highly competent to decide if plastic pipe should be used.

"And that's what we have, but we simply aren't going to submit that issue to this group. So we're not going to come in with our own dog and pony show."

Both Lancaster and Creamer contend that governmental agencies such as EPA and the Department of Health should be involved in the study and evaluation of the issue.

Couldn't Rebut

Lancaster protested the fact that he was not provided the opportunity to answer the charges made by Leonardini and Lappe, stating that they made several misstatements of fact.

As an example, he countered that the lawsuit in San Jose is centered around a mechanical fastening system, not issues concerning cancer. "He was pulling apples and oranges," Creamer added of his legal counterpart.

When it was pointed out to the plastics spokesmen that a member of the audience would surely have to be influenced by the presentation made by their foes, based on PPFA's lack of performance, Creamer concluded, "You got the message that the sponsors and the union people wanted you to get because, again, we were never told what was going to happen and they had a canned, rehearsed, slick presentation. The other thing to remember, and I'll stop saying it eventually, is that this is not the forum for that kind of thing."

Regardless of the contentions of PPFA, they may find that their counterparts on the committee left with a very strong impression from the presentation made by Leonardini and Lappe. If they were keeping score in the grandstands, the committee members may have concluded that it was no contest. The hired guns scored a TKO.



Reelies Journal - July 1985

Southwest Gas Replacing ABS Pipe in Gas Lines

PHOENIX, — Southwest Gas Corp. has been given the central business area top priority in its program to replace an estimated 2,300 miles of possibly defective gas pipe.

The utility acquired the gas distribution system from Arizona Public Service (APS) last November.

The first phase of the project is expected to require between three and four months and will depend on several contractors working simultaneously in various sections of the target area. Some of the work is already underway, according to John Hanenburg, program manager.

Utility officials noted that the program will involve all ABS-type plastic pipe. APS had used the pipe extensively in the Greater Phoenix area and in other parts of Arizona between 1959 and 1971.

Officials said the pipe constitutes about 23 per cent of the entire system. The whole replacement program will cost an estimated $120 million and will last about six years.

The ABS pipe was involved in an explosion in Phoenix last September that killed five persons and prompted an investigation. The probe revealed that the pipe was aging more rapidly than expected initially.

Reeves Journal - July 1985

Oregon City Seeking $3 Million to Replace Broken Plastic Pipe

by Jim Norland

MEDFORD, Ore. - This southern Oregon city of 50,000 is asking seven suppliers of plastic pipe to reimburse more than $3 million in damages the city expects to sustain in replacing the polybutylene water pipe bought between 1971 and 1981.

Attorneys for the Medford Water Commission and the City of Medford told the suppliers by letter, "It would appear . . . that this water pipe does not meet the requirements, warranties or representations made by you at the time of sale."

The city and the water commission have recently discovered defects and consequent breaking of "numerous pipe," says W. V. Deatherage, a member of Frohnmayer, Deatherage, deSchweinitz, Pratt & Jamieson, P.C., Attorneys at Law, in Medford.

Deatherage has asked each of the seven suppliers to notify his firm by June 26 whether they want to reimburse the two government entities "for the damages they have suffered as a result of said defective pipe.

"The Medford Water Commission will be required to replace all of this water pipe, which it has estimated will be at a cost in excess of $2,000,000," Deatherage's letter continues.

Medford City Attorney Gene Clark told **Reeves Journal** that the total damage is expected to be "in excess of $3 million, but no one supplier is expected to be responsible for more than $2 million."

Letters identical to the one quoted went to The Flintkote Co., Pipe Products Group, Orangeburg, N.Y.; Clow Corp., Plastics Division, P.V.C. Plastic Pipe, Bensenville, Ill.; Western Products Co., Union City, Calif.; Hinds Supply Co., Beaverton, Ore.; Westflex Manufacturing Co., Division of Western Plastic & Rubber Co., Richmond, Calif.; Budge-McHugh Supply Co., Medford; and Consolidated Supply Co., Portland, Ore.

Introduced: 1/16/85
Referred: Labor & Commerce

IN THE HOUSE

BY THE RULES COMMITTEE BY REQUEST OF THE GOVERNOR

HOUSE BILL NO. 63

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled. "An Act relating to the plumbing code."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.705 is amended to read:

Sec. 18.60.705. PLUMBING CODE. The following publications are adopted [DEPARTMENT OF LABOR SHALL ADOPT,] as the ~~offici~~al minimum plumbing code for the state,

(1) the Uniform Plumbing Code, 1985 [1979] edition, adopted at the 54th [49TH] Annual Conference, September, 1983 [1978], International Association of Plumbing and Mechanical Officials, chs. 1 -- 13 and appendices, Useful Tables, and Installation Standards, but excluding Part I, Administration, pages 1a -- 6a, and subject to AS 18.60.710 -- 18.60.740;

(2) the ~~Uniform Solar Energy Code,~~ 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials; and

(3) the Uniform Swimming Pool, Spa and ~~Hot Tub~~ Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials.

* Sec. 2. AS 18.60.740(1) is amended to read:

(1) "code" means the ~~1985 editions~~ of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 EDITION], adopted at the 54th [49th] Annual Conference, September 1983 [1978], International Association of Plumbing and Mechanical Officials;

Plumbing Code - UCA

Moen ✓

Sharon Macklin

AMENDMENT

In the HOUSE

By Navarre by request

TO: HB 63

Page 1, after line 29, insert new bill sections to read:

"* Sec. 3. AS 18.62.010 is amended to read:

Sec. 18.62.010. CERTIFICATE OF FITNESS REQUIRED. In connection with work performed subject to the standards established in AS 18.60.-580 and [AS] 18.60.705, a person may not be employed without a certificate of fitness to perform the work, except that a certificate of fitness may not be required of

(1) employees of an electric utility which does not have within its service area any portion of a city or unified municipality having more than 2,500 population; or

(2) a sewer or water line installer.

* Sec. 4. AS 18.62.010 is amended by adding a new subsection to read:

(b) In (a) of this section, a 'sewer or water line installer' means

(1) a person employed to install a building sewer pipe within the property lines of the building, starting at the first joint from the building to the main sewer trunk or disposal field; or

(2) a person employed to install a water service pipe from a private or public water supply to the first joint in a building above ground, within the property lines of the building."

Introduced: 3/18/85
Referred: Labor & Commerce

IN THE SENATE

BY THE LABOR AND COMMERCE COMMITTEE

SENATE BILL NO. 238

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the plumbing code."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.705 is amended to read:

Sec. 18.60.705. PLUMBING CODE. The following publications are adopted [DEPARTMENT OF LABOR SHALL ADOPT,] as the official minimum plumbing code for the state,

(1) the Uniform Plumbing Code, 1985 [1979] edition, adopted at the 54th [49TH] Annual Conference, September 1983 [,1978], International Association of Plumbing and Mechanical Officials, chs. 1 - 13 and appendices, Useful Tables, and Installation Standards, but excluding Part I, Administration, pages 1a - 6a, and subject to AS 18.60.710 - 18.60.740 and the changes specified in (b) of this section;

(2) the Uniform Solar Energy Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials; and

(3) the Uniform Swimming Pool, Spa and Hot Tub Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials.

* Sec. 2. AS 18.60.705 is amended by adding a new subsection to read:

(b) The 1985 edition of the ~~Uniform Plumbing Code adopted under~~ (a)(1) of this section [illegible] the following changes:

(1) On Page 37, Chapter 4, Drainage Systems, 401, Materials, Subsection (a), Sub-subsection ([illegible] all material is excluded and the following language is adopted:

"(1) Galvanized, wrought iron, galvanized steel, ABS, or PVC pipe [redacted] must be kept at least six (6) inches above ground."

(2) On Page 37, Chapter 4, [redacted] Systems, Section 401, Materials, Subsection (a), Sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or [redacted] installations [redacted] ABS and PVC pipe may not be less than schedule 40 (IPS) standard steel pipe thickness."

(3) On Page 45, Chapter 5, [redacted] Section 503, Materials, Subsection (a), Sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction of not more than 35 feet in stack height. ABS and PVC pipe may not be less than schedule 40 (IPS) standard steel pipe thickness."

(4) On Page 45, Chapter 5, [redacted] Section 503, Materials, Subsection (b), all material is excluded and the following language is adopted:

"(b) A person [redacted] malleable iron or galvanized steel, lead, copper, brass, [redacted] and galvanized malleable iron, galvanized steel. [redacted] may not be used underground and must be kept at least six (6) inches above ground."

(5) On Page 75, Chapter 10, Water Distribution, Section 1004, Materials, Subsection (a), the second and third sentences are not adopted.

(6) On Page 75, Chapter 10, Water Distribution, Section (e) is not adopted.

* Sec. 3. AS 18.60.740(1) is amended to read:

(1) "code" means the 1985 editions of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 EDITION], adopted at the 54th [49th] Annual Conference, September 1983 [1978], International Association of Plumbing and Mechanical Officials, as modified and adopted in AS 18.60.705;

Alaska State Legislature

House of Representatives

Pouch V
State Capitol
Juneau, Alaska 99811

Official Business

MEMORANDUM

TO: Rep. Mike Navarre, Chairman
Labor and Commerce Committee

FROM: Rep. Jack Fuller JF

SUBJECT: House Bill 314 - Extending the Alaska Public Utilities Commission

DATE: January 17, 1986

Many constituents in my district have questions concerning the Alaska Public Utilities Commission.

The area of most concern is the regulatory exemption level. There are a number of small utilities whose gross income is between $50-$100.0K level who feel the regulatory exemptions are burdensome.

I would like to know if the Labor and Commerce Committee has given any consideration to raising the current regulatory exemption level.

2 CIV. B008952
(LASC No. C395294)

IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

SECOND APPELLATE DISTRICT

FRIENDS OF THE EARTH, CONSUMER FEDERATION OF CALIFORNIA, STATE BUILDING AND CONSTRUCTION TRADES COUNCIL OF CALIFORNIA, AFL-CIO, and AILEEN ADAMS,	)
Plaintiffs and Appellants.	)
v.	)
INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, a California corporation,	)
Defendants and Respondents.	)

ON APPEAL FROM THE SUPERIOR COURT OF LOS ANGELES COUNTY

HONORABLE JACK A. CRICKARD, JUDGE PRESIDING

BRIEF OF AMICUS CURIAE IN SUPPORT OF APPELLANTS' FRIENDS OF THE EARTH, ET AL.

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IN THE COURT OF APPEAL OF THE STATE OF CALIFORNIA

SECOND APPELLATE DISTRICT

FRIENDS OF THE EARTH, CONSUMER FEDERATION OF CALIFORNIA, STATE BUILDING AND CONSTRUCTION TRADES COUNCIL OF CALIFORNIA, AFL-CIO, and AILEEN ADAMS,	)	
Plaintiffs and Appellants.	)	2 CIV. B008952 (LASC #C395294)
v.	)	
INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, a California corporation,	)	
Defendants and Respondents.	)	

BRIEF OF AMICUS CURIAE
IN SUPPORT OF APPELLANTS'
FRIENDS OF THE EARTH, ET AL.

* * *

INTRODUCTION

This Amicus Brief is filed by John K. Van de Kamp, Attorney General of the State of California, pursuant to his duties as chief law enforcement officer to assure uniform and adequate enforcement of state laws. (Cal. Const., art. V, § 13; Daily v. Superior Court (1977) 19 Cal.3d 132, 149-150.) The specific focus of this brief will be the applicability of Business and Professions Code sections 17500, et seq. to the type of conduct and type of defendant at issue in this case.

The central issue in this case is the applicability of section 17500 of the Business and Professions Code, forbidding false and misleading advertising, to the publication by the International Association of Plumbing and Mechanical Officials ("IAPMO") of the Uniform Plumbing Code ("UPC") and the IAPMO Research Directory. The Attorney General believes that Business and Professions Code section 17500 is applicable to these activities of IAPMO.

STATEMENT OF FACTS

The facts have been set out at length by the parties in their briefs, and will be reviewed only briefly here, as they are germane to the applicability of Business and Professions Code section 17500.

IAPMO is an organization made up of plumbing inspectors, and governmental entities and officials who enforce or administer plumbing codes, or who regulate plumbing, heating, air conditioning, and related construction matters. (Complaint, ¶ 10; Answer, ¶ 6.) IAPMO publishes a model plumbing code called the Uniform Plumbing Code, or UPC. The UPC has remarkable prestige and influence in the plumbing industry. Testimony shows that it is regarded as the industry bible, and is used widely by contractors and architects. (R.T. pp. 304-311, 388.) It is also used widely by government. The evidence

demonstrated that the UPC is widely carried by local plumbing inspectors in the field; in California, inspectors very often carry the UPC in place of the California Administrative Code sections relating to plumbing. (Id.) Many jurisdictions use the UPC, either as the basis for their plumbing codes, or by simply adopting the UPC by reference. California is among these jurisdictions, in that state law provides that the California Department of Housing and Community Development must adopt a plumbing code that imposes substantially the same requirements as the most recent edition of the UPC. (Health & Saf. Code, § 17922(a).) Evidence in the record, then, shows that the UPC is recognized, used and substantially relied upon both by private industry and by local and state government.

The UPC itself makes statements regarding the degree and type of reliance that may be made on the UPC. The UPC states that its purpose is to provide "minimum requirements and standards for the protection of the public health, safety and welfare." It also carries the IAPMO seal, bearing the inscription, "plumbing safety." (Complaint, ¶ 11; Answer, ¶ 7.)

IAPMO also publishes a Research Directory. While the UPC lists materials that may be used for specific purposes (e.g., copper piping of one-inch diameter may be used for certain applications in home plumbing), the

Research Directory lists specific products that IAPMO states are acceptable for use under the UPC (e.g., "X" brand of one-inch copper piping is acceptable for use in the applications listed in the UPC). (Respondent's Brief at p. 2.) IAPMO also affixes its seal of "plumbing safety" to the Research Directory. (Complaint, ¶ 11; Answer, ¶ 7.) The Forward to the Research Directory also states that a listing is a representation by IAPMO that the listed product has been found to "meet or exceed applicable standards and requirements of the latest edition of the Uniform Plumbing Code." (Exh. 7.)

In compiling and publishing the UPC and Research Directory, IAPMO reviews products for compliance with what IAPMO regards as "applicable recognized standards" as well as the UPC requirements. (Respondent's Brief, p. 17.) IAPMO also does a certain amount of quality control of its own on the products it lists, performing unannounced inspections at listed manufacturers' plants. (Id., at p. 18.) IAPMO recognizes that inspectors use the IAPMO publications to evaluate products. (Id., at p. 17.) However, IAPMO does no testing of the products it lists, although it sometimes requires independent laboratory testing to be done of some products. (R.T. pp. 676-677.)

IAPMO requires, and receives, a fee from any manufacturer seeking to have a product or products listed in

the IAPMO publications. In fact, the UPC is totally paid for by the fees paid by manufacturers. (Complaint, ¶ 15; Answer, ¶¶ 6 and 9.)

ARGUMENT

I

IAPMO IS ENGAGED IN ACTIVITIES THAT COMPRISE THE PERFORMANCE OF SERVICES WITHIN THE MEANING OF BUSINESS AND PROFESSIONS CODE SECTION 17500

A. The Status of IAPMO As a Nonprofit Organization Is Not Relevant

IAPMO argues that it is not engaged in the sort of activity--namely disposing of a product or performing a service--that is covered by Business and Professions Code section 17500. As support for this argument, it cites the fact that it is a nonprofit organization, which makes no profit on the publication and sale of its publications. This argument is irrelevant.

The applicability of section 17500 depends upon the nature of the activities engaged in by a person or entity, not upon the person or entity performing those activities. Whether a corporation is a for-profit or a nonprofit corporation has no bearing on the question of whether or not it offers goods or services for sale. As an example, if a charity sells goods of some kind to raise funds, and it makes a false or misleading statement in selling them, then

section 17500 would apply. The statute simply makes no exemptions for nonprofit organizations; it applies, on its face, to any person who makes false or misleading statements in the course of selling goods or services. The provisions of IAPMO's corporate charter, or the state of its balance sheet, are irrelevant. It is IAPMO's activities and intent that are germane here.

B. IAPMO Has Disseminated Statements With the Intent to Dispose of Goods or Services

IAPMO also argues that it has not made any statements with the intent of disposing of goods or services, as required by the statute. This is not correct.

It is true that IAPMO does not make the statements at issue in this case with the intent of disposing of piping or other construction materials that it manufactures itself. IAPMO appears to argue that it simply acts as a neutral umpire, impartially calling balls and strikes, and then just reporting the score, with no intent as to how its calls affect the salability of listed products. This argument does not square with what IAPMO actually does. IAPMO knows that it is widely and heavily relied upon by government and industry. It is well aware that contractors may select products, and building inspectors approve them, because IAPMO lists them. Indeed, IAPMO takes considerable pains to ensure that government and industry will rely on IAPMO's

listings. IAPMO observes listing procedures, reviews products, and inspects some manufacturers. It makes representations that it is competent to evaluate the safety and fitness of products, and that the products it lists may be trusted to meet applicable standards and to meet minimum safety requirements in the listed use. Were this not true, IAPMO's publications would not be purchased and its primary activity and purpose would vanish.

IAPMO here is in the role, not of a direct seller of goods, but of an endorser of goods, an entity that presents itself as an expert and presents its expert evaluation of products it evaluates. It cannot avoid responsibility for its representations simply by saying that it does not manufacture the products it endorses.

A similar argument was rejected in Hanberry v. Hearst Corp. (1969) 276 Cal.App.2d 680. Plaintiff in that case alleged that she had purchased defectively designed shoes bearing the Good Housekeeping Seal. Defendant argued that it had no responsibility for any consequences, since its seal constituted nothing more than a statement of opinion. Rejecting that argument, the court said:

> "Respondent was not the seller or manufacturer of the shoes; it held itself out as a disinterested third party which had examined the shoes, found them satisfactory, and gave its

endorsement. By the very procedure and method it used, respondent represented to the public it possessed superior knowledge and special information concerning the product it endorsed. Under such circumstances, respondent may be liable for negligent misrepre entations of either fact or opinion." (276 Cal.App.2d at p. 686.)

IAPMO is similarly responsible for its representations concerning the safety of plastic pipe.

More importantly, IAPMO is in the business of selling its own services as a product endorser. It is with intent to dispose of its services as an endorser that it makes its statements that the products it lists meet applicable requirements and are safe. Having presented and established itself as an expert on plumbing codes, IAPMO actively attempts to preserve that image. As a result, manufacturers come to IAPMO to be evaluated and listed, and they pay for the IAPMO seal and the IAPMO endorsement that their products may be relied upon to meet all applicable standards and to meet minimum safety requirements.

The situation of IAPMO as an endorser, selling its services as an endorser, falls within the ambit of section 17500 as surely as if such services as writing wills or repairing cars were being sold. The statute requires only that a person make certain kinds of statements with the

intent to sell goods or services for section 17500 to be applicable. IAPMO meets this test. It publishes the UPC and the Research Directory publications, which state that certain materials and products meet applicable standards and are safe, with every apparent intention that these publications will be widely bought and relied upon. IAPMO also evinces every intent that manufacturers avail themselves of IAPMO's services as an endorser, and that they pay for these services. This meets the test of section 17500.

This office has held that section 17500 is not limited to "misrepresentations in commercial situations involving a quid pro quo." (66 Ops.Cal.Atty.Gen. 40, 46 (1983).) That opinion dealt with charitable solicitations, but noted the broad sweep of the section:

> "The general purport of section 17500 evident from its language is to protect a person from being deceived or misled when statements and representations concerning the disposing of property or the performing of services seek to induce such person to expend money for a result he desires." (Id., at p. 46.)

IAPMO's publications unquestionably have such effects. Manufacturers surely would not pay to have their products listed if such listing did not have a positive effect on sales.

II

IAPMO'S STATEMENTS ARE MISLEADING WITHIN THE MEANING OF BUSINESS AND PROFESSIONS CODE SECTION 17500

A. Section 17500 Prohibits Untrue and and Misleading Statements

Business and Professions Code section 17500 makes it unlawful for any person to make any statement which the person knows or by the exercise of reasonable care should know to be untrue or misleading in order to dispose of goods or services. It is not necessary that any person be misled by the statements; the gravamen of the offense is the making of untrue or misleading statements, and the offense is "complete without regard to whether or not anyone is deceived or damaged." (In re Application of O'Connor (1927) 80 Cal.App. 647, 652.) A statement is impermissibly untrue or misleading if the statement merely has the capacity to deceive members of the public:

> "A statement is false or misleading if members of the public are likely to be deceived. Intent of the disseminator and knowledge of the customer are both irrelevant. Referring to both section 17500 and Civil Code section 3369 [the predecessor to section 17200], it has been said: 'The statute affords protection against the probability or likelihood as well as the actuality of deception or confusion.'" (Chern v. Bank of America (1976) 15 Cal.3d 866, 876; emphasis added.)

See Fletcher v. Security Pacific National Bank (1979) 23 Cal.3d 442, 451; Ball v. American Trial Lawyers Assn. (1971) 14 Cal.App.3d 289, 310; People ex rel. Mosk v. Lynam (1967) 253 Cal.App.2d 959, 965-966; People v. Wahl (1940) 39 Cal.App.2d Supp. 771, 773. These cases clearly indicate that an action predicated on violations of section 17500 is not the same as an action for fraud or common law deceit: intent to deceive, reliance, and damage are not elements of a section 17500 cause of action. (See also People v. Superior Court (Olson) 1979) 96 Cal.App.3d 181, 190, 198, cert. den. (1980) 446 U.S. 935.)

In determining whether a representation has the capacity to deceive, the courts look to the least sophisticated members of the public. (Exposition Press, Inc. v. FTC (2d Cir. 1961) 296 F.2d 869, 872.[1/] Although a statement may not deceive or mislead a sophisticated consumer, the statement may be misleading or deceptive to others who are less experienced or more vulnerable. As the United States Supreme Court stated nearly fifty years ago:

"The fact that a false statement may be obviously false to those who are trained and

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1. Because of the similarity between California and federal statutes in the area of deceptive business practices, decisions of federal courts are more than ordinarily persuasive. (People ex rel. Mosk v. National Research Co. of Cal. (1962) 201 Cal.App.2d 765, 772.)

experienced does not change its character, nor take away its power to deceive others less experienced. There is no duty resting upon a citizen to suspect the honesty of those with whom he transacts business. Laws are made to protect the trusting as well as the s spicious. The best element of business has long since decided that honesty should govern competitive enterprises, and that the rule of caveat emptor should not be relied upon to reward fraud and deception." (FTC v. Standard Education Society (1937) 302 U.S. 112, 116.)

Accordingly, courts have ruled that:

"The law is not made for experts but to protect the public, -- that vast multitude which includes the ignorant, the unthinking and the credulous, who, in making purchases, do not stop to analyze but too often are governed by appearances and general impressions." (Aronberg v. FTC (7th Cir.1942) 132 F.2d 165, 167.)

IAPMO's statements may not be actively false, only misleading or incomplete. However, the law provides that words and sentences may be literally and technically true and still be used in a manner to mislead or deceive the

public. (FTC v. Sterling Drug, Inc. (2d Cir. 1963) 317 F.2d 669, 675; Koch v. FTC (6th Cir. 1953) 206 F.2d 311, 31.) If a representation is susceptible to both a misleading a truthful interpretation, the representation will be construed against the person making it. (Murray Space Shoe Corp. v. FTC (2d Cir. 1962) 304 F.2d 270, 272; Rhodes Pharmaceutical Co. v. FTC (2d Cir. 1953) 208 F.2d 382, 387, mod. for other reasons, 348 U.S. 940.) As the Court of Appeal has stated:

> "'The use of a word having a double meaning is a common device of those desiring to deceive or mislead others. One who does this cannot escape the charge of misleading or deceiving by saying that to him or as he meant the words, they were true.'" (Garvai v. Bd. of Chiropractic Exmrs. (1963) 216 Cal.App.2d 374, 379, citing Smulson v. Bd. of Dental Exmrs. (1941) 47 Cal.App.2d 584, 590.)

Further, even the failure to disclose information can be actionable, for as the California Supreme Court has noted:

> "[T]he omission of crucial information can be as misleading as a direct misstatement of fact." (Ford Dealers Assn. v. Department of Motor Vehicles (1977) 32 Cal.3d 347, 363-364.)

* * * * * *

The listing by IAPMO of certain plastic piping in the UPC and the Research Directory is such an incomplete, and therefore misleading, statement. By listing them in the Research Directory for use for potable water, IAPMO has brought plastic pipe products within the representation made as to all listed products, namely that it meets all applicable standards. By listing it in the UPC, IAPMO has brought plastic piping within the statement in the UPC that materials listed therein meet minimum safety requirements.

In the case of plastic piping for drinking water uses, such statements are, at best, incomplete when made in California. Plastic pipe is not approved for use in California in carrying potable water inside structures; plastic pipe therefore does not meet all applicable requirements in California. Any generalized statement that materials listed in the UPC meet all applicable requirements is false as to this use of plastic pipe in California; it is certainly a statement so incomplete as to be misleading. The carefully self-cultivated influence of IAPMO makes it even more likely that its listing of plastic pipe in the UPC and the Research Directory will mislead the many persons in government and private industry who use the IAPMO publications into assuming that the listed materials and products are acceptable in California for the uses IAPMO lists. This is more than sufficient to bring IAPMO's statements within the ambit of section 17500.

III

THE INJUNCTION SHOULD BE EXTENDED TO THE 1985 UPC

The applicability of section 17500 to IAPMO's conduct in this case is not an academic question of law, but a vital matter of public safety. The State of California is deeply concerned about the possibility that known or suspected human carcinogens may enter the drinking water of families and individuals because of the use of plastic piping for the carrying of potable water in homes. The state is sufficiently concerned to take the unusual step of researching and preparing a full environmental impact report (EIR) on the use of this building material for carrying water people drink, bathe in, and cook with. See judgment entered by Honorable Judge Crickard on January 24, 1984, pages 2-3.) The state has not yet approved plastic pipe for certain drinking water uses precisely because of the unknowns and the risks, and the state is attempting to ensure that sufficient time and sufficient effort is taken to evaluate the risks before it does so approve plastic pipe.

It was in this context of many unknowns and substantial potential risks that the trial court issued its injunction requiring that IAPMO inform all users of the 1982 UPC that plastic pipes are not approved for certain potable

water uses in California. The injunction reflects concerns the trial court obviously must have had for protection of public health and protection of the public against possible exposure to carcinogenic chemicals.

The injunction was well founded and, indeed, compelled by the evidence in the case. However, given the showing made by appellants, the trial court erred in limiting the injunction to the 1982 UPC and Research Directory. Under a proper application and interpretation of Business and Profession Code section 17500, the injunction should be continued until an appropriate change in circumstances occurs.

The injunction provisions connected with section 17500 create a different situation from the normal request for an injunction. Under Business and Professions Code section 17535, a court may issue an injunction upon a finding that section 17500 (or other sections of that code dealing with false advertising or unfair business practices) has been violated. The finding of a violation is all that is required; no showing of irreparable harm need be made, and no balancing of the equities need be done. Rather, a rebuttal presumption of irreparable harm arises in such a case. (IT Corp. v. County of Imperial (1983) 35 Cal.3d 63.) In effect, the Legislature has itself decided the questions of harm and of the balance of equities, and has decided that

whenever section 17500 has been violated, an injunction may issue.

Here, a very convincing showing was made that IAPMO's conduct in publishing the 1982 UPC and the Research Directory violated section 17500. The trial court very properly issued an injunction requiring appropriate disclaimers regarding the use of plastic pipe for potable water uses in structures. However, this injunction was limited to the 1982 editions of these publications, and automatically terminated when the 1985 editions were published. This was an error on the trial court's part.

The identical facts exist as to the 1985 editions of the UPC and Research Directory as existed as to the 1982 editions. The influential and well known IAPMO is widely circulating publications that imply that plastic pipe is acceptable and approved for use in carrying potable water. It expects that these publications will be relied on in both the public and private sector and, indeed, actively encourage such reliance. IAPMO circulates these publications in California, a state in which it knows that plastic pipe is not accepted for certain of these uses and is being studied by a government agency for possible health hazards, including cancer. IAPMO does not inform its California readers of what it well knows, that they cannot rely on IAPMO's implied representations of acceptability and

safety as to plastic pipe for drinking water uses in California. Now, as when the injunction issued, an EIR is being prepared. Neither the facts nor the law has changed.

Where a violation of section 17500 has been shown, and where identical facts exist to those that existed when the injunction was issued, the injunction should not be termi ated but should continue until either the underlying facts or the underlying law change significantly. Amicus believes that the injunction should be extended to apply to the 1985 UPC and Research Directory.

* * * * * *

CONCLUSION

The Attorney General believes that this case falls within the ambit of Business and Professions Code section 17500, and that IAPMO's conduct constitutes a violation of that section. Accordingly, the Attorney General feels that the trial court's injunction should be extended to apply to the 1985 editions of IAPMO's publications.

DATED: OCTOBER 15, 1985

Respectfully submitted,

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SLD:CT:dm

Exception: When in the opinion of the Administrative Authority no hazard to the potable water supply system is evident, special approval may be obtained to omit the vacuum breakers.

(l) **Aspirators** shall not be directly connected to a sewer connected waste pipe, but may be connected to the inlet side of a trap and shall be equipped with an approved vacuum breaker installed at least six (6) inches (152.4 mm) above the aspirator unit. The discharge pipe from the aspirator unit shall be designed for free flow and shall discharge through an approved airgap.

(m) **Vacuum breakers for hot water over 160°F (71°C)** shall be of approved type designed to operate at temperatures of one hundred sixty (160) degrees F (71°C) or more without rendering any portion of the device inoperative.

(n) **Steam and steam boiler connections** shall be protected by an approved backflow prevention device as set forth in subsection (o) of this section.

(o) **Non-potable Water Piping.** In cases where it is impractical to correct individual cross-connections on the domestic water line, the line supplying such outlets shall be considered a non-potable water line. No drinking or domestic water outlets shall be connected to the non-potable water line. Backflow or back-siphonage from the non-potable water line into the domestic water line shall be prevented by the installation of a gravity tank or by a tank having a pump for desired non-potable water. The domestic water inlets to the non-potable water tank shall have an approved airgap as required elsewhere in this chapter. Where it is impractical to install tanks, as set forth above, an approved pressure type backflow or back-siphonage prevention device shall be installed as follows:

Where reverse flow due only to gravity or a vacuum within the line can occur, an approved pressure type vacuum breaker unit or other approved backflow prevention device shall be installed in the supply line.

Each pressure type vacuum breaker unit shall be installed at a height of at least twelve (12) inches (.3 m) above the highest tank, equipment or point of usage of the non-potable water. Other approved backflow prevention devices shall be installed in a manner satisfactory to the Administrative Authority, but in no case less than twelve (12) inches (.3 m) above the surrounding ground or floor.

Where backflow can occur due to steam boilers, pumps, etc., creating a higher pressure in the non-potable water line, an approved backflow prevention device shall be installed in the supply line. Such backflow prevention device shall be installed at least twelve (12) inches (.3 m) above the surrounding ground or floor.

Whenever possible, all portions of the non-potable water line shall be exposed and all exposed portions shall be properly identified in a manner satisfactory to the Administrative Authority. Each outlet on the non-potable water line which may be used for drinking or domestic purposes shall be posted: DANGER — UNSAFE WATER.

Residential Building

(p) **Vacuum breakers** shall be located outside any enclosure or hooded area containing fumes that are toxic or poisonous.

Section 1004—Materials

(a) Water pipe and fittings shall be of brass, copper, cast iron, galvanized malleable iron, galvanized wrought iron, galvanized steel, lead or other approved materials. Asbestos-cement, CPVC, PB, PE, or PVC water pipe manufactured to recognized standards may be used for cold water distribution systems outside a building. CPVC and PB water pipe and tubing may be used for hot and cold water distribution systems within a building. All materials used in the water supply system, except valves and similar devices shall be of a like material, except where otherwise approved by the Administrative Authority.

(b) Cast iron fittings up to and including two (2) inches (50.8 mm) in size, when used in connection with potable water piping shall be galvanized.

(c) All malleable iron water fittings shall be galvanized.

(d) Piping and tubing which has previously been used for any purpose other than for potable water systems shall not be used.

(e) Approved plastic materials may be used in water service piping, provided that where metal water service piping is used for electrical grounding purposes, replacement piping therefore shall be of like materials.

Exception: Where a grounding system, acceptable to the Administrative Authority is installed, inspected and approved, metallic pipe may be replaced with non-metallic pipe.

Section 1005—Valves

(a) Valves up to and including two (2) inches (50.8 mm) in size shall be brass or other approved material. Sizes over two (2) inches (50.8 mm) may have cast iron or brass bodies. Each gate valve shall be a fullway type with working parts of non-corrosive material.

(b) A fullway valve controlling all outlets shall be installed on the discharge side of each water meter and on each unmetered water supply. Water piping supplying more than one building on any one premises shall be equipped with a separate fullway valve to each building, so arranged that the water supply can be turned on or off to any individual or separate building; provided however, that supply piping to a single family residence and building accessory thereto, may be controlled on one valve. Such shutoff valves shall be accessible at all times. A fullway valve shall be installed on the discharge piping from water supply tanks at or near the tank. A fullway valve shall be installed on the cold water supply pipe to each water heater at or near the water heater. A fullway valve shall be installed for each apartment or dwelling of more than one (1) family. In lieu of the main supply shutoff in each apartment, individual shutoff valves may be provided at each fixture.

(c) All valves used to control two (2) or more openings shall be fullway gate valves or other approved valves designed and approved for the service intended.

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(c) All valves used to control two (2) or more openings shall be fullway gate valves or other approved valves designed and approved for the service intended.

away from a terminal for pregnant women; (3) allow periodic rest breaks for terminal operators; (4) provide comfortable working conditions with respect to furniture, lighting, heat, noise, etc.; and (5) arrange for periodic inspection and maintenance of the terminals.

Proponents of this type of legislation cite two studies by Mt. Sinai Hospital and the International Labor Organization that concluded that terminal operators often suffer from headaches, eye strain, poor vision, back and shoulder pain, anxiety, irritability, sleep disorders and fatigue. Another study undertaken by the National Research Council concluded that while terminals per se are not harmful, the working conditions and the work environment of terminal operators is often uncomfortable and can lead to physical maladies.

Opponents contend that the best available scientific evidence shows that terminal operation is not harmful. The American Academy of Ophthalmology has issued a statement, for example, that says terminals are not harmful to the eyes. The American College of Obstetricians and Gynecologists has found no link between terminal operation and problems with the human reproductive function. A review of the scientific literature by the American Newspaper Publishers Association turned up no evidence that terminals were hazardous to human health.

GOVERNMENT
Building Codes Conflict

6. Should legislation be enacted which will provide that when a local government has adopted and is enforcing a nationally recognized building, electrical, fire or plumbing code, the version of the code adopted by the State of Alaska will not supersede the version adopted by the local government?

☐ YES (1) ☐ NO (2) ☐ UNDECIDED (3) (17)

64% 24% 12%

BACKGROUND: The situation often exists where a local government is enforcing a more current, nationally recognized version of a building, electrical, fire or plumbing code than the one adopted by the state. Under present law the state code must be followed.

For example, if a contractor in Juneau installs plumbing in accordance with the 1982 Plumbing Code, which has been adopted by the City and Borough of Juneau and an inspector for the State of Alaska happens to stop by and inspects the job, (under state law they have the right to do so) the state inspector may require the contractor to remove any plumbing which does not conform to the 1979 Uniform Plumbing Code which is the version adopted by the state.

Proponents of this legislation feel that contractors and/or individuals building their own home have enough problem trying to meet the requirements of the codes which have been adopted by the local government. They believe contractors or private citizens should not also have to determine what additional requirements must be met because the state has adopted a different version of one or more of the codes.

The codes which have been adopted locally are compiled by a national group of experts so they are not just the local official's opinion of what are proper construction techniques or materials, proponents say. They feel that local governments do not need "Big Brother" (the State) mandating what codes should be applied when the local governments are capable of making these decisions. There is no argument that the codes adopted by the State of Alaska should apply in the situation where the local governments have not adopted particular building codes or are not actively enforcing the codes which have been adopted.

Opponents of this type of legislation feel that the state should always reserve the right to make sure that appropriate building codes are properly applied to construction anywhere in the state. It is argued that many local government building officials do not understand the building codes well enough to properly enforce them.

GENERAL BUSINESS
Highway Signs

7. Should legislation be adopted which would require the State to install signs on all highways which would identify the specific travel services which are available in the area?

☐ YES (1) ☐ NO (2) ☐ UNDECIDED (3) (18)

BACKGROUND: Several states have adopted legislation which stipulates that the signs on all major highways, which indicate the travel services available; i.e. gas, lodging or food, should also include the symbol or name of the company providing the service. For example, the sign to indicate that there was gas available ahead, would also include the company symbol such as Chevron, Union, etc. This would include all applicable businesses within one-quarter mile of the highway.

Proponents point out that these types of signs are of great assistance to the traveler so that if they are looking for a certain type of gas station or lodging, they will not have to pull off the highway and look for the station or motel to determine if it is the one which they were looking for.

Opponents feel that the state is not developed to the degree that this type of information is necessary on the highway signs. For the majority of our highways, the gas stations, motels or restaurants are located on the highway so it is not necessary to pull off the road to identify the business. Further, with the exception of the gas stations, we have very few national chains of motels and restaurants, so the logo or name will usually not mean anything to the traveler, even if it is on the highway sign.

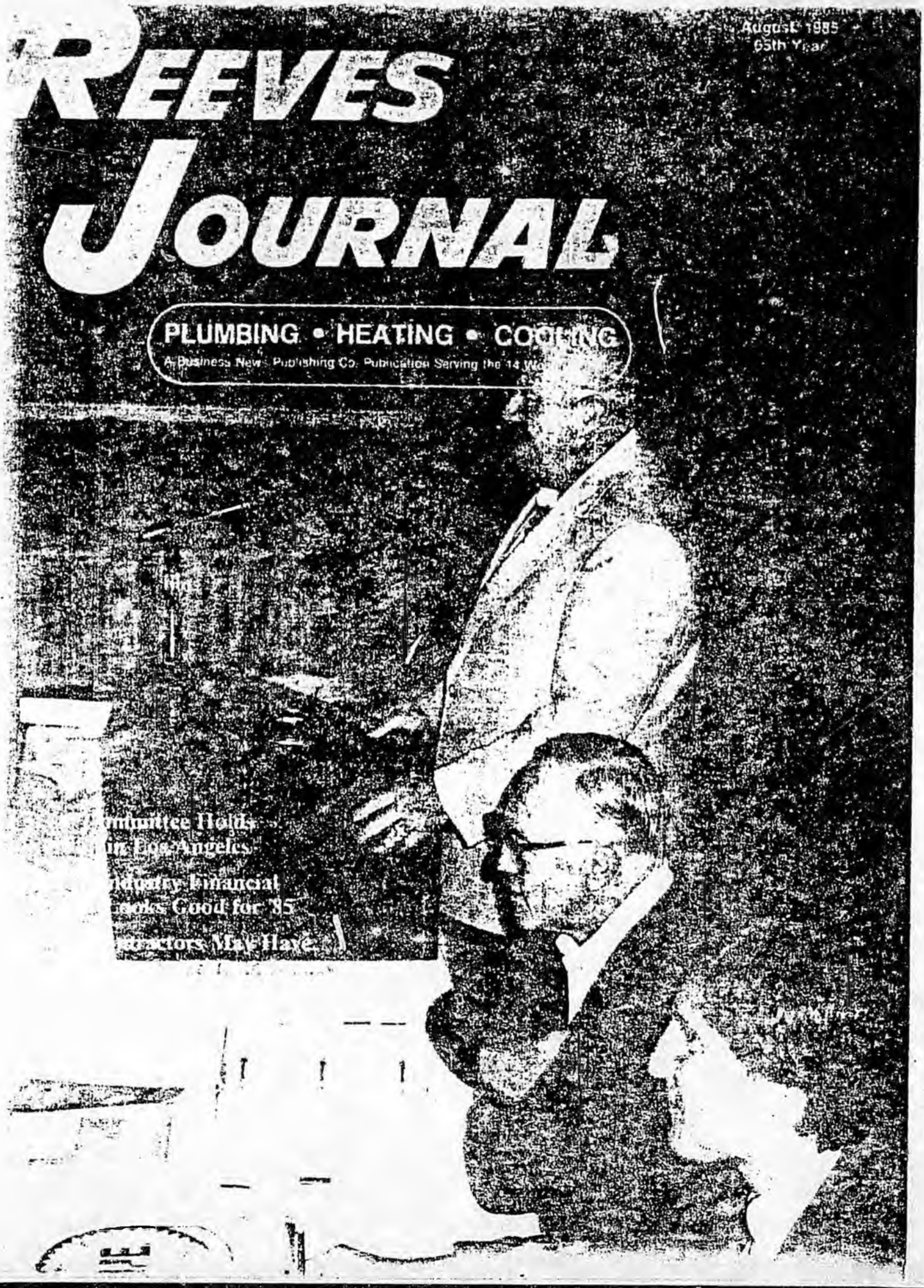
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Materials Controversy Continues

Anti-Plastics Forces Bring Out Hired Guns in LA A-40 Session

by Larry Diil

UNIVERSAL CITY, Calif. — It was only fitting that the American National Standards Institute's A-40 Committee on Safety Requirements for Plumbing hold its latest meeting at the Universal Sheraton Hotel here July 23-25.

Overlooking the Universal Studio lots, soundstages and outdoor arenas used for western stunt shows and the like as part of the studio's tours, the hotel was the perfect site for an old fashioned shootout between the advocates and opponents of plastic piping materials. The only trouble with the shootout, however, was that it was as one-sided as Custer's debate with Sitting Bull. If it was a fight, it would have been stopped on cuts in the third round.

While the majority of the three-day exercise was dominated by tedious reviews of the A-40 Committee's Table 3.1.3 (Standards for Materials, Equipment, Joints and Connections) and discussions regarding the chapters pertaining to such products in the developing model code being formulated by the committee, the liveliest session took place on the opening afternoon when it was announced that there would be a 90-minute discussion on permeation of plastic piping materials, providing 45 minutes for both advocates and opponents of plastic pipe to speak, to be followed by a 10-minute question-and-answer session.

The first speaker called to the podium was Jack Lancaster, spokesman for the Plastic Pipe and Fittings Association (PPFA). Lancaster briefly outlined PPFA's position on the issue of pipe permeation and reviewed two documents — a review of the plastics industry's position on permeation (which had the joint letterheads of the Plastic Pipe Institute, the Vinyl Institute, the Uni-Bell PVC Plastic Pipe Association and PPFA) and a copy of PPFA's position that characteristics of water and soil should be considered when making materials selections.

The former document listed the advantages of using plastic piping materials and the latter stressed that proper evaluation of soil and water conditions would lead to responsible selection of materials. The conclusions of the second document stated that "in order to maintain a viable supply of potable water, thought must be given to the installation of affected materials in known or suspect soil and ground water conditions which may cause permeation, corrosion or structural failure of the pipe, tubing or fittings."



Jack Lancaster, Plastic Pipe and Fittings Association, reviews PPFA's position on pipe permeation.

The point of Lancaster's presentation, it appeared, was that all piping materials are subject to failure or permeation and leaching under particular circumstances.

Lancaster's statement was concluded in approximately six minutes and he sat down with nearly 40 minutes still alotted to him. The shortness of Lancaster's presentation was surprising to many of the committee members present at the session, including one who candidly told **Reeves Journal**, "I went to the bathroom and when I got back Jack was sitting down."

Opponents Speak

After Lancaster concluded his remarks and left the podium, chairman Vincent Doyle, representing the Mechanical Contractors Association of America as part of the joint committee with the National Association of Plumbing-Heating-Cooling Contractors as joint secretariats of the committee, called for the other speakers to step forward.

If Lancaster's presentation appeared to be surprisingly short and light to the committee members, what was to follow was a grand performance.

The committee members next witnessed a very organized, polished, professional and dynamic presentation by Raymond J. Leonardini, the attorney who has represented the California Pipe Trades (consisting primarily of United Association interests) in its legal battles with the International Association of Plumbing and Mechanical Officials (IAPMO) during the last three years over the addition of certain plastic pipe products to the Uniform Plumbing Code. He was followed by Marc Lappe, PhD and the chief consultant to the California Pipe Trades on matters concerning its charges that plastic pipe contains toxic materials which are hazardous to the health of the public.

Leonardini, in his best courtroom manner, delivered a moving presentation blasting plastic piping products and their usage in plumbing systems. He also called for the A-40 Committee members to use their own judgment to keep plastics from their model code document. Lappe followed with supporting statements from a health policy consultant's viewpoint, before Leonardini delivered the closing summation.

Toxic Spills

Addressing the subject of permeation, Leonardini cited statistics that estimate 300 toxic waste spills in California every three months. "You don't know where those spills are going to be," he said, "so the idea of analyzing permeation and saying not to put them (plastic pipes) in areas where there are known toxins" is similar to "closing the corral after the horses are out."

"How are you going to know where there is going to be a toxic spill?" Leonardini asked, labeling the committee members "public policy makers and public health officials."

The attorney then pointed out that while efforts are made to determine locations that were once the sites of hazardous wastes, several cases pop up each year where housing tracts have been found to be built on waste sites three or four years after their construction.

One of Leonardini's strongest contentions was that research performed by the American Water Works Company revealed that toxic vapors, particularly from gasoline products, can permeate plastic piping as well as liquids.

"Now where are you going to put pipe to avoid infiltration and permeation by vapors?" he asked.

Leonardini went on to discuss a recent lawsuit filed in the San Jose region concerning polybutylene piping system failures. Submitting a deposition on the issue for the record, Leonardini called the failure rate of PB "time dependent."

"Because of the chemical development of that pipe (PB), if you wait long

enough that particular installation will fail," he claimed.

Leonardini concluded his opening remarks and called upon Lappe, a former official with California's Department of Health and the chief consultant in the lawsuit brought forward by the California Pipe Trades Council and the state's former director of the Department of Consumer Affairs, Richard Spohn, who lent his name to the IAPMO lawsuit under the banner of the Department of Housing.

"I want to thank this group for giving me the opportunity to speak, and the United Association for bringing me here," Lappe said in his opening remarks.

Lappe later explained that the quality of drinking water is generally measured at its source in public treatment facilities. "We assume that nothing happens to it to aid and abet any levels of contaminants in transit," he added, charging that contaminants are being picked up through plastic piping systems.

"We also know of contaminants from metal ions and we are assuming that they are not raising the level of lead, copper or arsenic above the levels that are permissible from the source."

Lappe pointed to three studies conducted by the Pipe Trades Council (under his supervision), the American Water Works Company and the Vinyl Institute.

"What each of these studies found was that there are differences as clear as day and night between plastic and metal," he said. "Plastic permeates certain organic chemicals of health concern. Metal absolutely unequivocally does not."

Leonardini Summarizes

Leonardini followed with a tight, passionate conclusion that hit home with a number of emotional charges and pleas to the committee members.

The attorney challenged IAPMO (which has successfully defended its position on plastics against the Pipe Trades Council, et al in the courts, largely from a judge's ruling that no sufficient evidence has been produced to show any health hazards from plastic piping) and its 1982 UPC additions of plastics. He also questioned the validity of the National Sanitation Foundation which presented key testimony in IAPMO's California lawsuit.

Noting that IAPMO relies upon NSF testing, Leonardini said, "NSF 14 is an inadequate standard for the evaluation and analysis of leaching characteristics in plastic pipe.

"Can you trust EPA? EPA is talking about relying on NSF. EPA has not developed drinking water standards for any of the chemicals that are involved."

Leonardini concluded by stating that all of the data is yet to be received and that it would probably take at least another year and a half to gather all information and comments on the conclusions.

"You have nothing to gain and everything to lose" by acting before governmental studies are completed, he said in closing.



John Woodward, Cast Iron Soil Pipe Institute, expresses his opinion during a discussion of the A-40 Committee's proposed product standards.

Confusion Begins

The polished presentation by Leonardini and Lappe was followed by Doyle's announcement that "in the interest of fairness to both sides and everyone who is on the committee," a 10-minute question-and-answer period would follow.

Lancaster returned to the podium and began to comment on the remarks made by the other two speakers by first acknowledging that he, indeed, represented PPFA and that the other speakers were employed to represent the interest of the United Association.

Lancaster's remarks were quickly met with an objection from Edward Brabec, executive vice president of the United Association. This was followed by Doyle's announcement that the remaining time would be limited to questions from the floor, not rebuttal statements.

Lancaster protested the procedures and then left the podium where Leonardini and Lappe proceeded to answer several questions from the committee members regarding their statements.

Very Convincing

To the members of the audience, it must have appeared as though the anti-plastic speakers clearly presented a very convincing argument for their case, while the plastic concern failed to prove any of their contentions.

When confronted with the question of why Lancaster had failed to make a more comprehensive and prepared statement, PPFA attorney Robert Creamer and Lancaster both charged that they had no prior knowledge that speakers were going to be given 45 minutes each nor were they informed of the type of presentation Leonardini and Lappe were going to make.

While the plastics representatives claimed that they had not been contacted directly by the committee, but that a message was delivered through a third party, chairman Doyle told **Reeves Journal** that he did speak to Lancaster personally by telephone. William Abernathy, committee secretary, George Kauffman, co-chairman, and at least two A-40 members told **Reeves Journal** they had been told that PPFA was notified of the anti-plastics concerns' plans to appear at the meeting more than a month prior to the sessions.

Creamer told **Reeves Journal** that PPFA did not have any plans of making a similar presentation before the committee because the organization did not feel it was the proper venue to air such testimony.

"This group, regardless of what they call themselves or how they self-anoint themselves, is not competent to make these kinds of decisions, and we are not going to engage in a debate before the A-40 Committee on scientific and technical matters.

"The union can bring in people to talk about whatever they want, but we are not going to do anything that would imply that this committee is competent enough to make those kinds of judgments.

"For us to bring in toxicologists would be, in effect, to submit this issue to this group; and it doesn't belong here. This may be a safety code in terms of traditional concern of plumbers for safety, in terms of what is a safe plumbing system, but I don't believe that makes this group competent to decide whether a particular kind of plastic pipe leaches or is permeable to

Continued on page 50

Final Arguments Presented In Calif. Suit Challenging AC Efficiency Rates

by Larry Dill

SACRAMENTO, Calif. — A Sacramento county superior court judge is expected to deliver a final decision in early October on the lawsuit pitting air conditioning manufacturers against the California Energy Commission (CEC) over the CEC's proposed 1988 and 1993 minimum energy efficiency standards.

Judge James I. Morris heard final arguments from attorneys on July 16, and agreed to allow both sides of the litigation to file final closing briefs within 15 days. Upon filing of the briefs, which will be limited to material presented during the July 16 court session, the parties involved in the suit will then have 30 days to file written responses. Upon review of the material submitted, Morris will then deliver his written decision, probably in early October.

The suit was filed by Lennox Industries, Inc., Bard Manufacturing Co., Heil Heating and Cooling Products and Borg-Warner Central Environmental Systems, Inc.. In a related action, American Standard's Trane Division has petitioned the CEC to reconsider its decision to adopt a minimum seasonal energy efficiency ratio (SEER) of 8.9 — beginning in 1988. The SEER would raise to 9.9 in 1993. California's current minimum SEER is 8.0.

The majority of the July 16 season centered around closing arguments by attorneys Thomas Knox, who represents Lennox Et Al. and Bruce Dodge, legal counsel for Trane.

The plaintiffs' attorneys focused their attention on charges that the CEC staff was selective in its use of reference materials, particularly data from the Department of Energy, and claims that the proposed regulations would drastically increase costs while resulting in products and requirements that would not be cost effective for consumers.

"We're very optimistic about the outcome," David F. Lewis, director of marketing for Lennox Industries, told **Reeves Journal.** "We think that the regulations will end up costing the consumer a lot more money. The key is that we don't feel it will be cost effective for the consumer."

Lewis also pointed out that the manufacturers contend CEC reached its decision through the selection of data that would only support its position.

Knox outlined a number of points raised in previous testimony which are being challenged by the manufacturers.

While questioning the methodology used to evaluate such factors as feasibility of compliance, discount rates, maintenance costs and particularly the "design life of units," Knox zeroed in on his clients' contention that the CEC did not have sufficient evidence to develop its regulation. Knox contended that CEC used the wrong "baseline" to determine the cost efficiency of air conditioners that would be subject to the regulations.

"They used the wrong yardstick to measure the cost effectiveness of the 1993 standards," Knox said. "There is no evidence considered that states SEER 9.9 will be cost effective in 1999," he added.

A large portion of the final session was spent arguing the language used in the regulation. The primary question was whether units covered by the regulation should be classified as residential or commercial or single and triple phase air conditioners.

Dodge stated that no data was submitted on a commercial category and that there is no evidence to support the contention the proposed SEERs would be cost effective. He suggested that the regulation be sent back to the CEC staff to either add language specifying commercial air conditioners or that commercial units be exempted from the action.

Exemption would be more favorable, he argued, because of the projected difficulty in enforcing such distinctions, particularly in light of the possibility of units designated for commercial applications being used for residential installations.

In challenging the CEC's selection of data in its regulation formulation process, Knox contended that the CEC staff ignored workshop testimony and input from industry sources and instead selectively referred to data that only tended to back its position on SEER minimums, particularly information from DOE.

Alan B. Lilly, deputy attorney general representing the CEC and the State of California, responded that CEC didn't rely on testimony supplied by industry because it was "just the opinions of their engineers."

CEC has been joined in the defense of the proposed regulation by Carrier Corp. and the Natural Resources Defense Council.

A-40 Committee

Continued from page 10

such a point that it should not be used in plumbing systems.

"No one on that committee is competent to make those kinds of decisions, and it's ironic to note that through all of the procedure they have said they are incompetent to decide whether lead should be used. They have decided they aren't competent to decide whether certain kinds of asbestos products should be used in the code. They have said they are not competent to make judgments whether certain kinds of pipe assemblies are fire retardant. They have denied competence to determine all kinds of issues, but yet when it comes to these extremely complex, complicated and controversial issues about plastic pipe, then all of a sudden there is a group of people that is in there who deem themselves highly competent to decide if plastic pipe should be used.

"And that's what we have, but we simply aren't going to submit that issue to this group. So we're not going to come in with our own dog and pony show."

Both Lancaster and Creamer contend that governmental agencies such as EPA and the Department of Health should be involved in the study and evaluation of the issue.

Couldn't Rebut

Lancaster protested the fact that he was not provided the opportunity to answer the charges made by Leonardini and Lappe, stating that they made several misstatements of fact.

As an example, he countered that the lawsuit in San Jose is centered around a mechanical fastening system, not issues concerning cancer. "He was pulling apples and oranges," Creamer added of his legal counterpart.

When it was pointed out to the plastics spokesmen that a member of the audience would surely have to be influenced by the presentation made by their foes, based on PPFA's lack of performance, Creamer concluded, "You got the message that the sponsors and the union people wanted you to get because, again, we were never told what was going to happen and they had a canned, rehearsed, slick presentation. The other thing to remember, and I'll stop saying it eventually, is that this is not the forum for that kind of thing."

Regardless of the contentions of PPFA, they may find that their counterparts on the committee left with a very strong impression from the presentation made by Leonardini and Lappe. If they were keeping score in the grandstands, the committee members may have concluded that it was no contest. The hired guns scored a TKO.



Reeves Journal - July 1985

Southwest Gas Replacing ABS Pipe in Gas Lines

PHOENIX, — Southwest Gas Corp. has been given the central business area top priority in its program to replace an estimated 2,300 miles of possibly defective gas pipe.

The utility acquired the gas distribution system from Arizona Public Service (APS) last November.

The first phase of the project is expected to require between three and four months and will depend on several contractors working simultaneously in various sections of the target area. Some of the work is already underway, according to John Hanenburg, program manager.

Utility officials noted that the program will involve all ABS-type plastic pipe. APS had used the pipe extensively in the Greater Phoenix area and in other parts of Arizona between 1959 and 1971.

Officials said the pipe constitutes about 23 per cent of the entire system. The whole replacement program will cost an estimated $120 million and will last about six years.

The ABS pipe was involved in an explosion in Phoenix last September that killed five persons and prompted an investigation. The probe revealed that the pipe was aging more rapidly than expected initially.

Reeves Journal - July 1985

Oregon City Seeking $3 Million to Replace Broken Plastic Pipe

by Jim Norland

MEDFORD, Ore. — This southern Oregon city of 50,000 is asking seven suppliers of plastic pipe to reimburse more than $3 million in damages the city expects to sustain in replacing the polybutylene water pipe bought between 1971 and 1981.

Attorneys for the Medford Water Commission and the City of Medford told the suppliers by letter, "It would appear . . . that this water pipe does not meet the requirements, warranties or representations made by you at the time of sale."

The city and the water commission have recently discovered defects and consequent breaking of "numerous pipe," says W. V. Deatherage, a member of Frohnmayer, Deatherage, deSchweinitz, Pratt & Jamieson, P.C., Attorneys at Law, in Medford.

Deatherage has asked each of the seven suppliers to notify his firm by June 26 whether they want to reimburse the two government entities "for the damages they have suffered as a result of said defective pipe.

"The Medford Water Commission will be required to replace all of this water pipe, which it has estimated will be at a cost in excess of $2,000,000," Deatherage's letter continues.

Medford City Attorney Gene Clark told **Reeves Journal** that the total damage is expected to be "in excess of $3 million, but no one supplier is expected to be responsible for more than $2 million."

Letters identical to the one quoted went to The Flintkote Co., Pipe Products Group, Orangeburg, N.Y.; Clow Corp., Plastics Division, P.V.C. Plastic Pipe, Bensenville, Ill.; Western Products Co., Union City, Calif.; Hinds Supply Co., Beaverton, Ore.; Westflex Manufacturing Co., Division of Western Plastic & Rubber Co., Richmond, Calif.; Budge-McHugh Supply Co., Medford; and Consolidated Supply Co., Portland, Ore.

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D-2 WEATHER
D-4 COFFEE BREAK
D-12 FUNERALS

City halts use of plastic pipes for drinking water

By Jane Hadley
P-I Reporter

The Seattle Water Department has placed a moratorium on its use of plastic pipe that delivers drinking water.

"We're not using any until we do come to a final decision" about the safety of the pipe, said Jim Chapman, water quality supervisor for the department.

"We've been contacted by a number of people who claim to have further information."

Water contaminated

The moratorium follows the discovery by a couple renting a home in West Seattle that their water was contaminated with toluene and xylene, two substances commonly found in airplane glue, gasoline, paint solvents and other products.

When the department investigated, it found soil around the meter box contaminated with a strong-smelling solvent. The department then replaced the plastic pipe from the street main to the meter box with copper pipe.

Plastic pipe is a problem because it can be permeated by organic solvents such as gasoline or trichloroethylene, a widely used degreasing solvent. Also, certain glues used to join the pipes are toxic and permeate the pipe to contaminate the drinking water inside.

The city first began to use plastic pipe in the early 1960s for service lines that run from the mains in the street to meters, Chapman said. He estimated that about half the service lines in the city are some type of plastic pipe. The mains are not plastic.

Many lines from the meters to the houses probably also are plastic, Chapman said, but property owners are responsible for installing those.

Forbidding use of plastic for those lines would require a change in the plumbing code, which the City Council would have to do by ordinance.

Chapman said there have been six or seven cases in Seattle within the past two or three years in which drinking water was contaminated when organic solvents penetrated plastic pipe.

All but one were in primarily commercial or industrial areas, where the likelihood of gasoline spills and other soil contamination is greater than in residential areas.

Installations halted

Consequently, the city already has stopped installing plastic water pipes in commercial and industrial areas. The new moratorium applies to residential and all other areas.

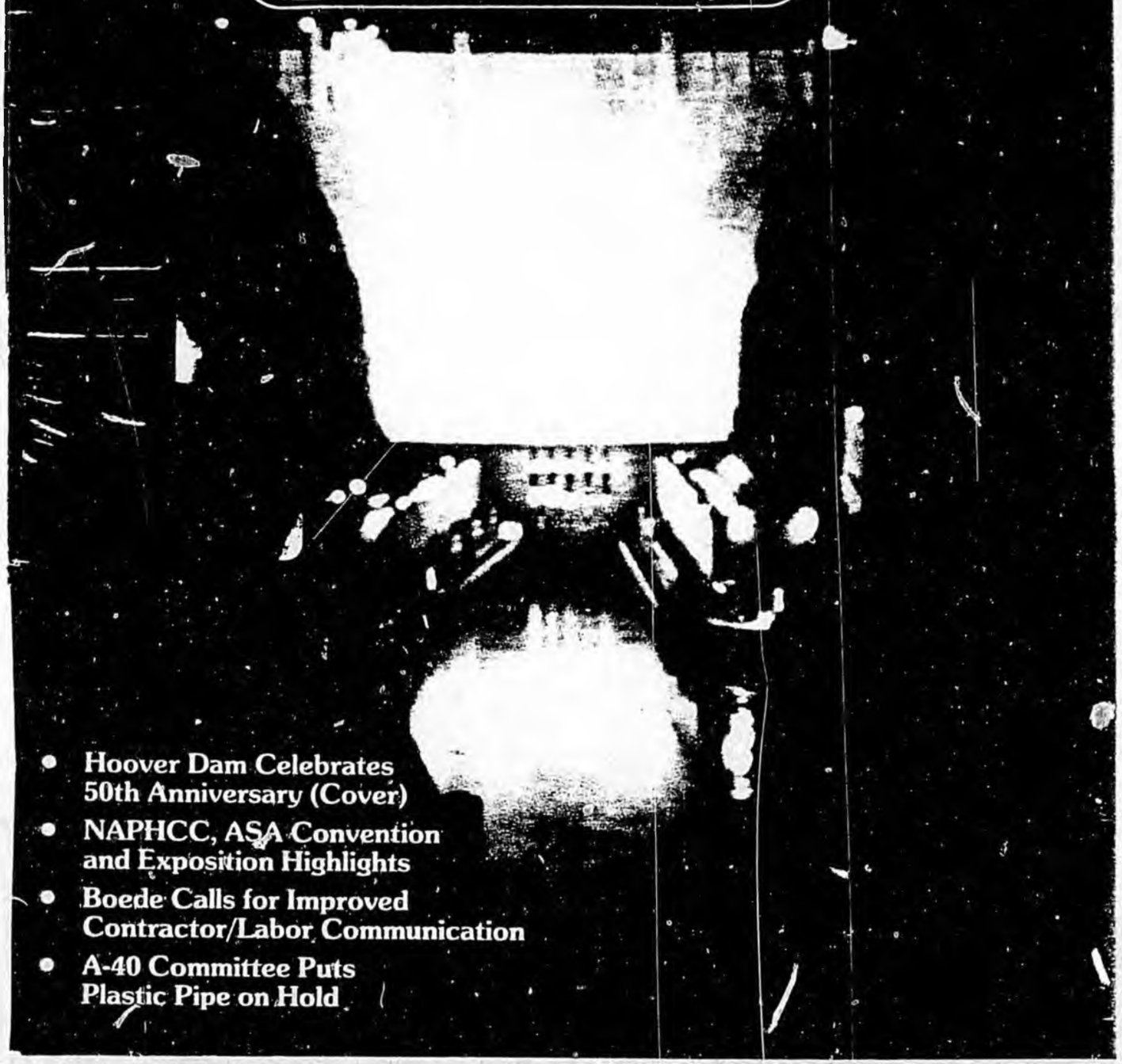
Bob Giron, business agent for the United Association of Plumbers and Fitters Local No. 82 in Seattle, said yesterday that plumbers oppose the use of plastic pipe for drinking water.

"It's not delivering as pure an item as it should be," he said. "And from the workers' standpoint, the glues and solvents we have to use we feel are dangerous."

November, 1985
65th Year

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- Hoover Dam Celebrates 50th Anniversary (Cover)
- NAPHCC, ASA Convention and Exposition Highlights
- Boede Calls for Improved Contractor/Labor Communication
- A-40 Committee Puts Plastic Pipe on Hold

Calif. Attorney General Critical of IAPMO Decision

SACRAMENTO — California's attorney general has written a brief of amicus curiae in support of the anti-plastics factions involved in an appeal of a court decision requesting that an injunction ordered against the International Association of Plumbing and Mechanical Officials (IAPMO) in 1983 be extended to IAPMO's 1985 Uniform Plumbing Code (UPC).

A number of parties, including the State Building Construction Trades Council of California (backed heavily by the United Association), filed suit in 1982 in an attempt to prevent IAPMO from circulating its 1982 edition of the UPC in California because of the addition of several new plumbing code changes which allowed plastic piping materials to be used for potable water within buildings for the first time under UPC guidelines.

The anti-plastics concerns attempted to stop circulation of the 1982 UPC in their lawsuit, which was also filed by the former director of the state's Department of Consumer Affairs, Richard Spohn, and a handful of environmentalist groups and individuals. The original suit alleged that IAPMO did not have the jurisdiction to make such additions to the code and that it was violating the state's Business and Professions Code.

Los Angeles Judge Jack A. Crickard ruled in the county's superior court, however, that IAPMO was not in violation of any laws or alleged unfair business practices and ruled against the anti-plastics factions' efforts to stop the publication of the 1982 UPC.

Crickard based much of his decision in favor of IAPMO on his opinion that there was not sufficient evidence to back up the anti-plastics camp's claims that plastic piping could be hazardous to the public health. Crickard did rule in favor of an environmental impact report to provide further input and agreed to issue an injunction on the code calling for a disclaimer to be distributed with the 1982 UPC in California, stating that an environmental impact report is in progress and advising users of the newly added plastics materials to consult with their local officials as to the status of plastics.

IAPMO had already agreed to voluntarily print the disclaimer before the injunction was ordered.

The injunction was scheduled to be in effect only for the 1982 UPC. Now, as the 1985 UPC is being published (IAPMO issues a new update every three years), the plaintiffs in the case have attempted to continue the injunction through the appeals process.

California District Attorney John Van De Kamp issued his opinion, which has no enforcement powers, on Oct. 15. In his statement, Van De Kamp stated that he felt the appeals case in question falls "within the ambit of Business and Professions Code Section 17500" and that "IAPMO's conduct constitutes a violation of that section."

Van De Kamp called for the extention of the trial court's injunction to apply to the 1985 UPC and the 1985 IAPMO Research Directory (which lists approved products).

One of the primary contentions of the original lawsuit was that IAPMO did not have the authority to list products or grant product approval for products said to be in compliance with the standards of the UPC. Crickard rejected this claim and, in fact, praised IAPMO's efforts and professionalism in making such determinations, citing the input and testimony of the National Sanitation Foundation, which provides testing information for IAPMO and other model code writing bodies.

Van De Kamp's opinion challenges IAPMO's right to make such determinations and contends that the organization's operations should be governed under the Business and Professions Code.

A-40 Committee Puts Plastic on Hold

by Larry Dill

CAMBRIDGE, Mass. — In an effort to avoid becoming bogged down in a never ending materials debate that could slow progress on the American National Standards Institute's A-40 Committee on Safety Requirements for Plumbing, the committee voted during its Oct. 22-25 session here to withhold acceptance of plastic piping materials for use in domestic hot and cold water systems for potable use until it can receive more input on the subject from impartial, outside sources.

The action took place following a follow-up to the controversial discussions about plastic pipe at the committee's last session in July in Universal City, Calif. The July session of the A-40 Committee was highlighted by presentations from plastic pipe advocates and opponents. It was during the July session that both sides of the issue were provided with equal time to discuss the plastics issue.

The anti-plastics camp headed by the United Association presented a well organized and emotional program featuring its two key "expert witnesses," attorney Raymond Leonardini, and Dr. Marc Lappe, PhD., two of the key figures in the union-backed California Pipe Trades council's long running legal battle with the International Association of Plumbing and Mechanical Officials (IAPMO) over the use of plastic pipe in Uniform Plumbing Code (see page 24).

The Plastic Pipe and Fittings Association's participation in the July presentations consisted of a brief six-minute summary of its position on the issue of alleged permeation and leaching of plastic piping materials and the distribution of two documents supporting its position.

After much debate after the July program, PPFA, which had contended that it was not properly notified of the format of the July presentations (which was refuted strongly by A-40 officials), was extended a second invitation to present its case before the A-40 body during the October session. The presentations were established on a similar format with each side given 45 minutes to present its testimony. Following the testimonies equal time was also provided for rebuttals and question answering sessions.

This time it was the plastics advocates who rolled out their team of hired guns in the expert witness derby.

The United Association, which was called upon to make its presentation first, was content to have its legal counsel briefly state that the union felt it had adequately presented its case in July and that it did not feel further input was necessary to express its views on the plastics issue. The United Association then distributed new documents for the committee members' consideration including an opinion (which has no legal binding power) by California attorney general John Van De Kamp on the on-going IAPMO court case over the use of plastics in the Uniform Plumbing Code (see page 24). In his statement, Van De Kamp voiced the opinion that an injunction which called for the inclusion of a disclaimer notifying users of the 1982 UPC in California that an environmental impact report was in progress to study plastic products, be extended for distribution with the 1985 UPC in California.

The United Association also distributed copies of a study being conducted by scientific experts at the University of California, Berkeley. The study, commissioned upon the request of the state's Department of Health Services, is providing a review of recent literature and research on the permeation of plastic pipe. The materials distributed were released Sept. 30 and represent the first half of a study that is scheduled to be concluded by April 1, 1986.

Also distributed were copies of correspondence to Leonardini from a representative of the California Department of Housing and Community Development which included a recent press release explaining the suspension of the environmental impact report assigned to Versar, Inc., a Virginia based research firm. This was accompanied by an audit of the work performed by Versar before suspension of the project.

Plastics Testimony

The plastics proponents were keyed by PPFA representative Jack Lancaster, who repeated PPFA's position following the July presentations. Lancaster continued to state that "PPFA believes, as it has stated other times, that this committee is not the appropriate group to decide complex, scientific and technical issues with regard to plastics or with regard to any other materials."

"None of us has the professional expertise to decide issues like alleged permeation and leaching that have been raised against plastic pipe in this committee," Lancaster continued.

Apparently intent upon stressing its position that the members of the A-40 Committee did not have the technical or scientific background to make decisions on plastics materials, the PPFA representatives innundated the voting committee members with more than 50 documents on the plastics issue. They then presented three witnesses of their own to provide technical testimony on various aspects of the plastics issue.

PPFA's witnesses included Steven C. Packham, PhD, of Salt Lake City, a longtime toxicologist who has worked with a number of governmental and scientific agencies, who announced that he is currently conducting a study of all available data on plastics.

Another witness was Joseph Zicherman, PhD, of Innovative Fire Technology, Berkeley, who discussed his work with studies concerning plastic piping materials in fire stations.

The third PPFA witness was Alan Olson, PE, of B.F. Goodrich's chemical group. Olson addressed the charges of permeation in plastic piping.

Put on Hold

Following the presentations, the committee was still faced with the monumental task of forging ahead with the A-40 document's Table 3.1.3 which provides "standards for materials, equipment, joints and connections."

Realizing that the table, which must be passed before any definative progress can be made toward completing the document, contains hundreds of pro-

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Edward Brabec of the United Association ponders the large stack of technical materials presented to A-40 members for their study on the plastic pipe issue.

A-40

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duct listings and their relating standards, the committee members were faced with the possibility of having progress slowed by debates on every plastics product that appears in the table.

In an effort to avoid such delays, Donald Dickerson, representing the American Society of Plumbing Engineers, suggested a motion which stated:

"Serious concerns regarding the suitability of plastic pipe to convey domestic hot and cold water for potable use have been brought before this committee.

"The committee has heard presentations and received materials regarding data which has been compiled and tests performed, planned and underway which deal with and address the 'complicated chemical, medical and public health questions' involved in such issues.

"It has been stated, and we believe, that much more work must be done in order to provide those data necessary to (make) a sound decision on these important matters.

"With all of the above in mind, the A-40 Committee is withholding acceptance of plastic pipe for use in domestic hot and cold water systems for potable use until such time as clear, definitive and impartial data are available which can substantiate its use for this purpose."

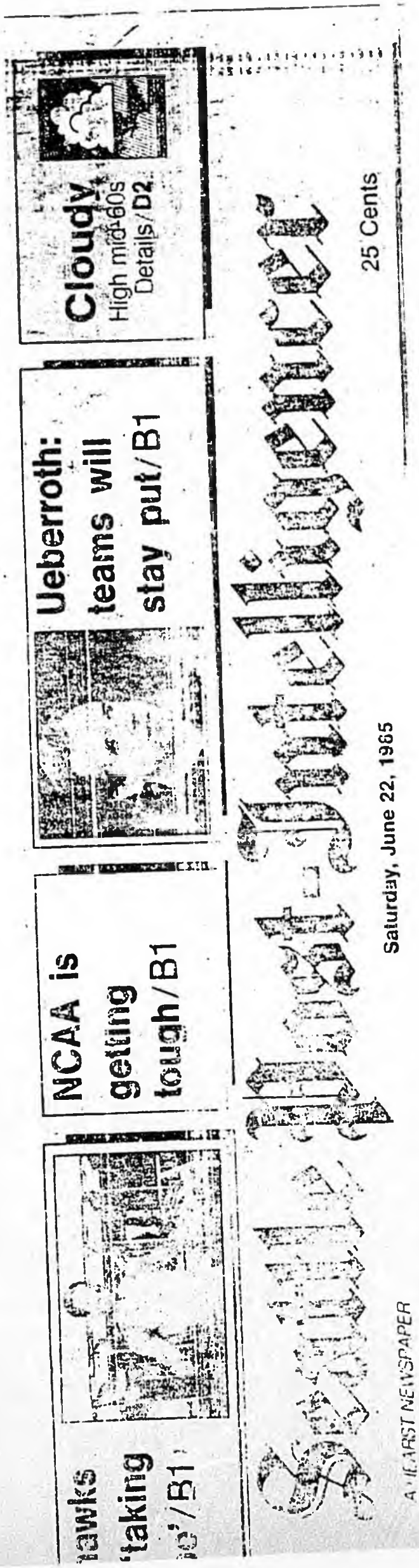
After acceptance of the motion, the committee members agreed that material from an outside source should be submitted and then studied before the committee made any decisions on plastics.

Refuting the charges by PPFA that the A-40 body is not capable of making the proper decisions on plastics, Dickerson noted that the body was qualified to make such determinations provided that it was given sound and impartial study results to evaluate. "I believe we have within this body the ability to analyze pretty technical reports," Dickerson said.

Vincent Doyle, co-chairman, said, "Collectively, we're probably the finest minds in the country in the plumbing industry."

PPFA's Richard Church protested the singling out of plastics materials and asked that all piping materials be studied. His pleas fell upon deaf ears. He continued his contention that the plastics industry would be willing to participate in such studies "if it was done across the board."

The A-40 Committee scheduled its next session for January in Tampa. At that time it will resume work on Table 3.1.3, which is nearly halfway completed with the exception of the plastics materials which have been placed on hold.



City fear: Plastic pipe lets poisons in

By Jane Hadley
P-I Reporter

The first time Alicia Berger, 29, drank a glass of water at the West Seattle house she was renting, she spit it out because it tasted so bad.

Soon, she and her boyfriend, Jeffrey Lewis, 38, found that their water was contaminated by xylene and toluene, two organic solvents commonly found in airplane glue, gasoline, paint solvents, plastics and other products.

As a result of five or six similar cases, the Seattle Water Department may stop using plastic water pipes, an official said.

The city already has tightened its policy within the past year on plastic water pipes, no longer installing them in industrial or commercial areas, said Jim Chapman, supervisor of water quality at the city Water Department.

Organic solvents

But now Water Department executives soon will discuss going even further and discontinuing their use altogether, he said.

The main problem with plastic pipes is that organic solvents can permeate the pipe, polluting the water they carry, said Roy Jones, an environmental scientist for the U.S. Environmental Protection Agency.

Typically, the ground around the pipe becomes saturated with a solvent, such as gas or oil or paint thinner, which passes through the pipe wall to the water.

A second problem is that certain kinds of adhesives used to join some plastic pipes also permeate the pipe and contaminate the water.

Plumbing code

The plumbing code requires that the right combination of adhesive and plastic be used, but Jones says it's hard for plumbing inspectors to know whether an installer has used the correct adhesive.

Chapman said the city began to use plastic pipe in the early 1960s and estimates that maybe half the city water lines serving residences are on plastic pipe today.

In the last two or three years, there have been about six cases in which residents have reported drinking water contaminated with organic solvents such as toluene, xylene and benzene, Chapman said.

Benzene is a known human cancer-causing agent, linked to leukemia. Xylene and toluene are

See TWO, Page A-4



Jeffrey Lewis and Alicia Berger had to leave a rental home because the water there was contaminated with organic solvents. Plastic water pipes may have been part of the problem.

Two leave rented house because city water there is contaminated

From Page A-1

not linked with cancer but can cause kidney, liver and central nervous system damage.

In all but one of the cases, the residents lived in commercial or industrial areas, Chapman said. But in one case, the home was in a residential neighborhood.

Chapman speculated that in that case somebody poured oil or some other petroleum product into the gutter and it leaked through an expansion joint in the concrete to saturate the soil around the water pipe.

In each case, the city replaces the plastic pipe that runs from the street to the property line with copper pipe. It's up to the property owner to replace the pipe from the property line to the house.

Berger and Lewis moved into a rented house last Nov. 28 on a sparsely populated, overgrown ridge in West Seattle just above Marginal Way Southwest. By Jan. 1, they had moved out.

The two were so upset by their experience they didn't even want to talk about it for several months, said Lewis, a teacher of Indian music.

He complained that officials at various agencies were slow to respond initially, never called back when they said they would, were timid and uninformative and tried constantly to limit their responsibility for the problem.

"Everybody was very nice, but nobody would make a commitment," he said. Meanwhile, the couple was driving 40 miles round-trip to shower every day, borrowing water from people across the street and eating elsewhere.

Berger, a graduate student at the University of Washington, and Lewis hired a private lab to test the water, because they felt the Water Department would not do a test.

But the Water Department did do a test. Both tests found the water contaminated and the department decided the plastic service line should be replaced.

When crews dug holes in the ground near the meter box along Marginal Way Southwest to install copper pipe, the soil was clearly contaminated and gave off a strong solvent odor, said Jones of the EPA.

Lewis said, "From 20 feet away you could smell this ground they were digging up. It stunk."

But though the Water Department did replace the pipe, nobody ever did anything about the contaminated soil.

In fact, Water Department crews started to cover over the new pipe with the old contaminated soil until Lewis questioned the wisdom of that move.

"Aren't you just asking for trouble?" Lewis asked. The crews then decided to haul the soil away and put clean dirt down instead.

Jones said he was at the site "strictly as an observer." Jane Lee of the Seattle-King County Department of Public Health said once she saw that the water department replaced the pipe, she considered her responsibility over.

Chapman said the Water Department's responsibility was only to replace the plastic pipe.

He said nobody checked to see whether the contamination is widespread or limited to the meter box area. And nobody checked the source of the contamination.

He said it would be hard to know where it came from, though he added, "Obviously, with the painting contractor next door, that would be suspicious." The meter box is adjacent to the property of Central Painting Inc. on Marginal Way Southwest.

Both Jones and Chapman said any soil contamination would be in the jurisdiction of the state Ecology Department. But the Ecology Department was never called about the case.

And Joan Thomas, director the Ecology Department's regional office in Redmond, said soil contamination isn't that department's responsibility unless either groundwater or surface water is polluted.

She acknowledged that groundwater pollution almost always starts as soil pollution.

When asked whose responsibility the soil contamination would be, Thomas said: "I can't say it was anybody's responsibility. I'm saying I don't know."

Tom Hubbard, a water quality biologist for Metro, said he considers it important to follow up such reports of soil contamination. Hubbard has been meticulous in testing the shores of the Duwamish. "I've the past several years trying to figure out where various river pollutants come from.

Jones of EPA said: "The problem is because of different jurisdictions and the delegation of programs back and forth, that we leave some pretty big gaps in the system. I'm not saying the fault right, but they exist."

Chapman said: "It's an area of mixed responsibilities. It's not entirely clear who does have responsibility. I agree it's not a terrific situation."

One person who has taken a stand on the source of the pollution is the owner of the house Berger and Lewis were renting. Landlady Carol Knox, a Cashmere resident, recently filed suit against Central Painting Inc.

Knox's Seattle lawyer, Linda Larson, said the suit alleges that the paint company released chemicals into the soil which ended up in the water line to Knox's house.

Though the new copper pipe put in by the Water Department reduced the levels of contamination, the drinking water is still contaminated, said Chapman.

Knox probably will have to replace at least some of the pipe on her property. To replace all of it up to her house, a long distance up a steep hill, would cost an estimated $23,000, said Knox's lawyer.

John Hamilton, president of Central Painting, denied responsibility for the problem. He said tests performed by a local environmental laboratory show that the pollution in the house drinking water is unrelated to diesel oil found at the meter box and naptha found at a sump on his

Plumbing Code - UCA

Moen ✓

Sharon Macklin

A M E N D M E N T

In the HOUSE

By Navarre by request

TO: HB 63

Page 1, after line 29, insert new bill sections to read:

"* Sec. 3. AS 18.62.010 is amended to read:

Sec. 18.62.010. CERTIFICATE OF FITNESS REQUIRED. In connection with work performed subject to the standards established in AS 18.60.580 and [AS] 18.60.705, a person may not be employed without a certificate of fitness to perform the work, except that a certificate of fitness may not be required of

(1) employees of an electric utility which does not have within its service area any portion of a city or unified municipality having more than 2,500 population; or

(2) a sewer or water line installer.

* Sec. 4. AS 18.62.010 is amended by adding a new subsection to read:

(b) In (a) of this section, a 'sewer or water line installer' means

(1) a person employed to install a building sewer pipe within the property lines of the building, starting at the first joint from the building to the main sewer trunk or disposal field; or

(2) a person employed to install a water service pipe from a private or public water supply to the first joint in a building above ground, within the property lines of the building."

UTILITY CONTRACTORS OF ALASKA, INC.
Alaska Chapter of the National Utility Contractors Association
P.O. Box 10-1186 • Anchorage, Alaska 99511 • (907) 344-4581

April 4, 1986

Sharon Macklin, Lobbyist
515 5th Ave. #6
Juneau, AK 99801

Re: House Bill Number 63 and Senate Bill Number 238, "An act relating to the plumbing code".

Dear Sharon:

UCA has no objection to adoption of the Uniform Plumbing Code as outlined in the above referenced bills.

However, we very much would like to see an amendment to Alaska Statute 18.62.070, (copy attached). We feel that House Bill No. 63 and Senate Bill No. 238 would be the appropriate vehicle for such an amendment. We propose that the AS 18.62.070 be amended to add the following:

(3) The requirement for Certificate of Fitness does not apply to "sewer/water line installers".

(4) A "sewer/water line installer" means:

a) A worker who installs the building sewer piping within the property lines, starting at the first joint from the building to the main sewer trunk or disposal field; or

b) A worker who installs water service piping to the first joint in a building above ground, within the property lines from either a public or private water supply.

The purpose for this proposed amendment is to avoid the kind of hassels we had last year with Bill Zubeck. The proposed definition for "sewer/water line installers" conforms with industry wide practice.

Please call me concerning this amendment at your convenience.

Sincerely yours,

William A. McKeever

cc: All UCA members

b.6.1

CERTIFICATE OF FITNESS

AS 18.62.070 PERSONS REQUIRED TO OBTAIN CERTIFICATE. A person engaged in one of the following trades shall first obtain from the department the appropriate certificate of fitness in that trade:

(1) electrical wiring subject to the standards established in AS 18.60.580; and

(2) plumbing subject to the uniform plumbing code, as established in AS 18.60.705 (1ch 12 SLA 1974)

AS 18.62.080. PENALTY: A person, either an employer or employee, who violates a provision of this chapter or of a regulaion issued under this chapter is guilty of a misdemeanor and upon conviction, is punishable by a fine of not more than $500.00 (1ch 12 SLA 1974)

M E M O R A N D U M

To: All Members, House State Affairs Committee

From: Roger Poppe, Committee Staff

Date: March 21, 1985

Subject: Testimony of Barry Haight on HB 63

HB 63 Testimony

Taken on the telephone on March 19 from Barry Haight of the Fairbanks Firefighter's Assocation, and the Fairbanks Labor Council (home phone 455-6293; office 456-8354):

Mr. Haight was present at the Monday teleconference in Fairbanks, but was one of those that due to the shortage of time was unable to testify. He is unable to make it for the Thursday teleconference, and so gave this testimony to me over the phone.

Mr. Haight states he is opposed to Hb 63, and in fact would contest almost every single statement that the members of the plastic industry made at the teleconferenced hearing on March 18.

He further states that the firefighters international union has decided to take a strong stand against the use of any kind of plastics in any kind of building or home furnishings, and it happens that plumbing is one of the first of many areas where they are coming out strongly opposed to the use of plastics.

He pointed out that Representative Koponen hit close to the mark when he metnioned that in the film there was a chemical company representative who expressed surprise at the plastic and how his product reacted to heat and didn't burst into flame; and how that really begs the question. PBC gives off 74 different kinds of fumes. Many of them are poisonous, but more importantly, all of them are carcinogens. One in four firefighters get cancer of the lung from enhaling various kinds of smoke fumes !!

There have been numerous detailed and accepted studies done recently which show the hazards of plastics, and the chemical industry in general has:

1) Fought the development and standardization of these tests; and
2) Disputed the results of any tests made, including the best ones done to date from the U. of Pittsburg

Another interesting point to make is that if you put the right heat to galvanized piping, it too will give off toxi fumes, but most iron piping will not.

Mr. Haight said that Mr. Jack Lancaster's talk about temperatures in fires was incorrect, some fires can go up to over 2,000° F. And most common plastics burn twice as hot and fast as organic materials; though there are some that don't burn.

The average home has between 300-500 pounds of plastic furnishings and piping in it, so it is a widespread and serious problem.

Plastic furnishings can be changed in any building over a period of time, but the important thing to note is that plastic piping is there to stay in the building and its walls for the life of the building, so we need to take a hard look at this.

Also, just because the Underwriter's Laboratory puts a seal of approval on something, doesnt mean it is guaranteed as far as it's safety is concerned. This whole issue is so new that UL hasn't investigated its ramifications yet, so a lot of products that give off toxic fumes have the UL seal on it.

To show you how recent this problem is, it was only recently in Fairbanks that the firefighters there discovered that the polycarbonate material that the firemen use for their helmets will melt down around our ears if we get exposed to even a short flash of heat in the medium to upper heat ranges of the average fire!!

And of course, there is the terrible toxic fumes that come from home furnishings like the polyurethene foam in sofas, etc.

Mr. Haight says to make a point in public lectures he gives on this issues, often challenges the plastic industry representatives to have each of them enter a sealed room, his own with 10-15 ounces of burning organic material, and the plastics representative with 10-15 ounces of burning plastic material, and see who lives to come out of the room in 20 minutes to tell about it.

He says that after a regular fire, he has some chest congestion problems for a while from enhaling smoke, but when he has been in a fire where he has inhaled fumes from buring plastic (unavoidable in many house fires these days), he is still blowing black stuff from his nose 3 days later, and he gives off black stuff from the poors of his skin for about 3 days that smells terrible.

His final point is that all firemen, including him, are breathing this stuff every day on the job and are all slowly dying from it.

Shell Chemical Company
A Division of Shell Oil Company

P.O. Box 7637
Stockton, CA 95207

February 15, 1985

RECEIVED
FEB 26 1985
ELY, GUESS & RUDD
Juneau Office

Mr. Gordon Evans
Ely, Guess and Rudd
318 4th Street
Juneau, Alaska 99801

Dear Gordon:

Thank you for your note and a copy of HB #63. Fifteen Polybutylene handout packages are on their way to you under separate cover.

The following is a partial list of states and major cities approving the use of Polybutylene, plus a list of model codes.

Model Codes approving Polybutylene
(refer to attachment)

Uniform Plumbing Code -- Most of West including Alaska
Building Officials and Code Officials -- Northeast
Southern Builder's Code -- Mid West and South

States with a state wide code approving Polybutylene

Oregon
Utah
New Mexico
Montana
Massachusetts

States without a Statewide code but with all major areas approving Polybutylene (refer to attached list)

Washington
Hawaii
Arizona
Nevada
Texas
Florida
Virginia
Georgia
North Carolina
South Carolina

It should also be noted that in May of 1984, the Plumbing Advisory Board for Anchorage approved the use of Polybutylene. In short, Polybutylene for plumbing application continues to grow at 10-20% per year. Over 5,000,000 units are now plumbed with Polybutylene across the U.S.

Thanks for keeping me informed.

Very truly yours,

Martin J. O'Brien

Martin J. O'Brien
Regional Sales Manager
Polybutylene Department

MJO/css

enclosure

SPECIFICATIONS, STANDARDS, APPROVALS, ACCEPTANCES, AND LISTINGS FOR POLYBUTYLENE PLUMBING

I. SPECIFICATIONS

ASTM D2581 - Polybutylene Material Specification
ASTM D2662 - Polybutylene Pipe Specification (IPS sizes) water service
ASTM D2666 - Polybutylene Tubing Specification (CTS sizes) water service
ASTM D3000 - Polybutylene Pipe Specification
ASTM D3309-82 - Polybutylene plastic for hot and cold water distribution systems
ANSI 119.1
ANSI 119.2 - Mobile Home and Rec. Vehicle Specifications
AWWA C902-78 - Polybutylene Water Service Sewer Tubing (American Water Works Association)
CSA B137.7 - Polybutylene Cold Water Service (Canadian Standards Association)
CSA B137.8 - Polybutylene Hot and Cold Water Distribution Tubing

II. CODES AND LISTINGS

BOCA (Code) - Building Officials Congress of America (accepts PB per ASTM D3309)
FHA (Listing) - Farmers Home Administration (cold water only)
FHA-HUD (Listing) - Federal Housing Administration (Bulletin 68) UM78 4/25/78 - (hot and cold water approval) UM 76.
ICBO (Code) - International Congress of Building Officials (plumbing approval)
IAPMO (Code) - International Association of Plumbing and Mechanical Officials (Uniform Plumbing Code)
MHA (Listing) - Manufactured Housing Association
NSF (Listing) - National Sanitation Foundation - (Standard #14)
NSPC (Code) - National Standard Plumbing Code (NAPHCC)(Code Table 3.1.3)(plumbing approval) National Association of Plumbing-Heating-Cooling Contractors
PPI (Listing) - Plastic Pipe Institute
RVI (Listing) - Recreational Vehicle Institute
SBCC (Code) - Southern Building Code Congress (accepts PB per ASTM D3309)
UL (Listing) - Underwriters Laboratory
MHMA (Listing) - Mobile Home Manufacturers Association
NFPA - National Fire Protection Association #501.C (mobile home)(plumbing approval)
South Florida Building Code

75/100

CODE APPROVALS IN MAJOR METROPOLITAN AREAS

METROPOLITAN AREA

+ Akron
+ Albuquerque
Allentown-Bethlehem
Anaheim, CA
Atlantic City
+ Austin
Baltimore
+ Birmingham
+ Boise
+ Boston
+ Buffalo
+ Canton, OH
+ Charleston, SC
+ Charlotte, NC
Chicago
+ Cincinnati
+ Cleveland
+ Colorado Springs
+ Columbia, SC
+ Columbus, OH
+ Dallas
+ Dayton
Daytona Beach
+ Delaware
+ Denver
+ Detroit
El Paso
Evansville
+ Fort Lauderdale
Fresno, CA
+ Gainesville, FL
+ Grand Rapids
+ Greenville County, SC
+ Harrisburg, PA
+ Hartford
+ Hawaii
+ Houston
+ Indianapolis
+ Jacksonville, FL
+ Kalamazoo, MI
+ Kansas City
+ Knoxville
+ Lakeland-Winter Haven, FL
Lancaster, PA
+ Las Vegas
Lincoln, NE
+ Little Rock
Los Angeles, Long Beach

+ = Code Approval

Madison, WI
+ Miami
+ Memphis
Milwaukee
+ Minneapolis
+ Nashville
+ Newark, NJ
+ New Brunswick, NJ
+ New Haven, CT
New York
+ New Orleans
+ Norfolk, VA
+ Oklahoma City
+ Orlando, FL
Oxnard, CA
+ Peoria, IL
Philadelphia
+ Phoenix
+ Pittsburgh
+ Portland
+ Raleigh, NC
+ Rhode Island
+ Riverside, CA
+ Roanoke, VA
Rochester, NY
Sacramento, CA
St. Louis
+ Salem, OR
+ Salt Lake City
San Antonio
+ San Diego
San Francisco
+ San Jose
+ Santa Barbara
+ Sarasota, FL
Scranton, PA
+ Seattle
+ Somerset County, NJ
+ Spokane
+ Springfield, IL
+ Tacoma
+ Tampa
+ Toledo
+ Tucson
+ Tulsa
+ Washington, DC
Wausau, WI
+ West Palm Beach
+ Wichita
+ Wilmington, NC

New Uniform Mechanical Code

Chapter 23

436

B-23-82-1[7-82-1]—S.C.C. Approval as Revised

As Submitted:

See *Building Standards, Part IV,* July-August, 1982.

As Revised:

Appendix B. Add a new chapter to read as follows:

Chapter 23
HYDRONIC PANEL HEATING SYSTEMS

General

Sec. 2301. The purpose of this chapter is to establish and provide minimum standards for the protection of public health, welfare and property by regulating and controlling the design and installation of panel heating systems.

Installation

Sec. 2302. (a) Panel sytems shall be designed and installed in accordance with installation standards incorporated in Appendix C, Panel Heating and the requirements of this code.

(b) Piping to be embedded in concrete shall be pressure tested prior to pouring concrete. During pouring, the pipe shall be maintained at the proposed operating pressure.

Piping Materials

Sec. 2303. (a) Panel. Piping for heating panel shall be standard-sight steel pipe, Type L copper tubing, polybutylene or other approved plastic pipe or tubing rated at 100 psi at 180°F. in accordance with design stresses listed in Appendix C, or other materials suitable for this type of design approved by the building official.

(b) Hot Water Supply Lines. Piping for hot water supply lines shall be installed according to requirements in Chapter 21.

Piping Joints

Sec. 2304. Joints of pipe or tubing forming the panel that are embedded in a portion of the building, for example, concrete or plaster, shall be in accordance with the following:

1. Steel pipe welded with electrical arc or oxygen/acetylene method.
2. Copper tubing joined with solder or copper brazing rods having a melting point of 1000°F.
3. Polybutylene pipe and tubing installed in continous lengths or with heat-fused polybutylene fittings.

Joints of other piping in cavities or running exposed shall be joined by the use of normally accepted methods in accordance with manufacturer's recommendations and related sections of this code.

Heat Sources

Sec. 2305. Heat sources for generating hot water for use in hydronic panel radiant heating systems shall include conventional fossil fuel, hot water boilers, electrical resistance heated boilers, air/water or water/water heat pumps or solar heat collector systems. The latter system may include booster or back-up heating units.

Systems shall be protected by pressure-temperature relief valves as outlined in this code.

Testing

Sec. 2306. Approved piping or tubing installed as a portion of a radiant panel system that will be embedded in the walls, floors or ceilings of the building it is designed to heat shall be tested for leaks by the hydrostatic test method by applying not less than 100 psi water pressure or one and one-half times the operating pressure, whichever is the greater.

For metal piping, a pressure gauge shall be connected to the piping, and after the pressure has been raised, the hydrostatic pressure connection shall be discontinued, and the systems under pressure shall remain at the test pressure for a sufficient period of time to determine whether any leaks exist in the system. Leaks shall be indicated by the pressure drop on the gauge. Minimum test period shall be 30 minutes.

For flexible plastic piping, the test pressure shall be applied for a period of 30 minutes. During this time, the system shall be maintained at the test pressure by the periodic addition of makeup water to compensate for the initial stretching of the pipe. The system shall then be visually inspected for tightness.

Tests for tightness of radiant piping systems shall be witnessed by the building official

Also:

Appendix C. Add entries to read as follows:

PANEL HEATING, ASHRAE Systems Volume 1980, Chapter 8

RECOMMENDED HYDROSTATIC STRENGTHS AND DESIGN STRESSES FOR THERMOPLASTIC PIPE AND FITTINGS COMPOUNDS, Technical Report TR-4, August, 1978, Plastic Pipe Institute, 355 Lexington Avenue, New York, New York 10017.

Reason: To provide appropriate recognition and code regulation of panel heating systems.

MECHANICAL CONTRACTORS
of Fairbanks, Inc.

P.O. Box 74796 Fairbanks, Alaska 99707-4796
1881 Marika Road Suite A (907) 456-8347 or 456-6413

January 24, 1985

Mike Navarre

Labor and Commerce Committee

Pouch V

Juneau, Alaska, 99811

Re: House Bill No. 63

Dear Representative Navarre:

The Mechanical Contractors of Fairbanks, Inc. endorses the passage of House Bill No. 63. This Act would have the State of Alaska adopt the:

1985 Uniform Plumbing Code

1985 Uniform Solar Energy Code

1985 Uniform Swimming Pool, Spa and Hot Tub Code

The adoption of these Codes by the State of Alaska will have the effect of making Alaska current on plumbing codes and bring the State closer in line with Codes presently in use here in Fairbanks as well as Anchorage.

Very truly yours,

Eugene R. Rutland

Eugene R. Rutland

Executive Director

MECHANICAL CONTRACTORS
of Fairbanks, Inc.

P.O. Box 74796 Fairbanks, Alaska 99707-4796
1881 Marika Road Suite A (907) 456-8347 or 456-6413

February 22, 1985

Representative Mike Navarre
Labor and Commerce Committee
Pouch V
Juneau, Alaska, 99811
Subject: House Bill 63

Dear Representative Navarre:

I understand that consideration of this bill in committee is being delayed because printed copies of the 1985 Codes are not yet available. These are supposed to be available before March 1, 1985.

We ask your cooperation in expediting action on HB 63 when these codes are available. We feel strongly that this legislation should be adopted this session.

As you know the State of Alaska presently recognizes the 1979 Codes as their standard. Both Anchorage and Fairbanks recognize the 1982 Codes. The differences in these codes cause many problems at the local level.

Adoption of the 1985 Codes will put the State of Alaska in a current stance and enable Anchorage and Fairbanks, by adopting the 1985 Codes, to be uniform with the State.

To those of us operating in the construction business at the local level this would simplify a needlessly complicated situation.

Very truly yours,

Eugene R. Rutland

Eugene R. Rutland
Executive Director

Exception: When in the opinion of the Administrative Authority no hazard to the potable water supply system is evident, special approval may be obtained to omit the vacuum breakers.

(l) **Aspirators** shall not be directly connected to a sewer connected waste pipe, but may be connected to the inlet side of a trap and shall be equipped with an approved vacuum breaker installed at least six (6) inches (152.4 mm) above the aspirator unit. The discharge pipe from the aspirator unit shall be designed for free flow and shall discharge through an approved airgap.

(m) **Vacuum breakers for hot water over 160°F (71°C)** shall be of approved type designed to operate at temperatures of one hundred sixty (160) degrees F (71°C) or more without rendering any portion of the device inoperative.

(n) **Steam and steam boiler connections** shall be protected by an approved backflow prevention device as set forth in subsection (o) of this section

(o) **Non-potable Water Piping.** In cases where it is impractical to correct individual cross-connections on the domestic water line, the line supplying such outlets shall be considered a non-potable water line. No drinking or domestic water outlets shall be connected to the non-potable water line. Backflow or back-siphonage from the non-potable water line into the domestic water line shall be prevented by the installation of a gravity tank or by a tank having a pump for desired non-potable water. The domestic water inlets to the non-potable water tank shall have an approved airgap as required elsewhere in this chapter. Where it is impractical to install tanks, as set forth above, an approved pressure type backflow or back-siphonage prevention device shall be installed as follows:

Where reverse flow due only to gravity or a vacuum within the line can occur, an approved pressure type vacuum breaker unit or other approved backflow prevention device shall be installed in the supply line.

Each pressure type vacuum breaker unit shall be installed at a height of at least twelve (12) inches (.3 m) above the highest tank, equipment or point of usage of the non-potable water. Other approved backflow prevention devices shall be installed in a manner satisfactory to the Administrative Authority, but in no case less than twelve (12) inches (.3 m) above the surrounding ground or floor.

Where backflow can occur due to steam boilers, pumps, etc., creating a higher pressure in the non-potable water line, an approved backflow prevention device shall be installed in the supply line. Such backflow prevention device shall be installed at least twelve (12) inches (.3 m) above the surrounding ground or floor.

Whenever possible, all portions of the non-potable water line shall be exposed and all exposed portions shall be properly identified in a manner satisfactory to the Administrative Authority. Each outlet on the non-potable water line which may be used for drinking or domestic purposes shall be posted: DANGER — UNSAFE WATER.

Residential Building

(p) **Vacuum breakers** shall be located outside any enclosure or hooded area containing fumes that are toxic or poisonous.

Section 1004—Materials

(a) Water pipe and fittings shall be of brass, copper, cast iron, galvanized malleable iron, galvanized wrought iron, galvanized steel, lead or other approved materials. Asbestos-cement, CPVC, PB, PE, or PVC water pipe manufactured to recognized standards may be used for cold water distribution systems outside a building. CPVC and PB water pipe and tubing may be used for hot and cold water distribution systems within a building. All materials used in the water supply system, except valves and similar devices shall be of a like material, except where otherwise approved by the Administrative Authority.

(b) Cast iron fittings up to and including two (2) inches (50.8 mm) in size, when used in connection with potable water piping shall be galvanized.

(c) All malleable iron water fittings shall be galvanized.

(d) Piping and tubing which has previously been used for any purpose other than for potable water systems shall not be used.

(e) Approved plastic materials may be used in water service piping, provided that where metal water service piping is used for electrical grounding purposes, replacement piping therefore shall be of like materials.

Exception: Where a grounding system, acceptable to the Administrative Authority is installed, inspected and approved, metallic pipe may be replaced with non-metallic pipe.

Section 1005—Valves

(a) Valves up to and including two (2) inches (50.8 mm) in size shall be brass or other approved material. Sizes over two (2) inches (50.8 mm) may have cast iron or brass bodies. Each gate valve shall be a fullway type with working parts of non-corrosive material.

(b) A fullway valve controlling all outlets shall be installed on the discharge side of each water meter and on each unmetered water supply. Water piping supplying more than one building on any one premises shall be equipped with a separate fullway valve to each building, so arranged that the water supply can be turned on or off to any individual or separate building; provided however, that supply piping to a single family residence and building accessory thereto, may be controlled on one valve. Such shutoff valves shall be accessible at all times. A fullway valve shall be installed on the discharge piping from water supply tanks at or near the tank. A fullway valve shall be installed on the cold water supply pipe to each water heater at or near the water heater. A fullway valve shall be installed for each apartment or dwelling of more than one (1) family. In lieu of the main supply shutoff in each apartment, individual shutoff valves may be provided at each fixture.

(c) All valves used to control two (2) or more openings shall be fullway gate valves or other approved valves designed and approved for the service intended.

14-0889
Moen
3/13/85

IN THE SENATE

SENATE BILL NO.

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the plumbing code."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.705 is amended to read:

Sec. 18.60.705. PLUMBING CODE. The following publications are adopted [DEPARTMENT OF LABOR SHALL ADOPT,] as the official minimum plumbing code for the state,

(1) the Uniform Plumbing Code, 1985 [1979] edition, adopted at the 54th [49TH] Annual Conference, September 1983 [,1978], International Association of Plumbing and Mechanical Officials, chs. 1 - 13 and appendices, Useful Tables, and Installation Standards, but excluding Part I, Administration, pages 1a - 6a, and subject to AS 18.60.710 - 18.60.740 and the changes specified in (b) of this section;

(2) the Uniform Solar Energy Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials; and

(3) the Uniform Swimming Pool, Spa and Hot Tub Code, 1985 edition, adopted at the 54th Annual Conference, September, 1983, International Association of Plumbing and Mechanical Officials.

* Sec. 2. AS 18.60.705 is amended by adding a new subsection to read:

(b) The 1985 edition of the Uniform Plumbing Code adopted under (a)(1) of this section is adopted with the following changes:

(1) On Page 37, Chapter 4, Drainage Systems, 401, Materials, Subsection (a), Sub-subsection (1), all material is excluded and the following language is adopted:

"(1) Galvanized, wrought iron, galvanized steel, ABS, or PVC pipe may not be used underground and must be kept at least six (6) inches above ground."

(2) On Page 37, Chapter 4, Drainage Systems, Section 401, Materials, Subsection (a), Sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction of not more than 35 feet in stack height. ABS and PVC pipe may not be less than schedule 40 (IPS) standard steel pipe thickness."

(3) On Page 45, Chapter 5, Vents and Venting, Section 503, Materials, Subsection (a), Sub-subsection (2), all material is excluded and the following language is adopted:

"(2) ABS or PVC installations are limited to type VN residential construction of not more than 35 feet in stack height. ABS and PVC pipe may not be less than schedule 40 (IPS) standard steel pipe thickness."

(4) On Page 45, Chapter 5, Vents and Venting, Section 503, Materials, Subsection (b), all material is excluded and the following language is adopted:

"(b) A person shall use cast iron, galvanized malleable iron or galvanized steel, lead, copper, brass, ABS, PVC, or other approved materials for vent fittings, and galvanized malleable iron, galvanized steel. ABS or PVC may not be used underground and must be kept at least six (6) inches above ground."

(5) On Page 75, Chapter 10, Water Distribution, Section 1004, Materials, Subsection (a), the second and third sentences are not adopted.

(6) On Page 75, Chapter 10, Water Distribution, Section (e) is not adopted.

* Sec. 3. AS 18.60.740(1) is amended to read:

(1) "code" means the 1985 editions of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 EDITION], adopted at the 54th [49th] Annual Conference, September 1983 [1978], International Association of Plumbing and Mechanical Officials, as modified and adopted in AS 18.60.705;

To: Mike
From: Roger March 18, 1985

HB 63: Well, this one should be fun. It's a statewide teleconference; and lots of interest on it. Also, Dwight Perkins of the Plumbers and Pipefitters union will show a video tape of about 10 minutes in length for the hearing as part of his presentation.

They went directly to Don Bennett in the Senate and he in turn leaned on Zharoff to accept a Senate Labor and Commerce Committee revised bill that incorporates the amendments they want (both of these are in your file). I gather that with Eliason on the SEnate L & C they might run into opposition on any bill that keeps the "plastic" piping in the Code. Though I also understand that the states seem to be starting to accept codes with the plastic piping in them, and Eliason's tactic in the past has been to stall to "wait and see what the other states do."

Also, there is a good chance we will be getting testimony from the Chemical Industry people on this issue, with possible visitors from Tennessee, Texas, and California, if Gordon Evans, their lobbyist, is correct.

Lots of stuff to wade through in the files this time, huh? This bill is a hot priority item with Grussendorf, so if we don't pass it out today, we might want to bring it back up again later in the week to get it out of committee as soon as possible; we are the only Committee of referral. At the rate the Senate is moving on it though, they could get their version out quicker than we do, unless we hurry. Normally, the courtesy is that the two houses will deal with whichever bill gets to the other house first.

cified test conditions and not necessarily to explain why they are more toxic (1-11).

A large selection of test conditions can be used. The toxicity screening program used by the Product Safety Corporation employs 16 different sets of test conditions: the rising temperature program at 40°C/min from 200 to 800°C and seven fixed temperatures at 100°C intervals (200, 300, 400, 500, 600, 700, and 800°C), both without forced air flow and with nominal 1 L/min air flow. This program has been used with polyethylene (12), polypropylene (13), polystyrene (14), polycarbonate (15), polyoxymethylene (16), polyethersulfone (17), polyetherimide (18), polytetrafluoroethylene (19) and Douglas fir (20).

Experiments at a succession of fixed temperatures have research value in that they determine the material responses at particular temperatures. The rising temperature method offers the potential for more cost-effective screening by attempting to integrate the effect of successive temperatures, and provides the ability to compare test results with those obtained for over 300 materials previously evaluated under the same rising-temperature conditions.

This report presents the toxicity test data obtained for two samples of polybutylene pipe and one sample of Douglas fir wood, evaluated under the routine screening test conditions of rising temperature at 40°C/min from 200 to 800°C without forced air flow. These test conditions have been described as Procedure B of the NASA-USF toxicity screening test method, and are included in the BART specifications for seat cushioning materials (21).

MATERIALS

The materials evaluated were two samples of polybutylene pipe received from Shell Oil Company, Houston, Texas. The samples were identified as follows:

DURAFLEX Polybutylene 4127 (grey)

DURAFLEX Polybutylene 4121 (black)

For purposes of comparison, a sample of Douglas fir wood was obtained from Underwriters Laboratories, Santa Clara, California. This material met the requirements of UL Standard 127 for testing of fireplace inserts.

DATA AND DISCUSSION

The times to various animal responses are presented in Table 1. Reproducibility was generally good.

Average times to death with the polybutylene pipe samples ranged from 21.5 to 24.4 minutes, compared to 16.8 to 18.6 minutes for Douglas fir wood. On the basis of time to death, the polybutylene pipe samples appeared to be significantly less toxic than Douglas fir under these particular test conditions.

CONCLUSIONS

The polybutylene pipe samples evaluated appeared to exhibit significantly less toxicity than Douglas fir under these particular test conditions.

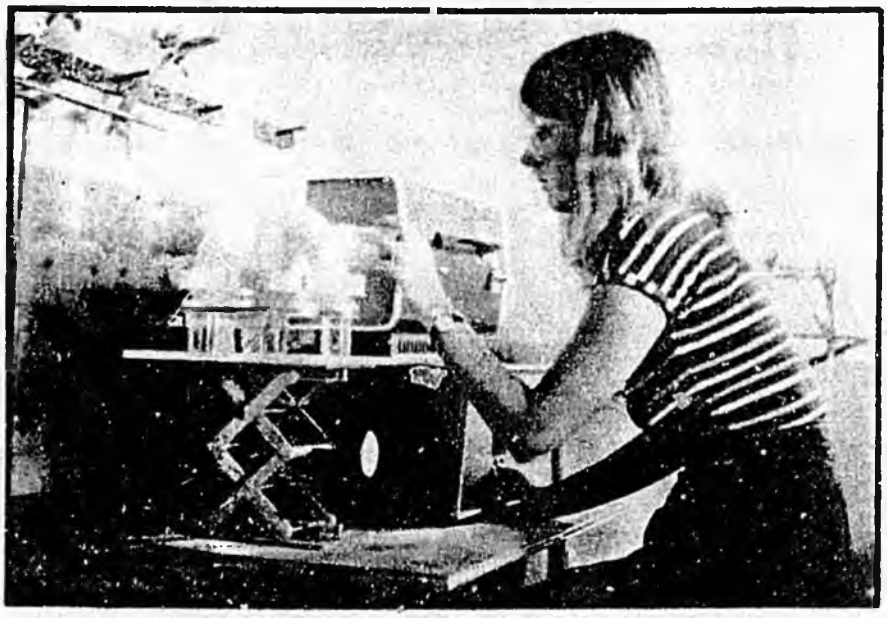
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courtesy of Shell Chemical Company

SC: 754-82
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Toxicity of Gases From Polybutylene And Douglas Fir

By CARLOS J. HILADO & PATRICIA A. HUTTINGER
Product Safety Corporation

EXECUTIVE SUMMARY

Widespread use of plastics has added both convenience and hazards to modern living. Below is a study of the dangers of toxic gases produced by the combustion of plastic pipes . . .

Because of their versatility and performance advantages, plastics have found their way into numerous applications. This widespread use has inevitably brought them into many applications in which safety upon exposure to heat or fire is an important consideration, and their response characteristics need to be known.

One aspect of safety which has caused considerable concern is the possible generation of toxic gases upon exposure to heat or fire. It is impossible to simulate all possible conditions under which such exposures could occur, but manufacturers conscious of their responsibilities to the consumer and to the general public nonetheless make an effort to evaluate their products by means of available technology to obtain some degree of assurance that there would be no unreasonable risk. Screening of materials is needed, because investigation of every possible formulation for every possible exposure is not feasible.

A laboratory toxicity screening test method has been developed by the authors to serve as a means for comparing materials on the basis of relative toxicity under specified test conditions, using apparatus, facilities and personnel which would be within the capabilities of most laboratories. With the purpose of screening in mind, this method is intended to indicate which materials are more toxic under spe-

Table 1. Toxicity Test Data on Polybutylene Pipe and Douglas Fir (PSC Condition 1 or NASA-USF Procedure B)

material	test no.	time to staggering min	time to convulsions min	time to collapse min	time to death min
DURAFLEX 4127	1	16.32 ± 0.88	17.75 ± 1.02	20.22 ± 2.44	24.35 ± 3.20
	2	16.53 ± 0.27	17.54 ± 1.34	18.70 ± 1.73	22.39 ± 2.77
	mean	16.42 ± 0.15	17.64 ± 0.15	19.46 ± 1.07	23.37 ± 1.39
DURAFLEX 4121	1	16.45 ± 0.45	16.88 ± 0.73	18.47 ± 0.14	21.49 ± 0.95
	2	16.33 ± 1.08	17.77 ± 0.96	18.45 ± 0.88	21.93 ± 0.54
	mean	16.39 ± 0.08	17.32 ± 0.63	18.46 ± 0.01	21.71 ± 0.31
Douglas fir	1	10.92 ± 2.18	14.98 ± 0.58	16.09 ± 1.05	18.57 ± 0.79
	2	12.29 ± 0.69	14.04 ± 0.52	14.41 ± 0.42	16.77 ± 0.40
	mean	11.60 ± 0.97	14.51 ± 0.66	15.25 ± 1.19	17.67 ± 1.27

MIDNIGHT SUN CONTRACTORS

General Contractors - Homebuilders

SRA 6614, Wasilla, Alaska 99687
(907) 745-2875

March 20, 1985

Representative Mike Navarre, Chair
House Labor and Commerce
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Committee Members: Representative Mike Navarre, Chair
Representative Mike Davis, Vice-Chair
Representative Red Boucher
Representative Niilo Koponen
Representative Drue Pearce
Representative Virginia Collins
Representative Katie Hurley

As a General Contractor in the Mat-Su Borough since 1982, I have personally built thirty three single or multi family structures. In talking with plumbing contractors of the Mat-Su Borough, I find they all agree that there is no practical grounds for restricting the use of plastic pipe for any type of residential construction.

All of my construction since 1973, a total of about one hundred and fifty single and multi family buildings, and some commerical buildings, have ABS plastic pipe for drainage and vent systems. There has been absolutely no problems or complaints about the plumbing in any of these buildings from owners or occupants.

The stand special interest groups in Alaska are taking against the use of plastic plumbing pipes and fittings is without merit.

The homebuyers and real estate investors of Alaska are paying a minimum of $300 for a small single family home, up to $3,000 on a four plex, unnecessary additional costs for just one item, plumbing drain and vent piping due to an obsolete plumbing code. Add 12% interest for 30 years to this unnecessary extra cost, and you have a substantial unnecessary financial burden for just this one item.

In the best interest of all of the people of Alaska, the 1985 Uniform Plumbing Code should be adopted with no amendments or exceptions to any sections regarding materials. The 1985 Uniform Plumbing Code allows for "state of the art" materials and plumbing practices that will bring the plumbing industry of Alaska up to date.

MIDNIGHT SUN CONTRACTORS
General Contractors - Homebuilders

SRA 6614, Wasilla, Alaska 99687
(907) 745-2875

I urge the legislators of the State of Alaska to act for the people and adopt HB 63.....or the 1985 Uniform Plumbing Code with no changes regarding approved materials and practices.

Sincerely,

Lester Hawkins

Lester Hawkins

LH:jf

HB 63 File Contents

March 18, 1985 Monday

1) Bill Summary -- Legislative Reporting Service

2) Overview -- Roger Poppe, Committee Staff

3) Alaska Statutes 18.60.705-740.

4) Letter of Support --Governor Sheffield

5) Fiscal Note -- Dept. of Labor 3/15/85

6) Position Statement & Proposed Amendments -- Dept. of Labor

7) Anchorage Municipality Local Amendments to the Uniform Plumbing Code, 1982 edition -- Chapter 23.25 (currently in effect)

8) Proposed Amendments to HB 63 by the Plumbers and Pipefitters Unions

9) Draft of proposed 1985 Senate Bill relating to the plumbing code dated 3/13/85

10) Additional Materials Supplied by the Plumbers and Pipefitters Unions

   a) Letter from Marie Sibuya Shell to Thomas Higham -- Dec. 20, 84
   b) Article from NEWS on "Polyvinyl Chloride Fumes Cause Long-Term Health Problems for Fire Survivors, Study Shows"
   c) Legislative Activities of Interest regarding Electrical Non-metallic Tubing and Other Plastic Construction Materials
   d) Summary of Lawsuit of California Department of Consumer Affairs et alli vs. International Association of Plumbing and Mechanical Officials (beige covered booklet).
   e) Investigation of Plastic Pipe Permeation by Organic Chemicals November, 1984 (blue-covered booklet)

11) Additional Materials from representatives and manufacturers of Polybutylene pipe

   a) Letter of May 16, 1984 from A. H. Schroer to Senate Labor and Commerce Committee regarding testimony on HB 508 last session.
   b) White paper--Testimonials on cold weather durability of polybutylene pipe (starts out with P.P.P. saved thousands of homes...etc.)
   c) Public Health News broadside of December 16, 1983 from Virginia Dept. of Health

d) Tests of Polybutylene Pipe at PT Relief Valve Conditions
e) Report to Congress by the Comptroller General--Feb. 18, 82
f) News Release -- Cold Bay -- February 18, 82.
g) Shell Chemical Company letter of May 27, 1983
h) Legislative Proposal Analysis on adoption of 1982 Uniform Plumbing Code
i) Polybutylene Pipe (grey brochure from Shell Chemical)

12) Letters of January 24, 1985 and February 22, 1985 from Eugene Rutland of the Mechanical Contractors of Fairbanks, Inc. to Chairman Navarre

13) List of states and major cities approving the use of Polybutylene in a Feb. 15, 85 letter from Martin O. Brien of Shell Chemical Co. to Gordon Evans of Juneau

14) Copies of the following materials are available for inspection on the Committee Table:

a) Uniform Plumbing Code -- 1985 Edition

b) Uniform Solar Energy Code -- 1985 edition

c) Uniform Swimming Pool, Spa, and Hot Tub Code -- 1985 edition

d) Advanced Drainage Systems Inc. Booklet (beige)

e) Effects of Heavy Loads on Buried Corrugated Polyethylene Pipe

f) Miscellaneous flyers from Polyethylene Pipe Manufacturers

March 21, 1985 Thursday additions

15) Health Hazards Associated With Plastic Pipe -- (gold covered booklet) -- Supplied by Plumber's union representatives

16) "Plastic Critics off-base," from January 15, 1985 issue of Contractor magazine -- Supplied by Plastics Industry representatives

JANUARY 15, 1985

Contractor Magazine

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TWICE-MONTHLY Essential News of Mechanical Contracting: AIR CONDITIONING • HEATING • PLUMBING

Plastics critics off-base

Burning toxicity, leakiness panned

BY HAROLD V. SEMLING JR.
Special to CONTRACTOR

WASHINGTON — Much-maligned plastic pipe was given favorable reviews in two recently released reports concerning fire hazards and water-service performance.

The American Council on Science and Health, an independent scientific organization, said burning PVC is no more toxic than any other material. In addition, a study by the engineering firm of Simpson, Gumpertz & Heger found that the majority of complaints about polyolefin water-service pipe can be traced to a single batch made by one manufacturer in 1974.

Not extraordinary hazard

In the fire safety study, ACSH said the public has been misled about the alleged dangers of PVC during a fire.

The scientific evidence "fails to show that PVC is an extraordinary fire hazard in fire situations," said ACSH Research Associate Sharon Campbell.

"The evidence that allegedly shows that smoke from burning PVC is extremely toxic is very weak," Campbell said. "What information there is in the scientific literature indicates that while PVC smoke is toxic, it is no more so than smoke from other burning materials.

"All types of smoke are dangerous, and smoke is an important cause of deaths in fires," she said. "However, there doesn't appear to be anything special about PVC smoke, and there is no evidence which would indicate that in a fire situation, PVC is a significant factor in the death rate."

Good international record

In response to suggestions that restricting use of plastics would decrease the fire death rate, Campbell noted, "International comparisons indicate that this is unlikely. Vinyl and other plastics account for more than half of the electrical pipe and tubing used in Sweden, as compared with less than 10% here, yet the Swedish fire death rate is far lower than ours.

"Similarly, in Japan, where more plastics are used in buildings and where fire hazards are generally greater than in the U.S., the seeming paradox is that the fire death rate is much lower than in this country," she said.

"Part of the excessive panic over PVC appears to be the result of a deliberate scare campaign on the part of a manufacturer of competing metal products," said ACSH Executive Director Dr. Elizabeth M. Whelan. "Unfortunately, this campaign has helped to spread a lot of unfortunate misconceptions about the hazards of PVC."

Water service study

The study of polyolefin water-service pipe was commissioned by The Society of the Plastics Industry in mid-1982 in response to growing complaints about the pipe in the late 1970s.

Polyolefin, which includes polyethylene and polybutylene, has been in use for water service since the late 1950s. When complaints about leaking pipes surfaced, the Plastic Pipe Institute of the Society contracted with Simpson, Gumpertz & Heger to investigate the complaints.

Plastic pipe defended in two reports

Contractor, January 15, 1985

The study was based on a survey of members of the American Water Works Ass'n, a utility group.

The engineering firm found that 75% of the complaints resulted from one bad batch of pipe.

Eighty percent of the users of polyclefin pipe were satisfied with its performance, according to the study, with 98% of their installations satisfactory.

Of the 20% that were unhappy with the pipe's performance, 80% of their installations were satisfactory.

Brittle batch of pipe

"Pipe made by a single manufacturer, circa 1974, that embrittled and started to fail by the end of the decade, appears to account for about 75% of the users that were dissatisfied with [polyethylene]," the engineering report said. "Laboratory tests indicate that the embrittlement was the result of oxidation due to some deficiency in stabilizer levels. Aside from the brittle [polyethylene] pipe, low levels of stabilizer were also found in [polyethylene] pipe made from one commercial class of material."

Other problems with the pipe were related to installation, according to the report.

"Kinks in [polybutylene] service lines, formed during installation and later resulting in rupture of the pipe wall, were a significant factor in the failure of [polybutylene] installations," the report said.

Leaking fittings

Another problem was caused by leaks in fittings, particularly failures at the tips of insert stiffeners used in compression fittings; corrosion of hose clamp screws; and cracks within plastic fittings (not polyethylene or polybutylene).

Also, "pinhole failures of pipe indented by stoney soils such as tightly bound cemented caliche have been responsible for a significant number of failures."

The report concludes, "Overall, and despite the significant problems experienced at some agencies, the track record of polyolefin pipe products in the water service application has been extensive and successful. The experience of satisfied users demonstrates that these products are viable in the application."

DELIVER TO: JPOM

014

file
HB63

ORIGINAL
SENT: 01/17/86 TIME: 12:45
FROM: ANNIE NEUBAUER
SUBJECT: POM/FAIRBANKS
PRINT DATE: 01/17/86 TIME: 12:45

TO: HOUSE LABOR & COMMERCE COMMITTEE

REPS: NAVARRE, DAVIS, BOUCHER, KOPONEN, PEARCE, COLLINS, HANLEY

ALSO: REPS FRANK, M.W. MILLER, RINGSTAD
SENS FAHRENKAMP, COGHILL, BENNETT

FROM: [redacted] P.O.BOX 56317, NORTH POLE 99705

PHONE 488-1586

RE: HB63 PLUMBING CODE

I AM THE PASTOR OF TRUE VICTORY BAPTIST MISSION HERE IN NORTH POLE AND PRESENTLY WE HAVE BEEN SEEKING APPROVAL OF THE PLASTIC PIPE, PBS, VENTILATION PIPING. THIS WOULD MAINTAIN THE PRESENTLY INSTALLED PLASTIC VENTILATION PIPING. WE HAVE HAD A WAIVER REQUEST INTO THE STATE PLUMBING INSPECTOR WHICH WAS APPROVED FOR SIX MONTHS, BUT SINCE SUCH TIME WE HAVE BEEN DIRECTED TO REMOVE IT. FURTHERMORE THE BOROUGH INITIALLY STATED WE WERE IN A NON RESTRICTED AREA WHICH IS THE REASON WE WENT WITH THE PLASTIC PIPE. HOWEVER, THE BOROUGH AND THE STATE REGULATIONS HAVE NOT COINCIDED. IN OUR BEST INTEREST PLEASE PASS HB63.

FEBRUARY 7, 1983 $3.00

FORTUNE

APPLE'S BID TO STAY IN THE BIG TIME



Apple Computer's Steven Jobs

TOIL AND TROUBLE AT CONTINENTAL ILLINOIS

THE EXPLOSION OF INTERNATIONAL BARTER

THE DUBIOUS WAR ON PLASTIC PIPE

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THE DUBIOUS WAR

BUILDING MATERIALS/STEVEN FLAX



■ Fire horrifies. Leaping flames and billowing smoke, victims carried choking on stretchers or lifeless in body bags—the sights arouse a deep-seated urge to control the menace. Major disasters like the hotel fire below can also be a marketing windfall for companies seeking to fight competing products by playing on the fear of fire.

This is the story of a company that has done so with an extraordinary outpouring of half-truths and misinformation. Its target: plastic pipe. Allied Tube & Conduit Corp. of Harvey, Illinois, is the largest U.S. producer of rigid metal pipe used to contain and protect electrical wiring. Plastic conduit, mainly made of polyvinyl chloride (PVC), has made heavy inroads, partly because it's easier to install. According to Predicasts, a market-research firm, its share of the conduit market widened from an estimated 9% in the late 1960s to 54% in 1980. Meanwhile, steel conduit's share fell, from nearly 50% to 32% of a business worth hundreds of millions a year. But Allied, a privately owned company with 1982 sales of about $300 million, has not been content to fight back with conventional salesmanship.

Since the late Seventies, Allied has run a campaign to publicize the supposedly unusual fire hazards of PVC, pitching it at consumers, contractors, legislators, and officials who write building codes. To give its effort the appearance of impartiality, Allied has set up a not-for-profit organization, the Foundation for Fire Safety. Supposedly the foundation, with offices in Rosslyn, Virginia, is dedicated to disseminating impartial scientific information. But with about 75% of its $750,000 budget coming from Allied, it has often served as a vehicle for anti-PVC propaganda. The foundation's officials frequently travel the country citing plastics as contributing to some of the deaths in prominent fires, even though there's no proof that their combustion products were responsible.

Allied has also lobbied heavily against the inclusion in the National Electrical Code, which serves as a guide for local codes, of a new, flexible type of PVC conduit. The new conduit—that's a sample above—is even cheaper to install. Allied's efforts have prompted the Carlon division of New York-based Indian Head Inc.—in turn controlled by Curaçao-based Thyssen-Bornemisza N.V.—to sue it for restraint of trade. The Society of the Plastics Industry, which has long retained the public relations firm of Hill & Knowlton, has also redoubled its efforts to present its side of the controversy. Carlon, with 1982 sales of $150 million, introduced the flexible conduit in 1980; it's also the leading maker of rigid PVC conduit. Other makers include Certain-Teed Corp. of Valley Forge, Pennsylvania, and Robintech Inc. of Fort Worth, both publicly owned. Leading suppliers of PVC are B.F. Goodrich, Tenneco, and Du Pont.

ALLIED SAYS IT HAS "a moral and legal responsibility" to oppose products that constitute "an inherent, immediate, and substantial danger to the public." Asserts Theodore H. Krengel, 57, Allied's founder, president, and controlling shareholder: "The plastics produced now kill." Allied's awareness that plastics are hazardous goes back to 1972, he says. "We began to hear more and more about the problems of toxicity, flammability, and smoke of plastics." Buildings, warns Krengel, are becoming "plastic bombs—they go up in a matter of seconds." Allied's general counsel, John Lison, adds ominously: "Any company that knowingly puts a harmful product into the stream of commerce is liable for punitive damages."

Allied is not the only campaigner against plastic pipe. Carol Bellamy, New York City's

RESEARCH ASSOCIATE *Ford S. Worthy*



PHOTOGRAPH BY GARY THOMPSON

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left the foundation. Conveniently for Allied, some professional firefighters have strong opinions against plastics and will state them publicly. Shortly after the Westchase Hilton fire, Andrew Casper, then chief of the San Francisco Fire Department, appeared on KPIX-TV. Casper sketched a simple causal sequence in the MGM Grand fire: "More plastics, more fires, more deaths caused by the inhalation of toxic fumes." Later he went on the payroll of the Foundation for Fire Safety, which he has since left.

WHILE AN EX-FIRE CHIEF has credentials to speak out, this can hardly be said for another PVC opponent financed by Allied. Deborah Wallace is president of the Public Interest Scientific Consulting Service, another organization mainly backed by the company, to the tune of $17,000 a quarter. With a Ph.D. in environmental physiology, Wallace has little expertise in deaths from fires. Yet she travels the country preaching the dangers of PVC and calling herself "an expert on fire toxicology."

She also made a pretrial deposition in 1980 as an "expert witness" in the litigation arising from a May 1977 fire at the Beverly Hills Supper Club in Southgate, Kentucky, in which 165 died. Later she testified that autopsy reports, hospital admission records of survivors, and questionnaires strongly suggested that PVC was responsible for the deaths and injuries at the fire. On this point she was disputed during the trial by the medical examiner of St. Louis County.

The Foundation for Fire Safety has lobbied repeatedly. Several states have been considering bills that would require that all materials be tested for their combustion toxicity before they can be considered for approval in building codes. Since metal conduit can't burn, it would pass such tests; PVC might not. Unfortunately, satisfactory testing procedures don't yet exist. Yet on May 6, 1982, Birky appeared before the fire safety subcommittee of the New York State senate finance committee and declared that they do. An inhalation test protocol that he helped develop at the National Bureau of Standards, he said, is able to prove that one material is more toxic than another.

One reputable authority disputes Birky. "There's no correlation between the test method and what happens in a real fire," says Irving Einhorn, an adjunct professor at the University of Utah, who has published 100 papers on combustion toxicology. "Yet Birky is going around the country trying to ban materials based on incomplete tests." The Bureau of Standards adds that even if its test protocol were ready to be used, which it isn't, it alone would not justify banning some materials from building codes.

The plastics industry and Carlon have charged Allied with using questionable tactics within the National Fire Protection Association. Prior to an NFPA vote in May 1980 that would have recommended the inclusion of Carlon's flexible PVC conduit in the National Electrical Code, they say, Allied and other companies and trade organizations in the steel industry purchased scores of (and perhaps as many as 100) $50 memberships in the organization. When the vote came up, these new members helped to defeat Carlon's conduit by 394 to 390.

SEVERAL NFPA MEMBERS were outraged by the way the outcome was achieved. One, Nathaniel Addleman, a registered fire protection engineer with Boeing Co., was particularly incensed when he addressed the group after the vote: "I had occasion to have lunch with a gentleman who is a salesman for one of the steel companies and he didn't know why he was here. He was going to go to a meeting at 12:30 to find out why he was here and be told how to vote. This is what's happening here today. We cannot let the NFPA degenerate to that type of thing."

Before and after Allied helped vote Carlon's conduit out of the electrical code, it was selling PVC products. Even though Allied President Krengel claims that he was aware of plastics' hazards as far back as 1972, his company sold PVC conduit during the mid-Seventies through distributors. Asked how he could sell a product that he considers hazardous, Krengel says, "Maybe we began to realize how bad it was later. Anyway, as soon as we began to realize how bad it was, we got out of the business."

Allied's general counsel, John Lison, says Allied got out of the PVC business for a different reason: it lost its supplier. He adds, "Our suppliers could not keep us price competitive. There wasn't enough profit margin in 1975." Allied got back into the PVC market during the summer of 1980. Krengel and other Allied officers worked out a deal in which Robintech would produce rigid plastic conduit for Allied on a private label basis. Krengel now says he wasn't aware that Allied was in the PVC business a second time. Asked if subordinates had put Allied back into PVC without his knowing about it, he responds: "Look, it was a nothing kind of thing. It was incidental and momentary. When we knew what was going on we backed off."

Actually Allied sold PVC conduit from about September 1980 to March 1981. It did so, moreover, without warning users of the fire hazards it professes to be concerned about. According to Lison, Krengel got out of the business because this time he *really* found the material hazardous. "Ted was amazed by the horrors of the MGM fire, and then the others," says Lison.

Allied's suppliers remember a completely different story. When Allied concluded its relationship with Robintech, Pat Madormo, Robintech's executive vice president, met Bernie Auerbach, Allied's product development manager, and asked why Allied was calling it quits. According to Madormo, Auerbach told him that Allied felt that PVC was a different market from those it was used to. "The PVC market got pretty tough around then," says Madormo, "and there wasn't enough margin for them to buy from Robintech and resell."

Allied returned to the PVC business for a third time in November 1981. It acquired Eleen Metal Products Co. of Franklin Park, Illinois, one of whose product lines is PVC coated. A current product, called Strut, is a hanging PVC-coated pipe holder. If the big hotel fires convinced Krengel he should get out of the business, why is Allied selling something like this? "Look," says Lison, "we don't know why people die from fires in this country." But wouldn't PVC be dangerous in this sort of application? "We don't have a corner on the wisdom of the world," Lison says, "and Factory Mutual [a testing organization that does inspections for the insurance industry] kept telling us that this stuff is fine, that it'll be included in all the codes. You know, for lots of applications PVC is better than our stuff."

Despite this strange admission, Allied's war on PVC has continued without letup. Last September the newsletter of the American Council on Science and Health, a consumer education group, published an article headlined "The Merchandising of Fear" on some less than savory aspects of Allied's campaign. Zoeller's quick reply was morally lofty: "Although Allied obviously has an interest in this issue, we had every opportunity to enter the PVC market and chose not to on safety grounds. We believe this issue concerns human life and safety, and therefore transcends the commercial interest of any company or industry. We believe our record shows this concern."

■ Allied's record is something rather different—a rare well-documented example of unfair tactics in the marketplace. Companies battling new products often play rough, with high-pressure salesmanship, aggressive pricing, antagonistic ads. But a few go further, in ways that sidestep notice. Allied has called attention to itself by overreaching. ■



Caught with his funding showing, *Michael Olsen (right), then managing director of the Allied-supported Foundation for Fire Safety, admitted in an interview for TV that the bulk of his support came from the metal industry. At left on this April 1982 broadcast on Houston's KHOU-TV is reporter Roger Lindberg, interviewing Olsen at the foundation's headquarters.*

have caused the occupants to succumb."

Snell's opinion is tersely endorsed by Irwin Benjamin, an eminent fire researcher and now a private consultant after many years at the Bureau of Standards. Says Benjamin, "If the public has been terrified about plastic conduit, that's completely ridiculous."

Surprisingly, these opinions are echoed even by Merritt Birky, director of research at the Allied-supported Foundation for Fire Safety. "Plastic conduits play little role in an ordinary hotel fire," Birky conceded in a recent interview. "It is unlikely," he adds, "that plastic conduit played any role in, for example, the fire at the Westchase Hilton in Houston." He refers to a March 1982 fire that took 12 lives.

A toxicologist with a Ph.D. in chemistry from the University of Virginia, Birky until January 1982 headed combustion toxicity studies at the National Bureau of Standards. He has generally been careful in his public utterances. Yet some of them, both before and after he changed jobs, have been used by Allied to give spurious scientific credibility to its campaign against PVC.

One of Allied's chief exhibits is the November 1980 fire at the MGM Grand Hotel in Las Vegas, which killed 85 people and injured hundreds of others. The cause of the fire, it should be noted, was a short circuit in the hotel's metal conduit. But burning PVC plumbing, Allied asserts, has been implicated in some of the deaths. The company has seized on a statement made by Birky while he was still with the Bureau of Standards and involved in the investigation of the blaze. The carbon monoxide levels in the victims' blood, Birky speculated at that time, were too low to have caused all the deaths.

This implied that something else caused them, and Allied has repeatedly pointed to plastics ever since. In a September 1982 news release headlined "Plastics in Construction Add to Fire's Tombstones," the company's public affairs vice president, Laurence Zoeller, declared: "There is mounting evidence that decomposing plastics contributed to the vast majority of fatalities in such recent tragic fires as at the MGM Grand Hotel."

This release did not mention that in November 1981 the National Fire Protection Association, an investigative and code-writing body, had issued its final report on the fire. It said that 79 out of the 85 victims died primarily from a combination of smoke inhalation and carbon monoxide or smoke inhalation only. Burns and smoke inhalation killed three more, while the remaining three each died of a different cause: burns, skull fracture, and heart failure. As Birky emphasizes, the report's findings are vague. But they are a far cry from implicating plastics.

Birky may nevertheless have done a bit of out-and-out propagandizing, though he vigorously denies it. He had taken up his post at the Foundation for Fire Safety when he was interviewed by reporter Rolando Santos of KPIX-TV in San Francisco. Santos reported last March 23: "The leading researcher in the study of the deaths at the MGM, Dr. Merritt Birky, told me in these cases the toxic gases had to come from the plastics in the room, probably cyanide." Birky claims that Santos misquoted him. Santos says that he and Birky had a detailed conversation prior to the broadcast, and that Birky said exactly what was reported.

Whatever Birky may have said about cyanide, Allied brandished this scare word before the final report on the MGM fire was out. In one May 1981 advertisement in the trade press, the company said: "The Clark County Coroner reported that five victims, who were among the first autopsied, showed evidence of cyanide in their bodies. Cyanide is produced from burning plastic pipe frequently used for drain, vent, and waste disposal, as well as plastic that is commonly used for decorative wall coverings." Allied omitted to say that cyanide is also given off when other synthetic materials burn. In any event, the presence of cyanide is no proof that it killed anyone. The final investigation report on the MGM fire never mentioned synthetic materials—plastic pipe or whatever—as the primary cause of any death.

One of the Foundation for Fire Safety's officials has resorted to innuendo in discussing the Westchase Hilton fire in Houston. Birky, as noted, says it's unlikely that plastic conduit caused any deaths there. Yet Michael Olsen, then the managing director of the foundation, got on KHOU-TV in Houston a month after the fire, offering his "preliminary report" that "toxic gases in addition to carbon monoxide must be considered as causes of death." The TV reporter told his audience, "The Fire Safety Foundation believes some of those deadly gases can come from plastics."

AS A RULE, the foundation's spokesmen have not volunteered the source of their funds during such interviews. Unfortunately for Olsen, KHOU-TV's reporter Roger Lindberg was one of the few to ask him where the money came from. Olsen admitted, listeners were told by another reporter, that "he was funded largely by the metal industry." Olsen insisted that his report was unbiased. KHOU-TV then presented Dale Everitt of the Houston Fire Department, who dismissed Olsen's views. Said Everitt, "When you have a group like this, I think they're going to be interested in keeping those funds coming in." Olsen has since

ON PLASTIC PIPE

politically ambitious city council president, made a fuss last year about new PVC conduit installed in subways. At her insistence $2 million is being spent to rip out some and replace it with metal, though most of the subway system's PVC will be left where it is. Plastics' growing use in plumbing, primarily for water and drain pipes, has also come in for criticism. Allied's crusade against PVC has been especially vehement, however. A significant proportion of its sales are threatened. The last straw may have been Carlon's flexible conduit, aimed at a $190-million-a-year market that steel had all to itself.

"I wouldn't deny we have a commercial interest," says Allied's President Krengel. "It's a big market. If you include cable, conduit, ducts, and pipe, you're talking in the multibillions of dollars." If the competition gets much worse, Krengel adds, Allied might switch to plastics—"*if* we could find one that is proven safe." Krengel goes on to declare: "I'm not going to make any Three Mile Islands or any Love Canals. I'm not going to make anything where I can't sleep nights because we've made a product that's unsafe. I don't want that on my conscience."

Krengel could be speaking his convictions, of course. But doubt is fanned by a curious fact recently discovered by FORTUNE: Allied itself has marketed PVC conduit on and off in recent years. In fact, it's still selling PVC-coated products.

PVC *is* hazardous when it burns, as the plastics industry admits. So is everything else that burns. PVC may give off, among other things, hydrogen chloride, a corrosive gas that is lethal in high concentrations. But burning natural materials also give off a host of dangerous substances, such as carbon monoxide and acrolein. When wool carpeting or upholstery catches fire, it can produce deadly cyanide gas. Furthermore, a government-sponsored study has shown that Douglas fir, widely used in construction, is every bit as hazardous when it burns as PVC.

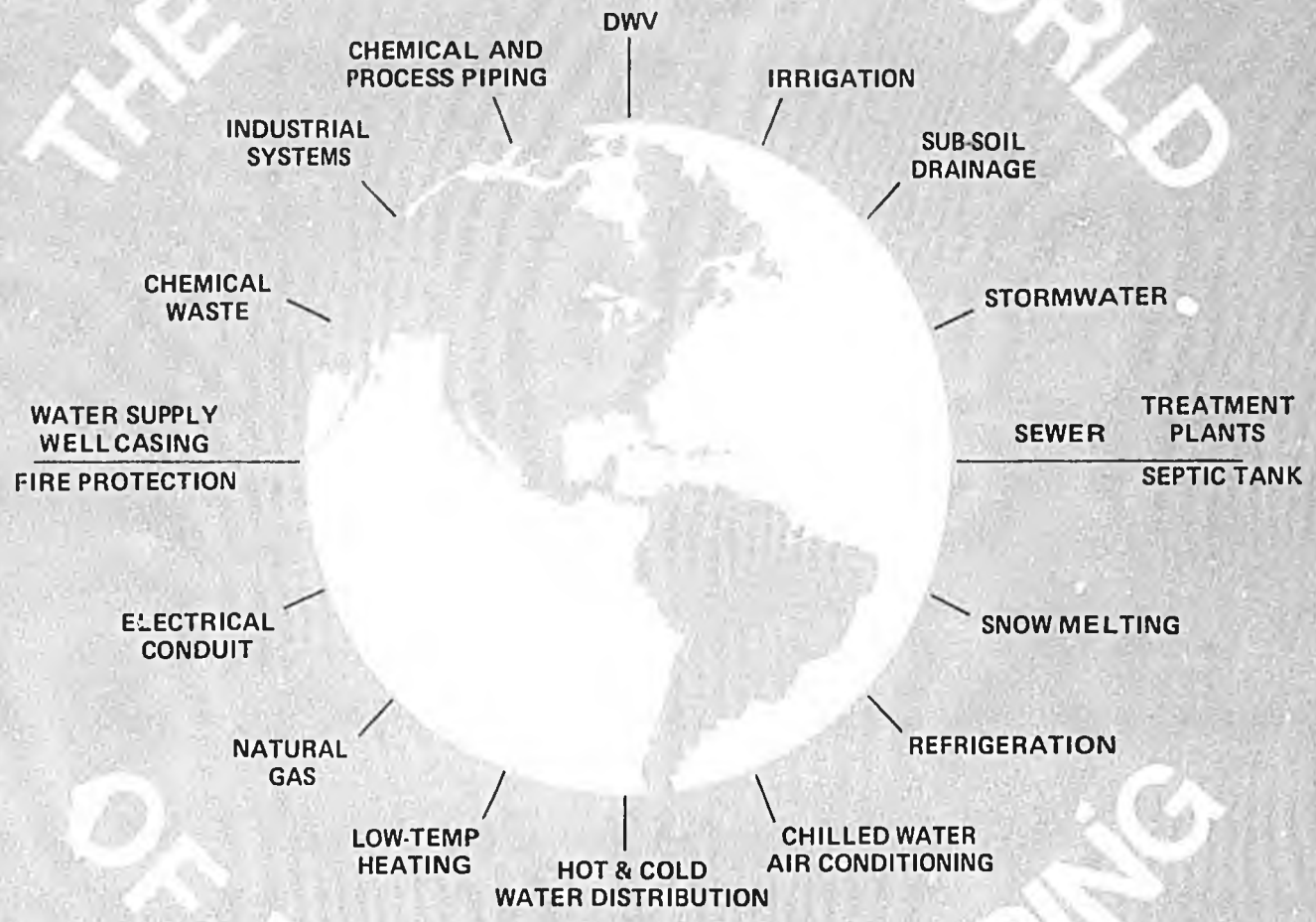
Still, wouldn't it make sense to ban plastics and use just noncombustible metal for conduit? The answer, according to experts not financed substantially by either side in this dispute, is a surprising no. There is much more to fire hazards than the toxicity of a material's combustion products. "You may be making the situation worse by having metal conduits," says Dr. Edward Radford of the University of Pittsburgh's Graduate School of Public Health. "Many fires result from electrical short circuits. One common type occurs as a result of improperly grounded metal conduits." Adds Radford, a leading authority on what kills in fires: "There is no evidence that PVC plays a major role in whether an individual dies in a fire."

Since no material is hazard free, the real issue is whether PVC is more hazardous than others. Here again the answer, according to impartial authorities, seems to be no. According to Jack Snell, director of the Center for Fire Research at the National Bureau of Standards, PVC conduit would probably be among the least of the worries in most fires. "Plastics would *not* create a significant additional hazard to life," says Snell. "Typically it's the contents of a building—in contrast to construction, plumbing, and electrical materials—that represent the largest fuel load. You would need a large fire before the conduit became involved, and by that time the burning contents of the room would



Neptune stood helpless *as flames ravaged the MGM Grand Hotel in Las Vegas on November 21, 1980, leaving 85 dead. Allied Tube & Conduit has cited this and other fires to publicize the supposedly extraordinary hazards of the lethal products given off when plastic pipe catches fire. The final report on the fire, however, did not blame plastics for any of the deaths.*

THE GROWING WORLD OF PLASTICS PIPING



A COMPREHENSIVE LISTING OF COMMON APPLICATIONS OF PLASTIC PLUMBING SYSTEMS COVERED BY NATIONAL CONSENSUS STANDARDS

Published by

PPFA

Plastic Pipe and Fittings Association

999 North Main St. • Glen Ellyn, IL 60137 • Phone: 312/858-6540

APPLICATION	PLASTIC MATERIAL	RIGID FLEXIBLE	ASTM STANDARD	SCOPE
DRAIN, WASTE & VENT (DWV)– Building drain and waste, building storm and rainwater piping	ABS	rigid	D2661 & F628 D2235 F402	Pipe & Fittings ABS solvent cement Safe handling of S.C.
	PVC	rigid	D2665 D2564 F402 D2855	Pipe & Fittings PVC solvent cement Safe handling of S.C. Making S.C. joints
	PVC	rigid	D2949 D2564 F402 D2855	Pipe & Fittings (3.25 o.d.) PVC solvent cement Safe handling of S.C. Making S.C. joints
HOT & COLD WATER DISTRIBUTION SYSTEMS	CPVC	rigid	D2846 F493 F402	Pipe, Tubing & Fittings CPVC solvent cement Safe handling of S.C.
	PB	flexible	D3309	Pipe, Tubing & Fittings
OUTSIDE SEWERS AND DRAINS – Building sewer, building storm sewer	ABS	rigid	D2751 & F628 D2235 F402 D3212 D2321 F477	Pipe & Fittings ABS solvent cement Safe handling of S.C. Elastomeric joints Underground installation procedures Elastomeric seals
	PVC	rigid	D3033 D2564 D2855 F402 D2321 F477 D3212	Pipe & Fittings, Type PSP PVC solvent cement Making S.C. joints Safe handling of S.C. Underground installation procedures Elastomeric seals Elastomeric joints

APPLICATION	PLASTIC MATERIAL	RIGID FLEXIBLE	ASTM STANDARD	SCOPE
WATER PIPING – Water supply, water distribution, yard sprinkler, swimming pool piping, chilled water piping, low-temp heating, irrigation systems, industrial process piping, ice rinks, ice melting, water well casing.	ABS	rigid	D1527 D2468 D2469 D2465 D2235 F402	Pipe, Schedules 40 & 80 Fittings, Schedule 40, socket-type Fittings, Schedule 80, socket-type Fittings, Schedule 80, threaded ABS solvent cement Safe handling of S.C.
	ABS	rigid	D2282 D2235 F402 D2468 D2469	Pipe, SDR-PR, o.d. controlled ABS solvent cement Safe handling of S.C. Fittings, schedule 40, socket-type Fittings, schedule 80, socket-type
	ABS	rigid	F480	Water Well Casings & Couplings, SDR
	PE	flexible	D2239 D2609	Pipe, SDR-PR, i.d. controlled Fittings, insert type
	PE	flexible	D2104 D2609	Pipe, Schedule 40 Fittings, insert type
	PE	flexible	D3035	Pipe, SDR-PR, o.d. controlled
	PE	flexible	D2737 D3261	Tubing, SDR-PR Fittings, butt-type, heat fusion
	PE	flexible	D2447 D3261	Pipe, Schedules 40 & 80 Fittings, butt type, heat fusion
	PB	flexible	D2662 D2609	Pipe, SDR-PR, i.d. controlled Fittings, insert type
	PB	flexible	D2666	Tubing, o.d. controlled
	PB	flexible	D3000	Pipe, SDR-PR, o.d. controlled
	PVC	rigid	D1785 D2564 D2855 F402 D2466 D2467 D2464	Pipe, Schedules 40, 80 & 120 PVC solvent cement Making S.C. joints Safe handling of S.C. Fittings, Schedule 40, socket-type Fittings, Schedule 80, socket-type Fittings, Schedule 80, threaded

Dear Reader:

Welcome to the *Growing World of Plastics Piping!* This pamphlet is an introduction to one of the truly exciting, growth industries in America. Since 1960, the use of plastics in piping applications has multiplied 46 times! There are millions of plastics plumbing installations in service all across the country.

It has been estimated that 95% of all new piping installations made in residential construction is plastics. In the early stages of its development as a plumbing product, plastics were primarily used in drain-waste-vent applications. Over the years plastics piping has grown not only by dominating the DWV market, but by adding new materials and applications as well.

Plastics are now used extensively in water service piping and in water distribution systems. Additionally, many other plumbing products are now manufactured partially or completely with plastics materials.

The use of plastics in plumbing has grown because its use is economical and efficient. Its characteristics are also superior to competitive materials in a variety of important ways.

Even though the feedstocks of most plastics are derivatives of oil, plastics piping uses are highly energy efficient because it takes far less energy to manufacture comparable lengths and sizes of plastics pipe than metal piping products.

We are pleased to provide this easy reference guide to the *Growing World of Plastics Piping* giving the reader the basics of plastics in plumbing and its many, many applications.

Sincerely,

The Plastic Pipe and Fittings Association

INTRODUCTION

You will find plastic plumbing materials to be an excellent value because of initial cost, ease of installation, low maintenance cost, long life, and their significant energy savings in manufacture and use. Plastics pipe and fittings compare favorably with all other materials.

This brochure provides engineers, code officials and consumers with basic information about plastics piping. Used successfully in the United States since 1943, these "engineered" plumbing materials, often called plastics piping systems, have met the challenge of providing improved technological advancements needed in the construction industry.

Plastics vary greatly in their characteristics and properties from one to another. These differences are utilized in plastics piping to the advantage of the consumer in two ways: first, through proper design each plastic raw material is properly applied and controlled (see ASTM Standards); and, second, a competitive market exists within plastics piping systems since the suitable characteristics and properties of different plastics often overlap in piping applications.

Plastic plumbing materials commonly in use are;

ABS ACRYLONITRILE-BUTADIENE-STYRENE, hard, strong, smooth interior surface, chemically resistant, not affected by contact with water or soil.

PE POLYETHYLENE, excellent resistance to chemicals, corrosive environments and rupture from mechanical shock.

PB POLYBUTYLENE, higher temperature strength combined with long-term strength and chemical resistance.

PVC POLYVINYL CHLORIDE, hard, strong, smooth interior surface, chemically resistant, not affected by contact with water or soil.

CPVC CHLORINATED POLYVINYL CHLORIDE, higher heat and chemical resistance than PVC.

PP POLYPROPYLENE, excellent rigidity, high strength and chemical resistance.

SR STYRENE RUBBER, high in tensile strength and stiffness, also, resistant to both corrosive soils and sanitary wastes.

Plastics piping do not conduct electricity and are not susceptible to galvanic or electrolytic corrosion.

The following chart shows the general categories of piping applications of plastic materials covered by applicable national consensus standards:

Piping Application	Plastic Material						
	ABS	PE	PB	PVC	CPVC	PP	SR
Tubular waste	X			X		X	
Outside sewers and drains	X			X			X
Drain, waste & vent (DWV)	X			X			
Water piping	X	X	X	X	X		
Gas piping	X	X	X	X			
Septic fields - sub-soil		X		X			X
Chemical waste piping	X	X		X		X	
Industrial process piping	X	X	X	X	X	X	
Other piping applications	X	X	X	X	X	X	X

NOTE: For procedures on installing thermoplastic pressure pipe underground see ASTM D 2774. For information on joints for plastic pressure pipe using elastomeric seals see ASTM D 3139. For procedures on flaring PE and PB Tubing see ASTM D 3140.

		[illegible]	[illegible] Couplings, Schedules 40 & 80, socket-type
PVC	rigid	D2241 D2564 D2855 F402 D2466 D2467 D3036	Pipe, SDR-PR, o.d. controlled PVC solvent cement Making S.C. joints Safe handling of S.C. Fittings, Schedule 40, socket-type Fittings, Schedule 80, socket-type Line Couplings, Schedules 40 & 80, socket-type
PVC	rigid	D2672 D2564 F402 D2855	Pipe, Schedule 40, Bellend, & Pipe, SDR-PR, o.d. controlled PVC solvent cement Safe handling of solvent cement Making S.C. joints
PVC	rigid	D2740	Tubing, SDR-PR, o.d. controlled
PVC	rigid	F480	Water Well Casings and Couplings, SDR
CPVC	rigid	F441 F493 F402 F438 F439 F437	Pipe, Schedules 40 & 80 CPVC solvent cement Safe handling of S.C. Fittings, Schedule 40, socket-type Fittings, Schedule 80, socket-type Fittings, Schedule 80, threaded
CPVC	rigid	F442 F493 F402 F438 F439	Pipe, SDR-PR, o.d. controlled CPVC solvent cement Safe handling of S.C. Fittings, Schedule 40, socket-type Fittings, Schedule 80, socket-type
CPVC	rigid	F443 F493 F402	Pipe, Schedule 40, Bellend CPVC solvent cement Safe handling of S.C.

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	PVC	rigid	D3034 D2564 D2855 F402 D2321 F477 D3212	Pipe & Fittings, Type PSM PVC solvent cement Making S.C. joints Safe handling of S.C. Underground installation procedures Elastomeric seals Elastomeric joints
	PVC	rigid	D2729 D2564 D2855 F402 D2321	Pipe & Fittings PVC solvent cement Making S.C. joints Safe handling of S.C. Underground installation procedures
	SR	rigid	D2852 D3122 F402 D2321 F477 D3212	Pipe & Fittings SR solvent cement Safe handling of S.C. Underground installation procedures Elastomeric seals Elastomeric joints
SEPTIC DISPOSAL FIELDS & SUB SOIL DRAINAGE – Perforated Piping	PE	flexible	F405 F481	Corrugated Tubing & Fittings, Perforated Installation
	PVC	rigid	D2729 F481	Pipe & Fittings, Perforated Installation
	SR	rigid	D3298 F481	Pipe, Perforated Installation
TUBULAR WASTE – Tube & fittings for accessible waste connections	ABS	rigid	F409 D2235 F402	Tube & Fittings ABS solvent cement Safe handling of S.C.
	PVC	rigid	F409 D2564 D2855 F402	Tube & Fittings PVC solvent cement Making S.C joints Safe handling of S.C.
	PP	rigid	F409 D2657	Tube & Fittings Heat joining

NOTE: Plastics pipe also has many applications for gas piping, chemical/industrial waste piping and chemical/industrial process piping.

THE MAJOR BENEFITS OF USING PLASTICS PIPING MATERIALS

● Plastics piping is **energy efficient.** In a recent study it was estimated that during 1977, 324 trillion B.T.U.'s more energy would have been required to make metal piping to replace the plastics piping which was manufactured. That equals a savings of about 56 million barrels of oil because of plastics pipe. Additionally, in hot water distribution systems, plastics piping serves as an insulator itself to reduce heat loss. While plastics piping is made from petroleum based products, it is truly doing its share to reduce energy consumption.

● The **initial cost of piping materials** is important to users. Here, again, plastics piping receives high marks. Its initial cost is significantly less than the cost of other material.

● **Installation costs** of plastics versus other materials represent further savings to the user. Cutting, joining and installing plastic pipe is far simpler than the same processes for other materials. At today's labor rates, increased productivity is vital.

● The **ease of handling** plastics pipe is a tremendous benefit. Not only does its light weight present real benefits to the installer when working in tight places, but a normal length of DWV pipe can be carried by one man whereas two men or a machine are required to move heavier metal piping.

● The **long life** of a material is important to the consumer of the material. Millions of plastics piping installations have been in service for over a quarter of a century and are still functioning the way they did the day they were installed.

● Plastics piping is **corrosion resistant and free flowing.** Plastics piping systems are resistant to normal household chemicals and many other substances which might enter a sanitary drainage system. DWV piping does not "gum up" as does some other materials. The smooth wall of the plastics makes transport of wastes and water more effective. Plastics water piping also resists the kind of interior build-up that sometimes plagues metal piping systems.

● Plastics piping is usually marked to **aid in identification.** Manufacturers making pipe and fittings according to ASTM standards and having the material tested to those standards usually mark the pipe and fittings to show the use and the applicable standard. This procedure makes it simple for users to properly identify the many kinds of plastics pipe and fittings which are available for different applications.

That's a pretty impressive list of benefits for any material. If you have not used plastics piping before, it may be time you did. If you have not been served by plastics piping, you are missing the many benefits which are available through its use. Our industry is proud of the materials which it offers for so many varying piping applications. We stand ready to serve our customers to bring them the benefits of The Growing World of Plastics Piping.

CODE ACCEPTANCE

Plumbing codes are the basis for acceptance of materials for specific plumbing installations and for the methods of installation. Model plumbing codes, sponsored by associations of building and plumbing code officials or other industry groups, are the basis for most of the over 14,000 local codes in this country.

The following organizations (and their model plumbing codes) accept the use of plastics for piping applications:

Building Officials and Code Administrators International, Basic Plumbing Code

International Association of Plumbing and Mechanical Officials, Uniform Plumbing Code

International Conference of Building Officials, Plumbing Code

National Association of Plumbing, Heating, Cooling Contractors/American Society of Plumbing Engineers, National Standard Plumbing Code

Southern Building Code Congress International, Standard Plumbing Code

Plastics piping is also an approved material for use in U.S. Government building projects according to directives of the U.S. Department of Housing and Urban Development.

Regardless of the material you choose to use, check your local plumbing code for approved materials and accepted installation practices.

The material contained herein was assembled through the efforts of the Plastic Pipe and Fittings Association for general informational purposes only. The PPFA, nor any of its members, make any warranties or representations of any kind whatsoever regarding the products or the materials described or referenced herein.

Additional information on plastics piping in plumbing applications may be obtained from the **Plastic Pipe and Fittings Association,** 999 North Main St., Glen Ellyn, Illinois 60137.

Additional information on plastics piping use for water and sewer mains may be obtained from the **Uni-Bell Plastics Pipe Association,** 2655 Villa Creek Dr., Suite 164, Dallas, Texas 75234.

General information on plastics piping for other purposes may be obtained from the **Plastics Pipe Institute,** 355 Lexington Ave., New York, New York 10017.

PPFA

Plastic Pipe and Fittings Association

999 North Main St. • Glen Ellyn, IL 60137 • Phone: 312/858-6540

Bill No. House Bill 63

Title "An Act relating to the Plumb ng Code."

Date March 15, 1985

Contact: Eileen Plate
465-2700
Bob Bacolas
465-4870

House Bill 63 provides for the adoption of the 1985 Uniform Plumbing Code, Uniform Solar Energy Code, and Uniform Swimming Pool, Spa and Hot Tub C de.

The International Association of Plumbing and Mechanical Officials revises its minimum standards for the installation of plumbing every three years to incorporate technological advances, and the 1985 edition is the most recent effort in this regard. The standards for the installation of solar energy and the spa and hot tub standards have not previously been adopted in Alaska (the minimum standards for swimming pools were formerly included in the Uniform Plumbing Code.) The 1979 code currently in effect in Alaska is outdated, and adoption of the 1985 version would bring Alaska's minimum standards into conformity with those adopted and used by the industry nationwide.

This bill also removes an anomalous provision that instructs the Department of Labor to adopt the specific publications that constitute the plumbing code. The current statute leaves no discretion in the department as to whether to adopt or as to what to adopt. Thus the actions of the department in going through the formal adoption procedures are unnecessary. Under the amendment in this bill, the statute will simply declare what constitutes the plumbing code. This is the approach already employed for the electrical code, for example; see AS 18.60.580.

With respect to the Uniform Plumbing Code, a number of water quality, worker safety, and fire safety questions have been posed nationally concerning code provisions which permit the use of plastic pipe (section 401 of chapter 4 dealing with drainage systems and section 1004 of chapter 10 dealing with water distribution). This concern also exists in Alaska, and no doubt will be brought out in the hearings on House Bill No. 63. Although the Department supports adoption of the 1985 code at this time, should it be determined in the course of the hearings that there are compelling reasons to prohibit the use of plastic pipe, we would not have any strong objection to the specific questioned sections being excluded from the State's minimum plumbing standards.

In any event, the Department would request that two provisions in House Bill No. 63 be amended, as follows.

Section 1, line 20 needs to be amended to read:

> of Plumbing and Mechanical Officials, chs. 1--9 and appendices, but excluding Part 1, Administration, pages 3--9; and

Section 1, line 23 needs to be amended to read:

> International Association of Plumbing and Mechanical Officials, chs. 1--5 but excluding Part 1, Administration, pages 1--9.

POSITION PAPER/Department of Labor

We did not have copies of the 1985 codes when we drafted our bill, so were not aware that the Solar Energy Code and Swimming Pool, Spa and Hot Tub Code both contained an Administration section. This section is comparable to the Administration section in the Plumbing Code itself, which Alaska has never adopted.

House Bill No. 63 would not have a fiscal impact on the Department of Labor.

APPROVED:

Jim Robison

Jim Robison, Commissioner
Department of Labor

HB 63 File Contents

1) Bill Summary -- Legislative Reporting Service

2) Overview -- Roger Poppe, Committee Staff

3) Alaska Statutes 18.60.705-740.

4) Letter of Support --Governor Sheffield

5) Fiscal Note -- Dept. of Labor 3/15/85

6) Position Statement & Proposed Amendments -- Dept. of Labor

7) Anchorage Municipality Local Amendments to the Uniform Plumbing Code, 1982 edition -- Chapter 23.25 (currently in effect)

8) Proposed Amendments to HB 63 by the Plumbers and Pipefitters Unions

9) Draft of proposed 1985 Senate Bill relating to the plumbing code dated 3/13/85

10) Additional Materials Supplied by the Plumbers and Pipefitters Unions

    a) Letter from Marie Sibuya Shell to Thomas Higham -- Dec. 20, 84
    b) Article from NEWS on "Polyvinyl Chloride Fumes Cause Long-Term Health Problems for Fire Survivors, Study Shows"
    c) Legislative Activities of Interest regarding Electrical Non-metallic Tubing and Other Plastic Construction Materials
    d) Summary of Lawsuit of California Department of Consumer Affairs et alli vs. International Association of Plumbing and Mechanical Officials (beige covered booklet).
    e) Investigation of Plastic Pipe Permeation by Organic Chemicals November, 1984 (blue-covered booklet)

11) Additional Materials from representatives and manufacturers of Polybutylene pipe

    a) Letter of May 16, 1984 from A. H. Schroer to Senate Labor and Commerce Committee regarding testimony on HB 508 last session.
    b) White paper--Testimonials on cold weather durability of polybutylene pipe (starts out with P.P.P. saved thousands of homes...etc.)
    c) Public Health News broadside of December 16, 1983 from Virginia Dept. of Health

d) Tests of Polybutylene Pipe at PT Relief Valve Conditions
e) Report to Congress by the Comptroller General--Feb. 18, 82
f) News Release -- Cold Bay -- February 18, 82.
g) Shell Chemical Company letter of May 27, 1983
h) Legislative Proposal Analysis on adoption of 1982 Uniform Plumbing Code
i) Polybutylene Pipe (grey brochure from Shell Chemical)

12) Letters of January 24, 1985 and February 22, 1985 from Eugene Rutland of the Mechanical Contractors of Fairbanks, Inc. to Chairman Navarre

13) List of states and major cities approving the use of Polybutylene in a Feb. 15, 85 letter from Martin O. Brien of Shell Chemical Co. to Gordon Evans of Juneau

14) Copies of the following materials are available for inspection on the Committee Table:

a) Uniform Plumbing Code -- 1985 Edition

b) Uniform Solar Energy Code -- 1985 edition

c) Uniform Swimming Pool, Spa, and Hot Tub Code -- 1985 edition

d) Advanced Drainage Systems Inc. Booklet (beige)

e) Effects of Heavy Loads on Buried Corrugated Polyethylene Pipe

f) Miscellaneous flyers from Polyethylene Pipe Manufacturers

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

January 15, 1985

The Honorable Ben Grussendorf
Speaker of the House
Alaska State Legislature
Pouch V
Juneau, AK 99811

Dear Representative Grussendorf:

Under the authority of art. III, sec. 18, of the Alaska Constitution, I am transmitting a bill relating to the plumbing code. The International Association of Plumbing and Mechanical Officials revises its minimum standards for the installation of plumbing every three years to incorporate technological advances. The 1985 edition contains the most recent revisions. The standards for the installation of solar energy are new, and the spa and hot tub standards have not previously been adopted in Alaska (the minimum standards for swimming pools were formerly included in the Uniform Plumbing Code). The 1979 code currently in effect in Alaska is outdated, and adoption of the 1985 version would bring Alaska's minimum standards into conformity with those adopted and used by the industry nationwide.

This bill also removes an anomolous provision that commands the Department of Labor to adopt the specific publications that constitute the plumbing code. The current statute leaves no discretion in the department as to whether to adopt or as to what to adopt. Thus the current adoption language is useless and the actions of the department in going through the formal adoption procedures are unnecessary. Under the amendment in the bill, the statute will simply declare what constitutes the plumbing code. This is the approach already employed for the electrical code, for example; see AS 18.60.580. Any publicity value that department adoption might have could be achieved through simpler means.

Sincerely,

Bill Sheffield
Governor

REQUEST

Bill/Resolution No.: HB 63

Title: "An Act relating to the Plumbing Code...."

Sponsor: Rules Committee

Requestor: Rules Committee

Date of Request:

FISCAL DETAIL

Agency Affected: Labor

Program Category Affected: Public Protection

BRU, Program or Subprogram(s) Affected: Labor Standards and Safety - Mechanical Inspection

EXPENDITURES/REVENUES: (Thousands of Dollars)

	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90
OPERATING						
100 PERSONAL SERVICES						
200 TRAVEL						
300 CONTRACTUAL						
400 SUPPLIES						
500 EQUIPMENT						
600 LAND & STRUCTURES						
700 GRANTS, CLAIMS						
800 MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS: Attach a separate page if necessary

Prepared By: Robert J. Bacolas, Sr. Phone: 465-4870

Division: Labor Standards & Safety Date: 12/28/84

Approved by Commissioner: Jim Robison Date: 12/28/84

Agency: Labor

Distribution (by Agency preparing fiscal note):

Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

7/1/84

STATE OF ALASKA 1985 LEGISLATIVE SESSION

FISCAL NOTE

Revision Date:

REQUEST

Bill/Resolution No.: HB 63

Title: "An Act relating to the plumbing code."

Sponsor: Governor

Requestor: House Labor & Commerce

Date of Request: 3/15/85

FISCAL DETAIL

Agency Affected: Labor

Program Category Affected: Public Protection

BRU, Program or Subprogram(s) Affected: Labor Standards & Safety
Mechanical Inspection

EXPENDITURES/REVENUES: (Thousands of Dollars)

	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90
OPERATING						
100 PERSONAL SERVICES						
200 TRAVEL						
300 CONTRACTUAL						
400 SUPPLIES						
500 EQUIPMENT						
600 LAND & STRUCTURES						
700 GRANTS, CLAIMS						
800 MISCELLANEOUS						
TOTAL OPERATING	-0-	-0-	-0-	-0-	-0-	-0-
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	-0-	-0-	-0-	-0-	-0-	-0-

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS: Attach a separate page if necessary

Prepared By: Robert J. Bacolas Sr. Phone: 465-4870

Division: Labor Standards & Safety Date: 3/15/85

Approved by Commissioner: Jim Robison Date: 3/15/85

Agency: Labor

Distribution (by Agency preparing fiscal note):

Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

7/1/84

STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF Consumer Affairs (916) 445-4465
1020 N STREET, SACRAMENTO, CALIFORNIA 95814

December 20, 1984

Mr. Thomas Higham
Executive Director
International Association
of Plumbing and Mechanical
Officials
5032 Alhambra Avenue
Los Angeles, CA 90032

Dear Mr. Higham:

As you know, this department actively participated in litigation concerning IAPMO last year. While our formal role in that matter has ceased, we remain abreast of current developments and are involved, in conjunction with HCD, in the ongoing environmental impact report.

I recently learned that IAPMO voluntarily has elected to include the notice concerning the use of plastic pipe in your upcoming edition of the Uniform Plumbing Code. It is also my understanding that the language to be used is identical to that which appeared in the last publication.

I applaud your decision. This action on the part of IAPMO carries forward the spirit of the trial court decision and allows all interested parties to focus their attention upon other critical problems.

While I trust that the information which I have received is correct, please don't hesitate to contact me if I have misstated your decision.

Sincerely,

Marie Shibuya-Snell

MARIE SHIBUYA-SNELL
Director

cc: Shirley Chilton
Secretary
State & Consumer
Services Agency

bcc: Mitch Wilk
Julie Nauman (HCD)
Tom Cecil

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIA
5032 ALHAMBRA AVENUE, LOS ANGELES, CALIFORNIA 90032-2400 • (213) 223-1471

January 14, 1985

Marie Shibuya-Snell, Director
Department of Consumer Affairs
1020 N Street
Sacramento, CA 95814

Dear Ms. Shibuya-Snell:

This is in response to your letter of December 20, 1984, regarding the insertion of the notice on the status of plastic pipe in California in the 1985 edition of the Uniform Plumbing Code.

At its recently held meeting, the IAPMO Board of Directors determined that IAPMO will voluntarily continue to insert the notice in copies of the Uniform Plumbing Code sold in California. The wording of the notice will be substantially the same as at present. We are, however, contemplating deleting the portion in parenthesis which refers to the "pending litigation". Since the litigation is no longer pending, there is no reason to continue to refer to it.

Very shortly I will be forwarding a copy of the proofs of the 1985 edition of the Uniform Plumbing Code to John Worsley so the Building Standards Commission can proceed with its adoption in a timely fashion.

Thank you for your letter and your interest. I hope we can continue to work closely together for the mutual benefit of the citizens of California.

Cordially,

Tom Higham

TOM HIGHAM
EXECUTIVE DIRECTOR

INTERNATIONAL ASSOCIATION OF
PLUMBING AND MECHANICAL OFFICIALS

TH:jg

cc: Jack McKenna

JAN 16

PROPOSED AMENDMENT TO HOUSE BILL NO. 63

In lieu of * Section 2. AS 18.60.740(1) is amended to read:

(1) "code" means the 1985 editions of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 Edition], adopted at the 54th [49th] Annual Conference, September 1988 [1978], International Association of Plumbing and Mechanical Officials;

the following is proposed:

(1) "code" means the 1985 editions of the Uniform Plumbing Code, the Uniform Solar Energy Code, and the Uniform Swimming Pool, Spa and Hot Tub Code [1979 EDITION], adopted at the 54th [49th] Annual Conference, September 1988 [1978], international Association of Plumbing and Mechanical Officials, provided: however, that the 1985 Edition of the Uniform Plumbing Code shall be amended as follows:

A. On Page 37, Chapter 4, Drainage Systems, 401, Materials, Subsection (e), Sub-subsection (1), shall be deleted and in its place shall be inserted " (1) No galvanized, wrought iron, galvanized steel, ABS, or PVC pipe shall be used underground, but all such pipe shall be kept at least six (6) inches above ground."

B. On Page 37, Chapter 4, Drainage Systems, Section 401, Materials, Subsection (e), Sub-subsection (2), shall be deleted and in its place shall be inserted "(2) ABS or PVC installations shall be limited to type VN residential construction, not over 35 feet in stack height. ABS and PVC pipe shall not be less than schedule 40 (IPS) standard steel pipe thickness."

C. On Page 45, Chapter 5, Vents and Venting, Section 503, Materials, Subsection (a), Sub-subsection (2), shall be deleted and in its place shall be substituted. "(2) ABS or PVC installations shall be limited to type VN residential construction, not over 35 feet in stack height. ABS and PVC pipe shall not be less than schedule 40 (IPS) standard steel pipe thickness."

D. On Page 45, Chapter 5, Vents and Venting, Section 503, Materials, Subsection (b), shall be deleted and in its place shall be substituted ,"(b) Vent fittings shall be cast iron, galvanized malleable iron or galvanized steel, lead, copper, brass, ABS, PVC, or other approved materials, except that no galvanized malleable iron, galvanized steel, ABS or PVC shall be used underground and shall be kept at least six (6) inches above ground."

E. On Page 75, Chapter 10, Water Distribution, Section 1004, Materials, Subsection (a), the second and third sentences shall be deleted therefrom

F. On Page 75, Chapter 10, Water Distribution, Section (e), shall deleted in its entirety, including the exception therefrom.

PROPOSED AMENDMENT TO HOUSE BILL NO. 63

APPROVED
Date: 2-8-83

Submitted by: Chairman of the Assembly at the request of the Mayor
Prepared by: Department of Public Works
For Reading: January 25, 1983

ANCHORAGE, ALASKA
AO No. 83-9

AN ORDINANCE PROVIDING FOR THE REPEAL AND REENACTMENT OF CHAPTER 23.25 OF THE ANCHORAGE MUNICIPAL CODE PERTAINING TO THE UNIFORM PLUMBING CODE AND AMENDING SECTION 23.05.010(C)

THE ANCHORAGE ASSEMBLY ORDAINS:

Section 1. That Chapter 23.25 of the Anchorage Municipal Code is hereby repealed and reenacted to read as follows:

Chapter 23.25

LOCAL AMENDMENTS TO THE UNIFORM PLUMBING CODE, 1982 EDITION

Sections:

23.25.010	Local amendments to the Uniform Plumbing Code (1982 edition).
23.25.015	Administration.
23.25.1.0	Application and scope.
23.25.1.1	Administrative authority and assistants.
23.25.1.2	Duties of the administrative authority.
23.25.1.3	Right of entry.
23.25.1.4	Dangerous and unsanitary construction.
23.25.1.5	Violations and penalties.
23.25.1.6	Permit required.
23.25.1.7	Work not requiring permit.
23.25.1.8	To whom permits may be issued.
23 25.1.9	Application for permit.
23.25.1.10	Cost of permit--Schedule of fees.
23.25.1.11	All work to be inspected.
23.25.1.12	Notification.
23.25.2.1	Definitions of plumbers and contractors.
23.25.2.2	General provisions.
23.25.2.3	Application for certificate of qualification or registration.
23.25.2.4	Board of Plumber Examiners.
23.25.2.5	Application and testing fee.
23.25.2.6	Issuance of certificate of qualification or registration.

AM101-83

APPROVED
Date: 6-21-83

Submitted by: Chairman of the Assembly at the request of the Mayor
Prepared by: Department of Public Works
For Reading: June 7, 1983

ANCHORAGE, ALASKA
AO No. 83-92

AN ORDINANCE AMENDING AMC 23.25.1.5, RTAINING TO PERMIT TIME LIMITATIONS

THE ANCHORAGE ASSEMBLY ORDAIN

Section 1. That the fourth paragraph of AMC 23.25.1.5, Violations and Penalties, is hereby amended to read as follows:

23.25.1.5 Violations and penalties.

Every permit issued by the administrative authority under the provisions of this code shall expire by limitation and become null and void, if the work authorized by such permit is not commenced within [180] 360 days from the date of such permit, or if the work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of [180] 360 days. Before such work can be recommenced a new permit shall be first obtained to do so, and the fee therefor shall be one-half the amount required for a new permit for such work, provided no changes have been made, or will be made in the original plans and specifications for such work, and provided further that such suspension or abandonment has not exceeded [one year] 18 months. (CAC 14.32.060-1.7, am AO 78-105, am AO 80-1, AO 82-5, AO 83-9).

Section 2. This ordinance shall take effect immediately upon passage by the Anchorage Municipal Assembly.

PASSED AND APPROVED by the Anchorage Municipal Assembly this 21st day of June, 1983.

Chairman

ATTEST:

Deputy Municipal Clerk

AO 83-92

23.25.010 Local amendments to the Uniform Plumbing Code (1982 Edition).

Amendments to the 1982 Uniform Plumbing Code and appendices thereto are listed hereafter by section. The last digits after the title and chapter digits of the section number are the section number of the Uniform Plumbing Code to which the amendment refers, i.e., 23.20.409(a) refers to Section 409(a) of the Uniform Plumbing Code. (new, am AO 78-105, AO 80-1, AO 82-5).

23.25.015 Administration.

Part I, Administration, is amended by deleting sections 10.1 through 20.8 and substitution of the following sections 23.25.1.0 through 23.25.2.10. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.0 Application and scope.

The provisions of this code shall apply to all new construction, relocated buildings and to any alterations, repairs or reconstruction, except as provided for otherwise in this code. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.1 Administrative authority and assistants.

Whenever the term "administrative authority" is used in this code, it shall be construed to mean the building official or his authorized representative. (CAC 14.32.030-1.1, am AO 78-105, AO 80-1, AO 82-5).

23.25.1.2 Duties of the administrative authority.

The administrative authority shall maintain public office hours necessary to efficiently administer the provisions of this code and amendments thereto and shall perform the following duties:

A. Require submission of, examine and check plans and specifications, drawings, descriptions, and/or diagrams necessary to show clearly the character, kind and extent of work covered by applications for a permit and upon approval thereof shall issue the permit for which application is made.

B. Keep a permanent, accurate account of all fees for permits issued and other moneys collected and received as provided by this code, the names of the persons upon whose account the same were paid, the date and amount thereof, together with the location or premises to which they relate.

C. Administer and enforce the provisions of this code in a manner consistent with the intent thereof and shall inspect all plumbing and drainage work authorized by any permit to assure compliance with provisions of this code or amendments thereto, approving or condemning the work in whole or in part as conditions require.

D. Issue upon request a certificate of approval for any work approved by him.

E. Condemn and reject all work done or being done or materials used or being used which do not in all respects comply with the provisions of this code and amendments thereto.

F. Order changes in workmanship and/or materials essential to obtain compliance with all provisions of this code.

G. Investigate any construction or work regulated by this code and issue such notices and orders as provided in Section 23.25.1.6.

H. Keep a complete record of all the essential transactions of his office.

I. Transfer all fees collected by him to the proper authority provided by law to receive such funds.

J. Maintain an official register of all persons, firms or corporations lawfully entitled to carry on or engage in the business of plumbing or to labor at the trade of plumbing to whom a plumber's certificate of qualification has been issued in accordance with provisions of Sections 23.25.2.1 through 23.25.2.10 of this code. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.3 Right of entry.

The administrative authority and assistants shall carry proper credentials of their respective office, upon exhibition of which they shall have the right of entry, during usual business hours, to inspect any and all buildings and premises in the performance of their duties. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.4 Dangerous and unsanitary construction.

A. Any portion of a plumbing system found by the administrative authority to be unsanitary as defined herein is hereby declared to be a nuisance.

B. Whenever brought to the attention of the department having jurisdiction that any unsanitary conditions exist or that any construction or work regulated by this code is dangerous, unsafe, unsanitary, a nuisance or a menace to life, health or property or otherwise in violation of this code, said department may request an investigation by the administrative authority who, upon determining such information to be fact, shall order any person, firm or corporation using or maintaining any such condition or responsible for the use or maintenance thereof to discontinue the use or maintenance thereof or to repair, alter, change, remove or demolish same, as he may consider necessary for the proper protection of life, health or property, and in the case of any gas piping or gas appliance may order any person, firm or corporation supplying gas to such piping or appliance to discontinue supplying gas thereto until such piping or appliance is made safe to life, health or property.

Every such order shall be in writing, addressed to the owner, agent or person responsible for the premises in which such condition exists and shall specify the date or time for compliance with such order.

C. Refusal, failure or neglect to comply with any such notice or order shall be considered a violation of this code.

D. When any plumbing system is maintained in violation of this code and in violation of any notice issued pursuant to the provisions of this section, or where a nuisance exists in any building or on a lot on which a building is situated, the administrative authority, through the municipal Legal Department, shall institute any appropriate action or proceeding in any court of competent jurisdiction to prevent, restrain, enjoin, correct or abate the violation or nuisance. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.5 Violations and penalties.

Any person, firm or corporation violating any provision of this code shall be deemed guilty of a misdemeanor and shall be subject to the penalties and remedies provided in Section 23.10.025 of this title.

The issuance or granting of a permit or approval of plans and specifications shall not be deemed or construed to be a permit for, or an approval of, any violation of any of the provisions of this code. No permit presuming to give authority to violate or cancel the provisions of this code shall be valid, except insofar as the work or use which it authorizes is lawful.

The issuance or granting of a permit or approval of plans shall not prevent the administrative authority from thereafter requiring the correction of errors in said plans and specifications or from preventing construction operations being carried on thereunder when in violation of this code or of any other ordinance or from revoking any certificate of approval when issued in error.

Every permit issued by the administrative authority under the provisions of this code shall expire by limitation and become null and void, if the work authorized by such permit is not commenced within 180 days from the date of such permit, or if the work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 180 days. Before such work can be recommenced a new permit shall be first obtained to do so, and the fee therefor shall be one-half the amount required for a new permit for such work, provided no changes have been made, or will be made in the original plans and specifications for such work, and provided further that such suspension or abandonment has not exceeded one year. (CAC 14.32.060-1.7, am AO 78-105, am AO 80-1, AO 82-5).

23.25.1.6 Permit required.

A. It shall be unlawful for any person to install, remove, alter, repair or replace or cause to be installed, removed, altered, repaired or replaced any plumbing, gas or drainage piping work or any fixture or water heating or treating equipment in a building or premises without first obtaining a permit to do such work from the administrative authority.

B. A separate permit shall be obtained for each building or structure.

C. No person shall allow any other person to do or cause to be done any work under a permit secured by a permittee except persons in his employ. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.7 Work not requiring permit.

No permit shall be required in the case of any repair work as follows: the stopping of leaks in drains, soil, waste or vent pipe, provided, however, that should any trap, drainpipe, soil, waste or vent pipe be or become defective and it becomes necessary to remove and replace the same with new material in any part or parts, the same shall be considered as such new work and a permit shall be procured and inspection made as hereinbefore provided. No permit shall be required for the clearing of

stoppages or the repairing of leaks in pipes, valves or fixtures, when such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.8 To whom permits may be issued.

A. No permit shall be issued to any person to do or cause to be done any work regulated by this code, except to a person holding a valid unexpired and unrevoked plumbing contractor's certificate of qualification or registration as required by Section 23.25.2.2, except when and as otherwise hereinafter provided in this section.

B. A permit may be issued to a properly licensed person not acting in violation of any current contractor licensing law.

C. Any permit required by this code may be issued to any person to do any work regulated by this code in a single-family dwelling used exclusively for living purposes, including the usual accessory buildings and quarters in connection with such buildings in the event that any such person is the legal owner of any such dwelling and accessory buildings and quarters, and that the same are occupied by said owner, provided that said owner shall personally perform all labor in connection therewith. (GAAB 22.20.010-1.10(d)1 and 2, am AO 78-105, AO 80-1, AO 82-5).

23.25.1.9 Application for permit.

Any person legally entitled to apply for and receive a permit shall make such application on forms provided for that purpose. He shall give a description of the character of the work proposed to be done, and the location, ownership, occupancy and use of the premises in connection therewith. The administrative authority may require plans, specifications or drawings and such other information as he may deem necessary.

If the administrative authority determines that the plans, specifications, drawings, descriptions or information furnished by the applicant are in compliance with this code, he shall issue the permit applied for upon payment of the required fee as hereinafter fixed. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.10 Cost of permit--Schedule of fees.

Every applicant for a permit to do work regulated by this code shall state in writing on the application form provided for that purpose the character of work proposed to be done and the amount and kind in connection therewith, together with such information pertinent thereto as may be required.

Such applicant shall pay for each permit issued, at the time of issuance, a fee in accordance with the following schedule, and at the rate provided for each classification shown herein.

Any person who shall commence any work for which a permit is required by this code without first having obtained a permit therefor shall, if subsequently permitted to obtain a permit, pay double the permit fee fixed by this section for such work, provided however, that this provision shall not apply to emergency work when it shall be proved to the satisfaction of the administrative authority that such work was urgently necessary and that it was not practical to obtain a permit therefor before the commencement of the work. In all such cases a permit must be obtained as soon as it is practical to do so, and if there be an unreasonable delay in obtaining such permit, a double fee as herein provided shall be charged.

For the purpose of this section a sanitary plumbing outlet on or to which a plumbing fixture or appliance may be set or attached shall be construed to be a fixture. Fees for reconnection and retest of existing plumbing systems in relocated buildings shall be based on the number of plumbing fixtures, gas systems, water heaters, etc., involved.

When interceptor traps or house trailer site traps are installed at the same time as a building sewer on any lot, no sewer permit shall be required for the connection of any such trap to an appropriate inlet fitting provided in the building sewer by the permittee constructing such sewer.

When a permit has been obtained to connect an existing building or existing work to the public sewer or to connect to a new private disposal facility, backfilling of private sewage disposal facilities abandoned consequent to such connection is included in the building sewer permit.

SCHEDULE OF FEES

Permit fee for all plumbing work:

A.	For the issuance of each permit	$ 10.00
B.	For each plumbing fixture	3.00
C.	For each gas outlet	3.00
D.	For each water heater per 1,000 B.T.U.	0.15
E.	For plumbing alteration work per outlet	3.00

F. For automatic sprinkler systems per head 1.00

G. Re-inspection fee 35.00

H. Inspection outside normal business hours, per hour, 4 hours minimum 35.00
(GAAB 22.20.010-1.12, am AO 78-105, AO 80-1, AO 82-5).

23.25.1.11 All work to be inspected.

All plumbing and drainage systems shall be inspected by the administrative authority to ensure compliance with all requirements of this code. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1.12 Notification.

It shall be the duty of the person doing the work authorized by the permit to notify the administrative authority orally or in writing that said work is ready for inspection. Such notification shall be given not less than 24 hours before the work is to be inspected.

It shall be the duty of the person doing the work authorized by the permit to make sure that the work will stand the tests prescribed elsewhere in this code before giving the above notification. (AO 78-105, am AO 80-1, AO 82-5).

23.25.2.1 Definitions of plumbers and contractors.

A. A plumbing contractor certificate holder can obtain permits, install or repair plumbing, gas piping and mechanical equipment.

B. A sewer or sewage disposal contractor is a person who may conduct, carry on or engage in the business of installing, altering or repairing sewers and private sewage disposal systems.

C. A journeyman plumber is a person who labors at the trade of plumbing as an employee. A journeyman plumber certificate holder can install plumbing, gas piping and mechanical equipment.

D. An apprentice plumber is a person other than a contractor or journeyman plumber who labors at the trade of plumbing as an employee. The apprentice plumber shall be under the direct supervision and in the immediate presence of a plumbing contractor or journeyman plumber. The apprentice plumber shall be a certificate holder of a valid Municipality of Anchorage apprentice card.

E. A gas certificate holder can install gas piping and gas equipment. He may also service said equipment. He will not be issued permits.

F. A gas piping contractor certificate holder can install and repair gas piping, install and repair mechanical equipment and obtain permits for such work.

G. Any other specialty contractors doing work covered by code shall be required to be tested and licensed and to obtain permits for such work, i.e., mobile home installer. Specialty contracting shall include, but not be limited to, work such as trailer hook-ups and duct work. (AO 78-105, am AO 80-1, AO 82-5).

23.25.2.2 General provisions.

A. It shall be unlawful for any person to conduct, carry on or engage in the business of plumbing or act in the capacity of a plumbing contractor without first having been issued a valid plumbing contractor's certificate of qualification or registration by the Board of Plumber Examiners.

B. It shall be unlawful for any person to labor at the trade of plumbing in the capacity of a journeyman plumber without first having been issued a valid journeyman plumber's certificate of qualification or registration by the Board of Plumber Examiners.

C. No person, firm or corporation except duly certified and licensed gas fitters or persons working under the immediate supervision and control of a licensee hereunder shall install, alter or repair any gas piping for illuminating or fuel gas or install, alter, repair or service any gas-burning devices connected thereto in or for any building or structure in the municipality without having a license acceptable to the building official authorizing said person, firm or corporation to do so.

D. Any other specialty contractors doing work covered by code shall be required to be tested and licensed.

E. It shall be unlawful for any person to labor at the trade of plumbing while learning the trade of plumbing, without first having been issued a valid apprentice plumber certificate of registration by the Board of Plumber Examiners. (AO 78-105, am AO 80-1, AO 82-5).

F. Applicants for an apprentice plumber license need no prior experience.

G. Applicants for a gas piping contractor's certificate shall prove that they have at least four years of previous practical experience.

H. Applicants for a specialty contractor's certificate shall prove that they have had at least four years of previous practical experience in the field for which they are applying. (GAAB 22.20.010-2.3, am AO 78-105. AO 80-1, AO 82-5).

23.25.2.4 Board of Plumber Examiners.

A. The Board of Mechanical Examiners and Appeals as established under Section 23.10.015 of this title shall also be the Board of Plumber Examiners. The building official or his deputy shall be the executive secretary to the Board of Plumber Examiners, and shall have no vote on any matter to be decided by the board.

B. Appeals shall be made in writing on an application obtained from the board secretary and shall be submitted with a $50.00 processing fee. Appeals shall be heard not later than 30 days after receipt of the application. The appellant may appear in person before the board, or may be represented by an attorney, and may introduce evidence to support his claims. The appellant shall cause to be made at his own expense any tests or research required by the board to substantiate his claims. (Adapted from GAAB 22.20.010-2.4, am AO 78-105, AO 80-1, AO 82-5).

23.25.2.5 Application and testing fee.

Every person applying for a plumber's certificate of qualification or registration shall pay to the secretary of the Board of Building Regulation Examiners and Appeals at the time he makes such application for examination the following fees:

A.	Mechanical and plumbing contractor's certificate of examination	$ 25.00
B.	Journeyman plumber's certificate of examination	15.00
C.	Journeyman gas fitter's certificate of examination	15.00
D.	Gas piping contractor's certificate of examination	15.00

E. Specialty contractor's certificate of examination 15.00
(GAAB 22.20.010-2.6, am AO 78-105, AO 80-1, AO 82-5).

23.25.2.6 Issuance of certificate of qualification or registration.

The Board of Plumber Examiners shall issue certificates of qualification or registration pursuant to the following provisions:

A. A plumbing contractor's certificate of qualification or registration shall be issued to every person who makes application for such certificate, pays the required fee, proves required experience and training and successfully passes the examination conducted by the Board of Plumber Examiners.

B. A journeyman plumber's certificate of qualification or registration shall be issued to every person who makes application for such certificate, pays the required fee, proves required experience and training and successfully passes the examination conducted by the Board of Plumber Examiners.

C. A journeyman gas fitter's certificate of qualification or registration shall be issued to every person who makes application for such certificate, pays the required fee, proves required experience and training and successfully passes the examination conducted by the Board of Plumber Examiners.

D. An apprentice plumber certificate of registration shall be issued to every person who makes application for such certificate and pays the required fee.

E. A gas piping contractor's certificate of qualification or registration shall be issued to every person who makes application for such certificate, pays the required fee, proves required experience and training and successfully passes the examination conducted by the Board of Plumber Examiners.

F. A specialty contractor's certificate of qualification or registration shall be issued to every person who makes application for such certificate, pays the required fee, proves required experience and training and successfully passes the examination conducted by the Board of Plumber Examiners. (GAAB 22.20.010-2.7, am AO 78-105, AO 80-1, AO 82-5).

23.25.2.7 Reexaminations.

A. Any person who fails to pass the examination as prescribed by the Board of Plumber Examiners may apply for reexamination after the expiration of 30 days. Should such person fail the second time, the board may refuse a third application until after the expiration of six months.

B. Fees for reexamination will be the same as initial examination fees. (GAAB 22.20.010-2.8, am AO 78-105, AO 80-1, AO 82-5).

23.25.2.8 Expiration of certificates of qualification or registration.

Every certificate of qualification or registration shall remain in force and effect until its expiration date, unless cancelled or revoked. All certificates expire December 31 of each year. (GAAB 22.20.010-2.9, am AO 78-105, AO 80-1, AO 82-5).

23.25.2.9 Fees for issuance or renewal of certificates of qualification or registration.

The fees for issuance or renewal of certificates of qualification or registration are as follows:

A. Journeyman plumber's certificate of qualification shall be $35.00.

B. Plumbing contractor's certificate of qualification shall be $100.00.

C. Gas fitter's certificate of qualification shall be $35.00.

D. Gas contractor's certificate of qualification shall be $100.00.

E. Specialty contractor's certificate of qualification shall be $100.00.

F. Apprentice registration shall be $25.00.

G. All contractors' certificates of qualification, except certificates that have been cancelled or revoked, may be renewed from year to year upon request and payment of the required annual fee. If a renewal of a certificate is requested and the required fee paid more than 30 days but less than 90 days after the expiration date of such certificate, the renewal fee shall be $125.00. No certificate may be renewed more than 90 days after the expiration date of such certificate except by appeal to the board. Retesting shall be required after three years' expiration.

H. For journeymen, if a renewal request is submitted and the required fee paid within 30 days of the expiration date of such certificate, the renewal fee shall be $35.00. If such renewal is requested and the required fee paid more than 30 days but less than 90 days after the expiration date of such certificate, the renewal fee shall be $45.00. No certificate may be renewed more than 90 days after the expiration date of such certificate except by appeal to the board. Retesting shall be required after three years' expiration. The apprentice plumber late fee will be $10.00. (GAAB 22.20.010-2.6, 2.10, am AO 78-105, AO 80-1, AO 82-5).

23.25.2.10 Revocation of certificates of qualification or registration.

A. The Board of Plumber Examiners may cancel or revoke any certificate of qualification or registration issued by it to any person, if such person later shows incompetency or lack of knowledge in matters relevant to such certificate or if such certificate was obtained by fraud. If the certificate of qualification or registration of any person be so cancelled or revoked, another such certificate shall not be granted to such person within 12 months after the date of cancellation or revocation.

B. Certificates of qualification or registration are not transferable from one person to another, and the lending of any certificate or the obtaining of permits thereunder for any other person shall be deemed cause for revocation. (AO 78-105, am AO 80-1, AO 82-5).

23.25.20.14 Board of appeals.

Delete this section in its entirety.

23.25.203(d) Use of copper tubing.

Amend to delete the words "or underground outside of structures." (CAC 14.32.150-203(d), am AO 78-105, AO 80-1, AO 82-5).

23.25.Table A Table A--Plumbing material standards.

Delete from Table A, page 23, the following:

"Homogenous bituminized fiber drain and sewer pipe." (CAC 14.32.160-Table A, am AO 78-105, AO 80-1, AO 82-5).

~~23.25.~~401(a) Materials.

Amend paragraph (a) as follows:

(a) Drainage piping shall be cast iron, galvanized steel, galvanized wrought iron, lead, copper, brass, ABS, PVC, or other approved materials having a smooth and uniform bore, except that:

Delete exceptions (1) and (2) and substitute the following:

1. No galvanized wrought iron or galvanized steel pipe or ABS or PVC pipe shall be used underground, but all such pipe shall be kept at least six inches above ground, except as specified in Section 23.25.612(i).

2. ABS or PVC installations shall be limited to Type VN residential construction, not over 35 feet in stack height. ABS and PVC pipe shall not be less than schedule 40 (IPS) standard steel pipe thickness.

Delete exception (3) in its entirety. (GAAB 22.20.010-401(a), am AO 78-105, AO 80-1, AO 82-5).

23.25.401(b) Materials.

Amend paragraph (b) to read as follows:

(b) Drainage fittings shall be of cast iron, malleable iron, lead, brass, copper, ABS, PVC, or other approved materials having a smooth interior waterway of the same diameter as the piping served and all such fittings shall conform to the type of pipe used.

23.25.503(a)(2) Materials.

Delete paragraph (a)(2) in its entirety and substitute the following:

(2) ABS or PVC installations shall be limited to Type VN residential construction, not over 35 feet in stack height. ABS and PVC pipe shall not be less than schedule 40 (IPS) standard steel pipe thickness. (GAAB 22.20.010-401(a), am AO 78-105, AO 80-1, AO 82-5).

23.25.506(b) Vent termination.

Amend paragraph (b) to read as follows:

(b) Each vent shall terminate not less than ten (10) feet (3 m) from or at least three (3) feet (.9 m) above any window, door, opening, air intake or vent shaft, nor less than three (3) feet (.9 m) in every direction from any lot line; alley, street and zero-lot line properties excepted.

23.25.506(f) Vent termination.

Amend paragraph (f) as follows:

(f) Change three (3) inches to two (2) inches in first sentence. (GAAB 22.20.010-506(f), am AO 78-105, AO 80-1, AO 82-5).

23.25.612(h) Chemical wastes.

Amend paragraph (h) by adding a clause to the last sentence as follows:

. . . . except that copper material for drainage shall be prohibited to the point of dilution. (CAC 14.32.190-612(h) and GAAB 22.20.010-612(h), am AO 78-105, AO 80-1, AO 82-5).

23.25.612 Chemical wastes.

Add paragraph (i) as follows:

(i) Vacuum dental systems may be installed with schedule 40 PVC pipe and fittings, above and below grade. Piping and fittings above grade shall have a flame spread not to exceed 25. Protection of this piping shall conform to the Anchorage Municipal Code. (AO 78-105, am AO 80-1, AO 82-5).

23.25.613 Vertical wet venting.

Amend by deleting this section in its entirety and substituting the following:

A. Vertical wet venting is limited to sections of vertical drainage piping serving not more than two fixtures set on the same floor level in private living quarters (residential uses only) and having a discharge rating of not more than two units each.

B. In each such installation the vertical drain shall be one pipe size larger than the upper fixture inlet, but in no case smaller than the lower fixture inlet, whichever is the larger, and the developed length between any two such inlets shall at no time be greater than five times the diameter of the intervening wet vented section. Identical fixtures installed back to back shall have their fixture inlets at the same level.

C. The unit load on the common vent serving the two fixtures shall be the sum of the unit values of such fixtures.

D. Fixtures that rough in above the floor shall not be combined with fixtures that rough in below the floor. (CAC 14.32.200-613 and GAAB 22.20.613, am AO 78-105, AO 80-1, AO 82-5).

23.25.615(f) Combination waste and vent system.

Amend by deleting the following sentence: An accessible cleanout shall be installed in each vent for the combination waste and vent system. (AO 82-5).

23.25.Table 7-1 Horizontal distance of trap arms.

Add * after Horizontal Distance of Trap Arms and add below Table 7-1 the following:

*Residential floor drain trap arm to be extended where it passes under the nearest wall. Residential garage floor drains with a three-inch minimum trap size and drain arm and two-inch minimum floor drain size need not be vented. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1003(i) Fixture inlets and outlets with hose attachments.

Amend by deleting the following sentence: Hose bibbs other than above and lawn hydrants shall be protected by an approved non-removable type backflow prevention device. (AO 82-5).

23.25.1003(k) Water cooled compressors, degreasers or any other water cooled equipment.

Amend by adding a third paragraph before the Exception to read as follows:

Installation, operation or use of air conditioning or cooling units employing water or other fluid as a cooling agent without a recovery and recirculation unit is prohibited. (GAAB 22.20.010-1003(k), am AO 78-105, AO 80-1, AO 82-5).

23.25.1004(a) Materials.

Amend by deleting the second and third sentences. (CAC 14.32.210-1004(a) and GAAB 22.20.1004(a), am AO 78-105, AO 80-1, AO 82-5).

23.25.1004(e) Materials.

Delete paragraph (e) and Exception.

23.25.1004(c) Water pressure, pressure regulators and pressure relief valves.

Delete paragraph (c) in its entirety. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1007(e) Water pressure, pressure regulators and pressure relief valves.

Delete paragraph (e) and substitute as follows:

(e) Relief valves shall be provided with a full-size drain of galvanized steel or hard drawn copper piping fittings with the end of the pipe terminating at a floor drain or other approved location inside the building. No part of such drain pipe shall be trapped, and the terminal end shall not be threaded. Each drain shall be piped independently of all other drains. Trap primers shall be required as per Section 707. (CAC 14.32.220-1007(e), am AO 78-105, AO 80-1, AO 82-5).

23.25.1010 Air chambers.

Amend Chapter 10 by adding Section 1010 to read as follows:

Section 1010 - Air Chambers

Air chambers a minimum of 12 inches in length shall be installed at all fixtures, or other approved mechanical devices shall be provided to reduce water hammer or line noises to such an extent that no pressure hazard to the piping system will exist. (GAAB 22.20.010-1010, am AO 78-105, AO 80-1, AO 82-5).

23.25.1011 Indoor water meter setter.

Amend Chapter 10 by adding Section 1011 to read as follows:

All newly constructed single-family, duplex and tri-plex residences shall install an approved indoor water meter setter with meter idler or a removable section of pipe to facilitate the future installation of water meters in a horizontal position. It shall be located in the vicinity of the main supply full-way valve, ahead of any branch lines and shall also be valved on the outlet side. An easily accessible frost-proof area with adequate clearances shall be provided for meter installation, maintenance or removal. "Easily accessible" shall be considered an open area which is not concealed by an appliance, furnace, water heater or standard building material.

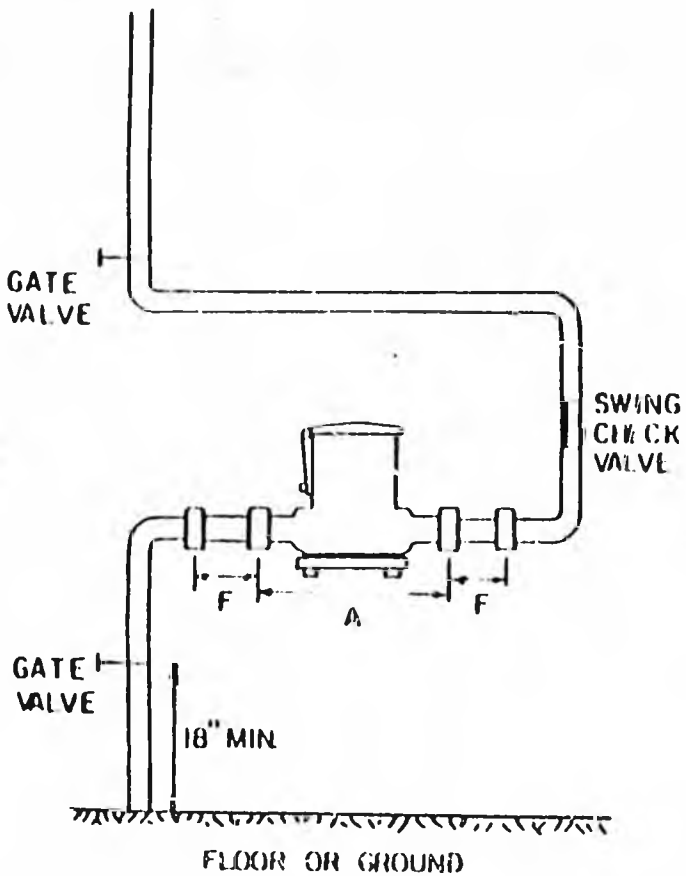
An approved indoor meter setter shall be constructed of all copper brass with all smooth water passages and shall provide permanent support for the water meter and shall be sized to accommodate a water meter in accordance with Table 10-2.

A removable section of pipe used in lieu of the indoor meter setter shall be the same length as the appropriate water meter, including meter couplings, according to the following Table of Standard Meter Dimensions and installed with appropriate fittings to allow its easy removal. The piping shall be supported to provide a permanent support for the water meter when installed.

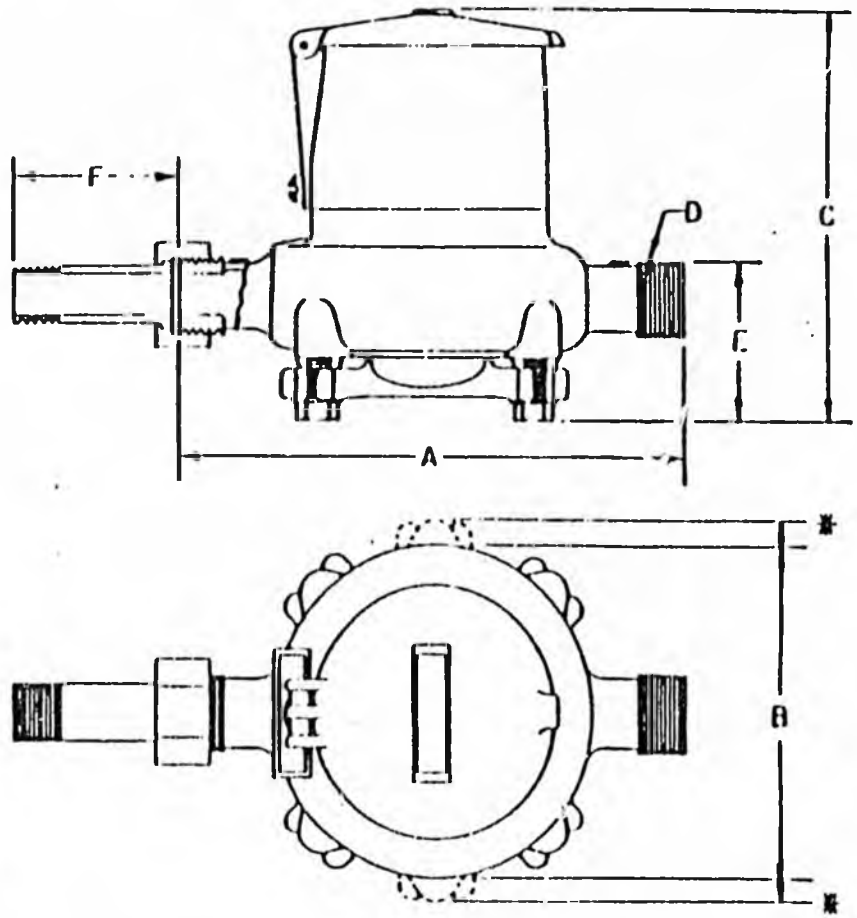
When the water tariff is revised to allow the metering of these residences the utility will furnish the meters and remote feed-outs at its expense and its crews will install remote read-out meters at the time of actual meter installation.

TABLE OF STANDARD METER DIMENSIONS

TYPICAL SMALL
METER INSTALLATION
(MUST BE HORIZONTAL)



SMALL WATER METER
STANDARD DIMENSIONS



METER SIZE	A	B	C		D		E	F	APPROX WEIGHT LBS
			STD	ARB/PUL	THD'S PER IN	OD			
5/8 x 3/4	7-1/2	4-5/8	5-3/4	5-3/4	11-1/2	1.290	1-3/4	2-5/8	6
3/4	9	5-3/8	6	6	11-1/2	1.232	1-7/8	2-5/8	7-1/4
1	10-3/4	6-1/8	7	7	11-1/2	1.626	2	2-3/4	13-1/2

23.25.1107 Cleanouts.

Delete first paragraph of subsection (a) and substitute the following:

(a) Cleanouts shall be placed at the end of building drains, two feet outside building and shall be of same material as building drain. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1212(a) Material for gas piping.

Amend paragraph (a) by deleting the last sentence and substituting the following:

.Approved type L soft copper or high carbon PE pipe may be used in exterior buried piping systems and will be buried at least 18 inches deep. (AO 78-105, am AO 80-1, AO 82-5).

23.25.1212 Material for gas piping.

Add the following paragraphs:

(e) At all points where fuel gas piping enters or leaves the ground there shall be installed, above ground, a connection capable of absorbing relative motion due to frost heave action. Such connectors shall be of a type approved by the building official. Three-quarter inch kink-proof wire, with a braided flexible connection with woven jacket and oil-proof synthetic tube and cover and neoprene liner may be used. Supporting wire shall run the full length of hose. Hose-to-pipe connectors are to be of the removable metal compression type. Temperature range shall be -40° F. to +250° F. (Aeroquip #1503 medium-pressure single-wire braid hose equipped with non-swivel male pipe fittings is an example of a suitable connector.)

(f) Three-quarter inch coated flex connector may be used between meter and house main, no more than 18 inches in length. No flex connector may pass through any wall, partition, panel or other barrier. Solid fittings shall be used on each end.

(g) At points where copper tubing type systems enter or leave the ground, they shall be protected from frost heave action by the incorporation of suitable above ground 6-inch radius bends or approved flex connection of equal size. (AO 80-1, am AO 82-5).

23.25.1213(a) Installation of gas piping.

Add the following to paragraph (a):

Swing joints using threaded fittings will not be allowed before or after the gas meter as flex connections. (AO 80-1, am AO 82-5).

23.25.1213(b) Installation of gas piping.

Add the following to paragraph (b):

All building fuel gas piping entrances and exits shall be located above grade or in an approved vented vault. (AO 80-1, am AO 82-5).

23.25.1213(o) Installation of gas piping.

Delete paragraph (o) and substitute the following:

(o) Any size gas pipe that goes under a driveway or right-of-way must be welded. (AO 80-1, am AO 82-5).

23.25.1213 Installation of gas piping.

Add the following new paragraphs (p) and (q):

(p) All underground joints made with rigid pipe of 1-1/4 inch or larger shall be welded.

(q) Pounds to inches water column regulators in copper tubing type systems shall be installed in locations outside and not under the mobile home. Preferably the regulator should be attached directly to the mobile home inlet connection. An approved gas valve shall be installed immediately preceding the regulator. (AO 80-1, am AO 82-5).

23.25.1214(a)(2) Appliance connectors.

Delete paragraph (a)(2) and substitute the following:

(a)(2) No part of such connector shall be concealed within or extended through any wall, floor, partition, furnace jacket or boiler jacket. (AO 80-1, am AO 82-5).

23.25.1220 Medium pressure gas piping systems.

Add the following paragraphs:

(i) Medium pressure (2-lb.) systems. The use of type L semi-rigid 3/8-inch O.D. copper tubing shall be permitted but limited to 2-lb. underground fuel gas systems designed to convey fuel gas from a meter set assembly to a mobile home.

(j) (1) All joints in the underground portions of medium pressure systems utilizing rigid pipe shall be welded.

(2) All joints in special medium (2-lb.) pressure copper systems shall be of the flared type and shall use the short cast flare nut. No underground joints shall be permitted unless the underground length of run exceeds 60 feet. All pipe to tubing transitions shall be made above ground. (AO 80-1, am AO 82-5).

23.25.1307(d) Louvers and grilles.

Amend paragraph (d) by deleting 1/4" mesh and adding 1/2" mesh. (AO 82-5).

23.25.1326 Check valves.

Amend Chapter 13 by adding Section 1326 to read as follows:

Check valves shall not be installed on any domestic water heater installation on the cold water supply branch, unless approved by the administrative authority. (GAAB 22.20.010-1326, am AO 78-105, AO 80-1, AO 82-5).

23.25.App. C Minimum plumbing facilities.

Amend Appendix C, Minimum Plumbing Facilities, by deleting the sections pertaining to theaters, auditoriums; dormitories; office or public buildings; manufacturing, warehouses, workshops, loft buildings, foundries and similar establishments; restaurants; and dwelling or apartment houses and adding the following sections:

APPENDIX C
MINIMUM PLUMBING FACILITIES[1, 12]

Type of building or occupancy[2]	Water closets		Urinals[8]	Lavatories[10]	Bathtubs or showers	Drinking Fountains[3]
	Males	Females	Fixtures/Males	Fixtures/Persons	Fixtures/Persons	Persons
Theaters, auditoriums, other places of public assembly	1 - 1-200 2 -201-400 3 -401-600 1 for each additional 500 males and 1 for each additional 300 females	1 - 1-100 2 -101-200 3 -201-400 1 for each addi- 500 additional	1 - 1-200 2 -201-400 3 -401-600 1 for each additional 300 males	1 - 1-200 2 -201-400 3 -401-750 1 for each additional 500 persons	- - -	1 - 1-100 2 -101-500 1 for each additional 1,000
Food service establishments, taverns, cocktail bars, restaurants[11]	1 - 1- 60 1 for each additional 60	1 - 1- 30 1 for each additional 30	1 - 1- 30 2 - 31- 90 1 for each additional 60	1 per 60 females 1 per 60 males	- - -	- - -
	Fixtures	Employees				
Office buildings stores, and similar establishments[9]	1 2 3 4 5 6 1 for each additional 50	1 - 15 16 - 35 36 - 55 56 - 80 81 - 100 101 - 150	***	1 - 1- 15 2 - 16- 35 3 - 36- 55 4 - 56- 80 5 - 81-100 6 -101-150 1 for each additional 50	- - -	1 per 75
Manufacturing, warehouses, workshops, loft buildings, foundries and similar establishments[5, 9]	1 2 3 4 5 1 for each additional 30	1 - 9 10 - 24 25 - 49 50 - 74 75 - 100		Up to 100 1 per 10 Over 100 1 per 15[6, 7]	1 shower for each 15 persons exposed to excessive heat or to skin contamination with poisonous, infectious or irritating materials	1 per 75
Dwelling or apartment houses[4]	1 for each dwelling unit		- - -	1 for each dwelling unit	1 for each dwelling unit	- - -

AO 83-9

*** Whenever urinals are provided, one water closet less than the number specified may be provided for each urinal installed, except the number of water closets in such cases shall not be reduced to less than two-thirds of the minimum specified.

1. The figures shown are based upon one fixture being the minimum required for the number of persons indicated or any fraction thereof. In applying this schedule of facilities, consideration shall be given to the accessibility of the fixtures. Conformity purely on a numerical basis may not result in an installation suited to the need of the individual establishment. For example, schools should be provided with toilet facilities on each floor having classrooms. The director of public health may approve variances from this schedule when its literal application is impracticable.

2. Minimum plumbing facilities for buildings or occupancies not shown in this table shall be as required by the building official. Facilities for the physically handicapped shall be as required by ANSI 117.1, 1980 and 1982 Uniform Building Code, as amended.

3. Drinking fountains shall not be installed in toilet rooms or on janitor services sinks or within 12 inches of any sink faucet.

4. Kitchen sinks - one for each dwelling unit.

5 As required by the American Standard Safety Code for Industrial Sanitation in Manufacturing Establishments (ASA Z4.1--1942).

6. Where there is exposure to skin contamination with poisonous, infectious or irritating materials, provide one lavatory for each five persons.

7. Twenty-four lineal inches of wash sink or 18 inches of a circular basin, when provided with water outlets for such space, shall be considered equivalent to one lavatory.

8. (a) Floor-type urinals: Floor-type trough urinals are prohibited.

   (b) Wall-type trough urinals shall be acid-resistant and each such urinal shall be not less than 6 inches deep and shall be furnished with one-piece backs and have strainers with outlets at least 1-1/2 inches in diameter.

The washdown pipe shall be perforated so as to flush with an even curtain of water against the back of the urinal. Urinal tanks shall have a flushing capacity of not less than 1-1/2 gallons of water for each 2 feet of urinal length.

(c) Equivalent length--Trough urinals shall be figured on the basis of one urinal for each 18 inches of length, provided that:

Length of urinal.....	24"	36"	48"	60"	72"
Equivalent number of urinals.....	1	2	2	3	4

(d) Surround materials--Wall and floor space to a point 1 foot in front of urinal lip and 4 feet above the floor, and at least 1 foot to each side of the urinal shall be lined with non-absorbent material.

9. (a) Toilet facilities shall be provided in separate rooms for each sex if there are more than four persons of mixed sex employed.

(b) Hand-washing basins supplied with hot and cold water shall be provided in commercial food-handling establishments for the use of employees convenient to their work area. The basin shall be equipped with an approved hot and cold water mixing faucet.

(c) Service sinks used for mopping and other similar cleaning operations shall be provided in food markets, taverns and restaurants. Office building occupancies having 10,000 or more square feet of area per floor shall have at least one service sink on each floor of the building. Office occupancy buildings having over 2,000 square feet per floor but less than 10,000 square feet per floor shall have at least one service sink on every third floor, provided such sink is available for use to the floor directly below and the floor directly above.

10. All places where hand-washing facilities are required shall have hot and cold water. Such fixtures shall be provided with approved mixing valves.

11. Includes only those food service establishments serving food or drink for consumption on the premises.

12. Table 33-A of the Uniform Building Code should not be applied in determining occupants for Appendix C. A realistic actual population count, subject to the approval of the building official, should be used. (AO 80-1, am AO 82-5).

23.25.App.D.1(a) Rainwater systems.

Amend Appendix D, Part A, D1.0, Materials, paragraph (a) by deleting paragraph (a) and substituting as follows:

(a) Drainage piping shall be cast iron, galvanized steel, galvanized wrought iron, lead, copper, brass, ABS, PVC, or other approved materials having a smooth and uniform bore.

23.25.App.D.1(c) Rainwater systems.

Amend Appendix D, Part A, D1.0, Materials, paragraph (c) by deleting paragraph (c) and substituting as follows:

(c) Rainwater piping located underground within a building shall be of service weight cast iron soil pipe, type DVW copper tube, or other approved materials. (AO 80-1, am AO 82-5).

Section 2. That Section 23.05.010(C) of the Anchorage Code is hereby amended to read as follows:

C. Uniform Plumbing Code, 1982 [1979] Edition (including the appendices thereto);

Section 3. This ordinance shall take effect immediately upon passage by the Anchorage Municipal Assembly.

PASSED AND APPROVED by the Anchorage Municipal Assembly this 8th day of February, 1983.

Chairman

ATTEST:

Municipal Clerk

Allied TUBE & CONDUIT CORPORATION
16100 South Lathrop
Harvey, Illinois 60426
(312) 339-1610
NEWS

POLYVINYL CHLORIDE FUMES CAUSE LONG-TERM HEALTH PROBLEMS FOR FIRE SURVIVORS, STUDY SHOWS

Long-term health effects of exposure to polyvinyl chloride fumes from electrical fires can include permanent damage to lungs, heart, vocal cords and other organs, a study of fire survivors discloses in the November, 1981 issue of Journal of Combustion Toxicology.

The study covers survivors of the 1977 fire that claimed 161 lives in the Beverly Hills Supper Club near Cincinnati and the 1975 New York Telephone Company fire, in which 239 fireman required medical attention for toxic gas inhalation. The fires are described as two of the largest polyvinyl chloride electrical fires in the 1970's.

Deborah N. Wallace, president, Public Interest Scientific Consulting Service, reports in the study that four Beverly Hills Supper Club survivors died of severe respiratory impairments several weeks to several months after the fire. Autopsies also revealed kidney damage in three of the four victims, Dr. Wallace reports.

In-depth interviews of eight other survivors showed a consistent picture... of severe damage to both upper and lower respiratory tract and secondary subsequent infections," Dr. Wallace notes. "Long-term diminuation of respiratory disease resistance, headaches, sleep problems, and inability to work constitute present secondary impacts of the respiratory damage....Several interviewees

experienced one or more of the following: irregular heart beat, skin problems, and visual perception impairment. Psychological effects included frequent nightmares, memory lapses, and heavy guilt characteristic of survivor syndrome."

A survey of 113 of the firefighters treated at the scene of the New York Telephone Company blaze covered the first sign of aftereffect injury and symptoms before later medical attention. "By far, the most frequent first symptoms were sore throat, irritated eyes ('burning'), dizziness, aching nostrils, and confusion. Other moderately frequent first symptoms included nausea, chest pains, chest congestion, and headache."

Nearly two-thirds of the firemen complained of persistent or permanent effects, Dr. Wallace reports. "Many men complained of being hoarse from the time of the fire to the present," she adds. "This condition became progressively worse in two men who...were found to have vocal cord lesions...The high prevalence of hoarseness indicates that the vocal cords of many of the men should be watched for growths."

Polyvinyl chloride (PVC) fumes were clearly identified in the Wallace study as the primary cause of death and injury in the two fires. She points out that in the Beverly Hills Supper Club fire, "A total of 161 people died that night without any direct involvement with the flames and long before the carbon monoxide had reached a concentration which affected the rescuers, most of whom wore no respiratory masks, and before any wood was burning in or near the...room."

During the New York Telephone Company fire, "...firefighters were collapsing or running out to the medical vans," Dr. Wallace reports. "Some men in the building depleted their airpacks and had to breathe the undiluted hot, acidic smoke. Some of the men on the outside also suffered from airpack depletion and breathed the dense downwash of smoke from the building."

Both fires have been traced to electrical origin. An estimated "minimum of 4,000 and a maximum of 8,000 feet of Romex-jacketed cabling containing several PVC-insulated wires in the plenum of the Cabaret Room alone..." where most of the Beverly Hills Supper Club fatalities occurred. "Although the fire was discovered in the Zebra Room about 8:40-8:45 pm, it had been building in the wall undiscovered for about one-two hours. By this time, the process of thermal decomposition which is the initial stage of a polyvinyl chloride fire had already spread through the wiring to the Cabaret Room."

The New York Telephone Company fire began in the main Manhattan switching center cables entering the basement vault. The 490 cables there were clad either in polyethylene plastic or lead sheathing. "The fire remained confined to these apparently, for some time because the heat had to reach about 600° C to ignite the PVC cables leading from the vault to the upper floors," Dr. Wallace recounts. "By the time the alarm was turned on, much thermal decomposition had occurred and the PVC cables were burning.

"The initial fire was extinguished only about 3¼ hours after the alarm was sounded. However, the gases from the decomposition of the PVC cables

accumulated in the vault and burst into flames on contacting the hot wires. The second fire spread rapidly along the cables to the upper floor, and all the burning cables were of the type with each individual wire coated in PVC .... According to the New York fire department and NYS Public Service Commision inventories of what burned and was available to burn, PVC cable insulation and jacketing constituted over 80% of the fuel....No other cable insulation or jacketing was used in the building itself, and only very small quantities of wood were present on the distribution frames."

The combination of PVC electrical insulation and its ready access to combustion-supporting air thus appear to have magnified the intensity of the two fires. The Beverly Hills Supper Club wiring used reinforced plastic-jacketed wires individually insulated in PVC, and the New York Telephone Company building contained large amounts of PVC-clad wire in open distribution channels. Neither installation had the protection of metal conduit capable of both resisting high heat and blocking access of combustion air that supported the fires.

The Journal of Combustion Toxicology article notes that "by the early-to-mid 1970's, PVC had become a common electric wire insulation and cable jacket because if its electrical properties flexibility, and high ignition temperature (600° C). Combustion toxicological research of the late 1960's-early 1970's had, however, uncovered a problem with PVC and several other halogenated plastics, namely that the combustion products were extremely toxic compared to those of most natural materials.

"Further research on PVC in the early-to-mid 1970's revealed a special pattern of thermal decomposition, characterized by evolution of anhydrous hydrogen chloride and traces of benzene and toluene from the surface of the plastic at temperatures as low as 100° C. When temperatures reach 250-300° C, the reaction accelerates to the point that significant quantities of HCl are generated. Long before actual ignition temperatures are reached, long before the presence of visible fire, and long before quantities of carbon monoxide become significant, both gaseous and soot-absorbed HCl are generated in high concentrations."

The article also notes that the pattern of decomposition of PVC into HCl varies with a number of factors, including "configuration of many wires vs few; and whether the wire is in metal conduit, PVC conduit, or no conduit."

Dr. Wallace also points out that in addition to combining with water in tissue of the upper respiratory tract (to form hydrochloric acid), "another effect of PVC decomposition products is that they impair perception and behavior. The smoke is extremely dense and drastically reduces visibility, and its irritation of the eyes, skin, respiratory tract, and possibly nervous system provokes disoriented movement, blind groping and incapacitation. The potential for escape from PVC decomposition products is low compared to that of the initial stages of a fire with natural products as fuel."

She urges that "because the decreased potential for escape appears to have contributed to increasing the number of people subjected to relatively lengthy exposure to high concentrations of PVC decomposition and combustion products,

monitoring survivors of wire insulation fires for long-term health effects would be an important contribution to both the field of combustion toxicology and to the body of data on which fire safety decisions are based."

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STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF Consumer Affairs

(916) 445-4465

1020 N STREET, SACRAMENTO, CALIFORNIA 95814

December 20, 1984

Mr. Thomas Higham
Executive Director
International Association
of Plumbing and Mechanical
Officials
5032 Alhambra Avenue
Los Angeles, CA 90032

Dear Mr. Higham:

As you know, this department actively participated in litigation concerning IAPMO last year. While our formal role in that matter has ceased, we remain abreast of current developments and are involved, in conjunction with HCD, in the ongoing environmental impact report.

I recently learned that IAPMO voluntarily has elected to include the notice concerning the use of plastic pipe in your upcoming edition of the Uniform Plumbing Code. It is also my understanding that the language to be used is identical to that which appeared in the last publication.

I applaud your decision. This action on the part of IAPMO carries forward the spirit of the trial court decision and allows all interested parties to focus their attention upon other critical problems.

While I trust that the information which I have received is correct, please don't hesitate to contact me if I have misstated your decision.

Sincerely,

Marie Shibuya-Snell

MARIE SHIBUYA-SNELL
Director

cc: Shirley Chilton
Secretary
State & Consumer
Services Agency

bcc: Mitch Wilk
Julie Nauman (HCD)
Tom Cecil

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIA
5032 ALHAMBRA AVENUE, LOS ANGELES, CALIFORNIA 90032-3400 • (213) 223-1471

January 14, 1985

Marie Shibuya-Snell, Director
Department of Consumer Affairs
1020 N Street
Sacramento, CA 95814

Dear Ms. Shibuya-Snell:

cc: Frankel

This is in response to your letter of December 20, 1984, regarding the insertion of the notice on the status of plastic pipe in California in the 1985 edition of the Uniform Plumbing Code.

At its recently held meeting, the IAPMO Board of Directors determined that IAPMO will voluntarily continue to insert the notice in copies of the Uniform Plumbing Code sold in California. The wording of the notice will be substantially the same as at present. We are, however, contemplating deleting the portion in parenthesis which refers to the "pending litigation". Since the litigation is no longer pending, there is no reason to continue to refer to it.

Very shortly I will be forwarding a copy of the proofs of the 1985 edition of the Uniform Plumbing Code to John Worsley so the Building Standards Commission can proceed with its adoption in a timely fashion.

Thank you for your letter and your interest. I hope we can continue to work closely together for the mutual benefit of the citizens of California.

Cordially,

Tom Higham

TOM HIGHAM
EXECUTIVE DIRECTOR

INTERNATIONAL ASSOCIATION OF
PLUMBING AND MECHANICAL OFFICIALS

TH:jg

cc: Jack McKenna

JAN 16 1985

9

LEGISLATIVE ACTIVITIES OF INTEREST REGARDING ELECTRICAL NON-METALLIC TUBING AND OTHER PLASTIC CONSTRUCTION MATERIALS

CONFERENCE OF INSURANCE LEGISLATORS

The Conference of Insurance Legislators is an organization of influential state legislators whose legislative duties include or have included state insurance codes. As an organization, COIL and a number of its members have been very active in fire safety. On November 1, 1981, the Resolutions Committee of COIL and members of the Missouri Legislature held a public hearing aimed at finding legislative responses to the fires at MGM Grand and Stouffers' Inn, among other tragedies. As a result of that public hearing, COIL adopted Resolution No. 6. Of particular interest to this Committee is the following finding by COIL:

> "Whereas, there are several avenues which state legislatures can take to marshall the power of state and local governments to bring about greater safety in hotels and other facilities of public accommodation, such as the enactment of laws which:
> --improve structural and fire safety codes to include among others, recently obtained data on toxicology . . ." (emphasis added)

To further refine that finding of fact and its ultimate resolution, COIL created a Task Force on Hotel Fire and Structural Safety. That Task Force is chaired by the Honorable Charles Butts, Senator of the State of Ohio. Senator Butts addressed the Symposium on Combustion Toxicology recently held at the NFPA's Annual Meeting. During his address, Senator Butts said:

"One of the things that I think is important to say and why I am grateful for the opportunity to speak to you is that when you have the fire storms in the media as we have had with the hotel fires particularly, but some of the other things; supper clubs and others, that there will be legislative reactions good or bad, and we will enact laws. We will enact into the statutes, code changes!"

Sen. Charles Butts,
NFPA Symposium on Toxicity
May 17, 1982

Senator Butts' observations were not only prophetic in terms of future legislation but he was relating some of the reactions that law makers and public officials across the country have already had when the issue of fire-gas toxicity and codes, such as the electrical code came before them.

STATE OF NEW MEXICO

In late July, 1981, the Electrical Bureau Chief of the Construction Industries Division of the Commerce and Industry Department of the State of New Mexico added Article 331 to the 1979 National Electrical Code under which the state was then operating. Upon learning of the development, Allied brought the facts regarding the potential hazards of PVC in a fire situation to the attention of the Construction Industries Committee, a group appointed by the Governor to oversee the adoption of codes throughout the State of New Mexico. Although the state's approval of proposed Article 331 was quickly withdrawn by the Electrical Bureau, the Committee, on the basis of the evidence presented by both Allied and the proponents of combustible, toxic electrical conduit decided there was sufficient evidence to warrant holding a full evidentiary hearing on the use of toxic building

materials. The Construction Industries Division held that hearing, which was chaired by Richard W. Lisle, Director of the Division on April 15, 1982. The purpose of the hearing was to gather information on the various kinds of plastic materials used in New Mexico.

The New Mexico statute, under which all minimum codes are adopted for the entire state, requires that the Division begin with model codes such as the National Electrical Code and amend those only so as to increase the standards. Prompted by the abortive attempt to gain approval for proposed Article 331, and by the facts regarding fire-gas toxicity, the state is now considering the question of whether PVC, along with other synthetics commonly used in construction materials, ought to be prohibited from use in the state.

Richard W. Lisle has now released a report recommending cutbacks on the use of synthetic building materials. His report cited growing evidence of injuries and often lethal effects of synthetic products when they decompose in a fire. New Mexico is the first state to study the issue and recommend that PVC conduit no longer be permitted in high-rise buildings or non-fire-rated high density occupancy structures.

CITY OF CHICAGO

The City of Chicago is one of the largest cities which does not authorize the use of combustible, toxic electrical wiring methods or water, drain, waste or vent systems in any of its codes. In October, 1981, the Major of Chicago proposed wide-sweeping revisions to the City's electrical, plumbing and building codes so as to promote the rehabilitation of existing but dilapidated housing in Chicago. There were several extensive hearings before the Committee on Buildings and Zoning of the City Council of the City

of Chicago. At those hearings, both the opponents and the proponents of combustible, toxic building materials had a full opportunity to present their view of the facts to the Committee. The result of those hearings was that, while extensive changes were made to Chicago's codes, the Committee and later the full City Council, voted to retain the City's ban on the use of plastic wiring and plumbing methods. The Chairman of the Building and Zoning Committee, Alderman Edward R. Vrdolyak, was quoted as saying:

> "There are too many questions the experts can't answer. I certainly am not a chemist or a toxicologist . . . but there are safety questions. We're going to take a good look until most, if not all, of the evidence is in."
>
> Chicago Tribune
> February 27, 1982

STATE OF NEW YORK

Chicago is not the only major city to protect its citizens from the unrestricted loading of its buildings with combustible, toxic materials. New York City has, for many years, prohibited the use of building materials which, in a fire, produce smoke more toxic or denser than that produced by wood. The City of New York has been requiring toxicity testing of building materials using several commercial testing laboratories for several years.

Until the unfortunate tragedy of the Stouffers' Inn fire, however, the State of New York did not have a uniform, state-wide code. Following that fire, the Governor of New York appointed a special fire safety Task Force chaired by the Honorable Basil A. Paterson, Secretary of State of New York. A key conclusion of that Task Force report, which was issued to the Governor of New York on February 19, 1981, was:

"Most fire deaths are caused by smoke inhalation with an apparent increase of involvement of petrochemical based and other synthetic materials."

Special Fire Safety Task Force Report, p. 3

The Task Force recommended that a Uniform Fire Prevention and Building Code to take effect on January 1, 1984, be adopted. That Act, which provides for mandatory and uniform state-wide construction and material requirements for public and private buildings, based on performance standards, was passed in 1981. To facilitate the work of the Council which is required to formulate this state-wide code, State Senator Dunne and Assemblyman Branca introduced legislation in March, 1982. This legislation contains very important legislative findings. It says:

"The legislature hereby finds that there is a growing concern regarding injuries and deaths related to the toxic behavior of certain building and furnishing materials when exposed to fire or high temperatures. The legislature further finds that model test methods exist for rating the toxicity of combustion products, but that no adequate program exists to improve upon and integrate such tests into the state uniform fire prevention and building code established pursuant to article eighteen of the executive law."

On May 6, 1982, the Fire Safety Subcommittee of the Senate Finance Committee held a public hearing to consider toxicity and fire safety. Several of the statements made during the course of that hearing are particularly important to note:

"Neither building codes nor fire regulations seem to have taken much account of the dangerous aspects of plastics. Such codes and

regulations are inadequate. Many buildings were made to withstand fire rather than smoke, but some flame retardants minimize burning and maximize smoke. Those codes and regulations, based on heat generated by fires, may not be sufficient for smoldering plastic."

Hon. Basil A. Paterson, p. 12
Secretary of State of New York

"We think it (N.Y. Senate Bill S8988, Attachment 3,) is a milestone piece of legislation, something that should be done on a national level. I don't foresee it at a national level, so I feel fortunate to live in the State of New York where we are assured that we will have some further study done in the area of toxic materials and the effects that it not only has on firefighters but the effects it's having on civilians.

We know it's killing people. We know it is coming from gases. If this study will help prevent some of these materials from being used in the buildings in the state, then it's a major step forward. Particularly, as I cited before, plastic pipes and plumbing should be outlawed, some of the other plastic materials that are being used in building construction."

Mr. Robert Gollnick, President
New York State Professional
Firefighters Association, p. 51

"From my experience, many thermoplastics, such as styrofoam, polyethylene, polyvinyl chloride, to name a few, used as building materials make the difficult job of firefighting more difficult. They, by virtue of their high fuel values, their ability to generate toxic thick smoke, and their thermoplastic melt-flow nature at fire

ground temperatures too often deprive firefighting forces from reaching their objective to seat the fire."

Officer Scott Kirchhofer,
Ladder Company No. 40
New York City Fire Department
p. 106

"Polyvinyl Chloride (PVC), polychlorinated biphenyl (PCB) are only a few of the compounds that can produce immediate or delayed injuries or death when involved in fire. State and federal legislation is needed to control the composition of materials used in furnishings and building construction so that the public may be properly safeguarded in the case of fire."

Chief Joseph C. Hess,
Chief of Fire Prevention
New York City Fire Department
p. 218

This testimony and the clear and cogent testimony of toxicologists experienced in fire-gas toxicity such as Dr. Merritt Birky formerly of the National Bureau of Standards, Center for Fire Research and now of the Foundation for Fire Safety and Dr. Yves C. Alarie, Chairman, Department of Respiratory Physiology and Toxicology, Graduate School of Public Health, University of Pittsburgh that it was feasible to rate the toxicity of materials resulted in Senate Bill 8988 being unanimously passed in the New York State Senate. On July 3, 1982, despite enormous budgetary pressures, this legislation was passed 140 to 1 by the New York State Assembly and was signed by the Governor on July 20.

At the same time as the New York legislature was considering this landmark toxicity legislation, a dispute arose regarding PVC electrical conduit installed in the New York City subway system. As in the other

instances where the facts on fire-gas toxicity were brought to the attention of responsible lawmakers charged with the duty to protect the safety of their constituency, there was quick governmental action. The New York Subway Authority discontinued the use of PVC electrical conduit based upon their concerns about the toxic hydrogen chloride gases emitted by the PVC electrical conduit in a fire. The controversy did not end, however, with discontinuance of the use of such material. On June 2, 1982, Carol Bellamy, President of the New York City Council called for the removal of all of the PVC tubing in use in the New York subway system. Answering the standard assertion that combustible, toxic PVC conduit presents no imminent hazard, Ms. Bellamy was quoted as saying:

> "The system-wide use of PVC tubing indoors poses a clear and present danger to millions of subway passengers and transit workers, as well as to firefighters responsible for controlling fires in the system. Our first concern must be safety. Using PVC tubing is perilous economy."(emphasis added)
>
> Journal of Commerce Daily
> June 2, 1982

Finally, on June 25, 1982, the New York City Council appropriated $2,000,000 to remove PVC electrical conduit from the subway system.

TULSA, OKLAHOMA

The recent action of the Board of Commissioners of the City of Tulsa is another example of the overwhelming response of lawmakers to the facts on fire-gas toxicity. In Tulsa's case, when asked to permit the use of flexible non-metallic conduit, the Mayor and Board of Commissioners referred the matter to the Fire Marshal. His conclusion was to reject the material and said, "The danger of PVC, particularly under fire conditions,

are well known because of the hazardous, death-dealing products of combustion."

STATE OF CALIFORNIA

The Supreme Court of California recently enjoined the publication in California of a model plumbing code which would have expanded the use of plastic pipe in California. The Court decided that unless the public was adequately informed about the health hazards of such pipe, that that model code could not be sold in California until a complete environmental impact report, currently about to begin, was completed. How that report would deal with the problem and solution to the problem of combustible, toxic building materials was not clear enough for members of the California Assembly. As a result, on June 29, 1982, Assemblywoman Maxine Waters, a member of the majority leadership, introduced Assembly Concurrent Resolution No. 146 which would direct the development of a standard toxicity test method by the state and require the environmental impact report to include the toxicity of all building materials included in the electrical, plumbing, structural, or any other building code of the state.

On August 31, 1982, the legislature of the state of California passed the resolution with amendments requiring the establishment of tests to determine the fire-gas toxicity and combustibility of materials used in buildings. The measure calls for the Department of Industrial Relations and the State Fire Marshal to review combustion toxicology test methods and to "adopt or adapt the most appropriate existing test method to rate the relative toxicity of all materials intended for use in or as part of high-density occupancy buildings."

####

(b) In case of complaints by a contractor, builder or installer charging arbitrary actions or incompetence on the part of an inspector, the commissioner, after reviewing written presentation of the dispute, may require reinspection by a new inspector who has no connection with either disputant. (§ 1 ch 15 SLA 1972)

Sec. 18.60.730. Penalty for violations. A person who violates a provision of the code, and who, after receiving the notification required by AS 18.60.725, refuses to correct the violation, after proof of the violation, is subject to a fine of not more than $1,000. (§ 1 ch 15 SLA 1972)

Sec. 18.60.735. Borough or city regulation. AS 18.60.705 — 18.60.740 do not affect the authority of any municipality to prescribe by ordinance, rule or order, standards for their respective areas of jurisdiction no less stringent than those established under AS 18.60.705. This chapter is not intended to duplicate or preempt code administration or enforcement by municipalities. Any organized municipality or unorganized village having less than 2,500 population is exempt from the provisions of this Act. (§ 1 ch 15 SLA 1972)

Sec. 18.60.740. Definitions. In AS 18.60.705 — 18.60.740

(1) "code" means the Uniform Plumbing Code, 1979 edition, adopted at the 49th Annual Conference, September 1978, International Association of Plumbing and Mechanical Officials;

(2) "commissioner" means the commissioner of labor;

(3) "department" means the Department of Labor;

(4) "inspector" means a qualified inspector employed by, designated by, or under contract to the Department of Labor. (§ 1 ch 15 SLA 1972; am § 3 ch 88 SLA 1980)

Effect of amendments. — The 1980 amendment, in paragraph (1), substituted "1979" for "1970" preceding "edition" near the beginning of the paragraph, substituted "49th" for "40th" preceding "Annual Conference" near the middle of the paragraph, and substituted "1978" for "1969" following "September" near the middle of the paragraph.

Article 9. Safety Glazing.

Section	Section
750. Labeling required	770. Local ordinances
755. Safety glazing materials required	775. Applicability
760. Employees not covered	780. Definitions
765. Penalty	

established under this chapter only for inspections requested by the owner of a structure.

(e) The department shall maintain a record of all plumbing inspections performed by it and of all inspection fees and permit fees collected by it. (§ 1 ch 15 SLA 1972; am § 2 ch 88 SLA 1980)

Effect of amendments. — The 1980 amendment added subsections (d) and (e).

Sec. 18.60.720. Cost of permits. (a) If the department by regulation requires permits for plumbing work, fees may not exceed the following:

(1) for issuing each permit	$2.00
(2) a permit for each	
(A) plumbing fixture or trap or set of fixtures on one trap, including water, drainage piping and backflow protection	1.50
(B) building sewer or trailer park sewer	5.00
(C) drain in rainwater system	2.00
(D) cesspool	5.00
(E) private sewage disposal system	10.00
(F) water heater and/or vent	1.50
(G) gas piping system of one to five outlets	1.50
(H) gas piping system of six or more outlets, per outlet	.30
(I) industrial waste pretreatment interceptor, including its trap and vent, but excluding kitchen type grease interceptors functioning as fixture traps	1.00
(J) installation, alteration or repair of water piping or water treating equipment	1.50
(K) repair or alteration of drainage or vent piping	1.50
(L) lawn sprinkler system or any one meter which includes backflow protection devices	2.00
(3) for vacuum breakers or backflow protective devices on tanks, vats, or for installation on unprotected plumbing fixtures including necessary water piping	
(A) one to five	2.00
(B) over five, each	.30

(b) The department shall keep a record of all fees collected and all inspections performed. (§ 1 ch 15 SLA 1972)

Sec. 18.60.725. Enforcement of compliance. (a) A department inspector shall give written notice to the owner of a constructed premise or the contractor of a premise under construction of each violation of the code. The notice of violation shall accurately describe the violation and give specific reference to the section and paragraph of the code. In addition, the notice shall prescribe the necessary changes so that the work will comply with the code.

Collateral references. 13 Am. Jur. 2d, Buildings, § 29.

39A C.J.S., Health and Environment, §§ 28-32.

Sec. 18.60.705. Plumbing code. The Department of Labor shall adopt, as the official minimum plumbing code for the state, the Uniform Plumbing Code, 1979 edition, adopted at the 49th Annual Conference, September, 1978, International Association of Plumbing and Mechanical Officials, chs. 1 — 13 and appendices, but excluding Part I, Administration, pages 1a — 6a, and subject to AS 18.60.710 — 18.60.740. (§ 1 ch 15 SLA 1972; am § 1 ch 88 SLA 1980)

Effect of amendments. — The 1980 amendment substituted "1979" for "1970" preceding "addition" near the middle of the section, substituted "49th" for "40th" preceding "Annual Conference" near the middle of the section, substituted "1978" for "1969" following "September" near the middle of the section, deleted "Part II and" preceding "chs. 1 — 13" near the middle of the section, and substituted "1a — 6a" for "1a — 7a" near the end of the section.

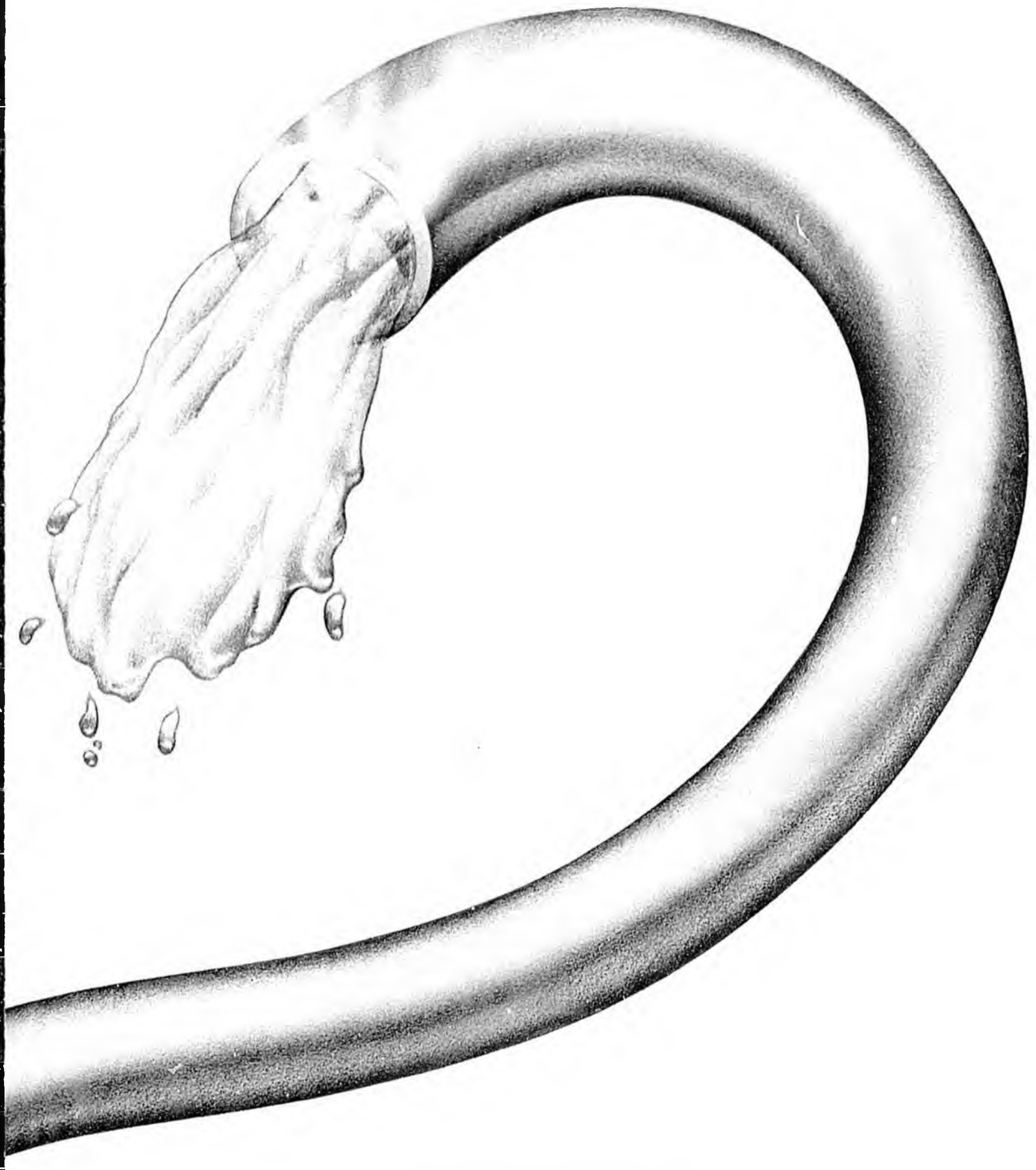
Sec. 18.60.710. Duties of the department. The department is responsible for the administration of the code. The department may promulgate regulations designed for maximum practical implementation of the code, and may grant exceptions from specific code provisions, where distance or other factors make implementation impractical. Specific consideration shall be given to outlying villages and sparsely populated areas to ensure that AS 18.60.705 — 18.60.740 will not impose an undue financial burden. The department may by regulation designate appropriate inspection to a public or private utility company. A company so designated may refuse utility connections if an installation does not meet the requirements of this code. (§ 1 ch 15 SLA 1972)

Sec. 18.60.715. Administration. (a) The code applies to all new construction, all new work in relocated buildings and to any alteration, repairs or reconstruction of buildings except as provided otherwise under AS 18.60.705 — 18.60.740.

(b) The department may inspect work installed, removed, altered, or replaced on any plumbing, gas or drainage piping, plumbing fixture, water heater or water treating equipment in a building or other location. No permit or inspection is required for the following work: the stopping of leaks in drains, soil, waste or vent pipes, the clearing of stoppages in or repairing of leaks in pipe valves or fixtures, repairs or alterations not of a substantive nature which can be reasonably exempted from inspection.

(c) Nothing in AS 18.60.705 — 18.60.740 prohibits a person from performing plumbing work on his own property.

(d) The department may adopt regulations establishing fees for inspections conducted under AS 18.60.705 — 18.60.740. Fees may be



HOT AND COLD WATER
PLUMBING PIPE

The Toughest Pipe at the Lowest Cost.

Pipe made with Duraflex* polybutylene resin from Shell Chemical Company is the toughest *and* the most economical plumbing you can buy.

When you match polybutylene pipe against copper, galvanized, CPVC or any other plumbing material used for hot and cold water service, you'll see there's no comparison. You won't find a better pipe for homes, townhouses and apartment buildings at any price.

Polybutylene pipe is tough — tougher than any other plumbing pipe. It resists corrosion, rust, scale and freezing. It can be used for water systems with pressures up to 200 psi at 73°F (cold water pipe) and up to 100 psi at 180°F (hot water pipe).



And polybutylene pipe is less expensive than other types of plumbing pipe. Material costs will be significantly less than copper. In addition, its price is more stable than the cost of copper, allowing contractors to bid jobs more accurately. Polybutylene pipe is less expensive than CPVC and also saves on installation time.

Flexibility Simplifies Installation.

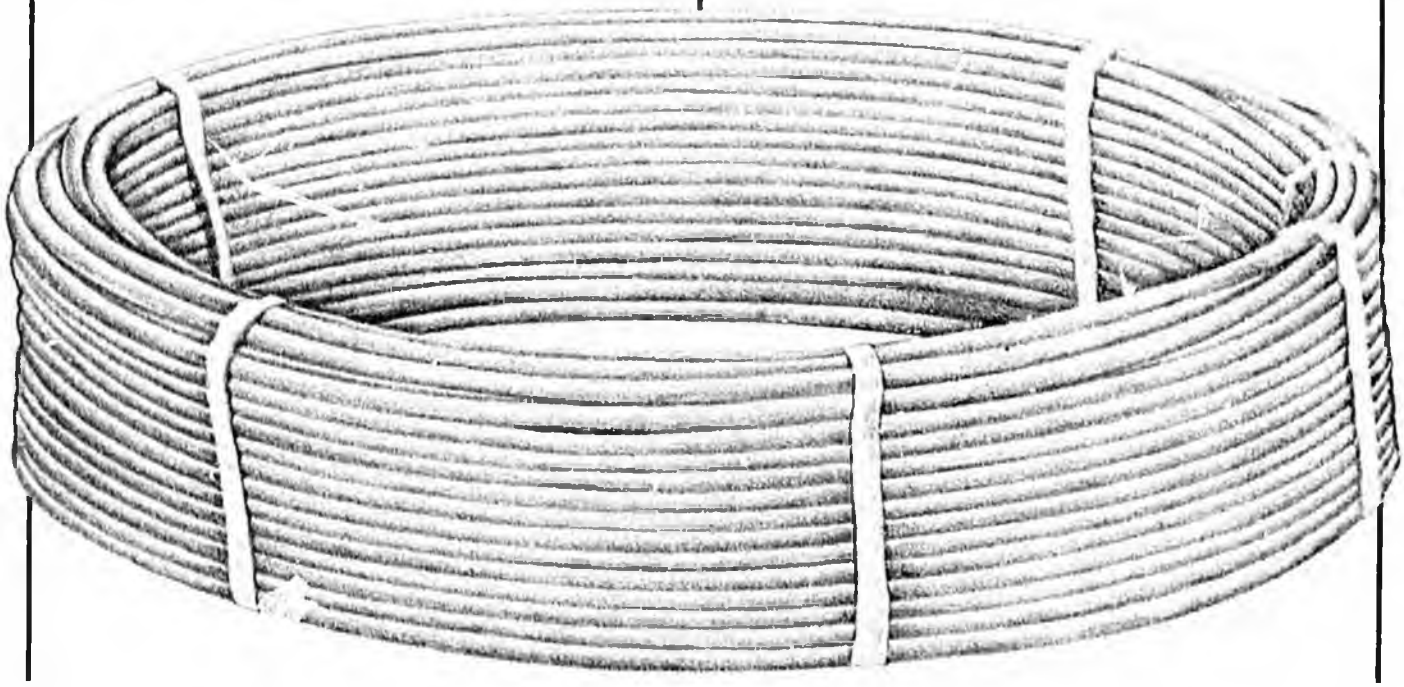
Polybutylene pipe is lightweight and flexible, which means it's easy to install.

Because it weighs about one-ninth as much as copper, polybutylene pipe can be handled by one person. It bends easily, so elbows aren't needed every time you turn a corner. You can pull it through wall studs in tight spaces, simplifying retrofit jobs. You also can curve it to meet fixtures, reducing the number of costly and time-consuming fittings required.



Polybutylene pipe offers other savings. You have less waste with polybutylene pipe compared to other plumbing because it comes in coils up to 1,000 feet in length. You can cut the amount you need and save the rest. It also is available in straight lengths for areas where aesthetics are important.

**Duraflex™ is a trademark of Shell Chemical Company for its polybutylene resins. Shell Chemical does not manufacture pipe.*



A Choice of Fitting Methods.

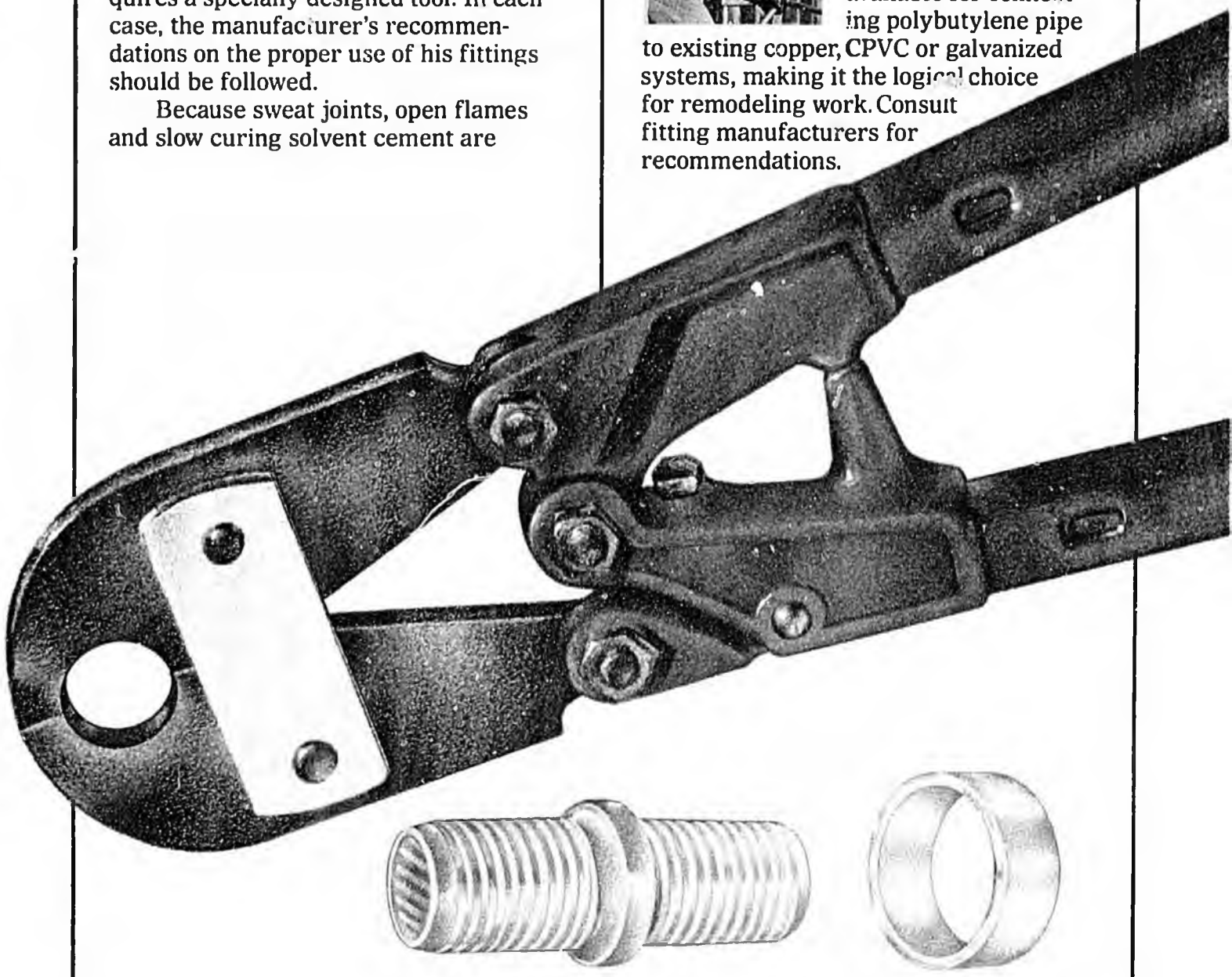
Polybutylene pipe can be joined using one of three common methods. (Shell does not endorse or recommend any joining method. They are listed merely for completeness of information.)

A tubing cutter and a wrench are required if you use *compression fittings*. Low-cost tools are readily available for *crimp-type fittings*. And heat fusion that uses polybutylene *pipe and fittings* requires a specially designed tool. In each case, the manufacturer's recommendations on the proper use of his fittings should be followed.

Because sweat joints, open flames and slow curing solvent cement are eliminated, the safety of your operation is improved. You don't have to wait for joints to cure before making pressure checks. Water can be turned on when the last pipe connection is completed. Pressure check at 200 psi to expose any possible bad joints.



Adapters are available for connecting polybutylene pipe to existing copper, CPVC or galvanized systems, making it the logical choice for remodeling work. Consult fitting manufacturers for recommendations.





Freeze Tolerance Can Protect Homes. Plumbing systems should always be designed to avoid freezing. However, homes, townhouses and apartments with polybutylene plumbing pipe have an extra degree of protection against damage that might occur when pipes burst during freezing weather.

When water freezes, it expands, causing ordinary copper plumbing to crack and eventually burst. But polybutylene pipe can expand to accommodate frozen water and then regains its original shape after the water thaws, providing a greater margin of safety than any other plumbing material.

Polybutylene pipe won't split or crack under subfreezing conditions. However, when short lengths of polybutylene pipe are connected to rigid fittings or pipe, the pipe may not be able to expand sufficiently to protect the whole system. In such cases, it is essential to protect against freezing.

Corrosion, Rust and Scale Resistant. Pipe made with Duraflex polybutylene resin offers added protection because it won't corrode, rust or rot. Duraflex resin is inert, so it resists the corrosive elements in water that can eventually eat holes in metallic pipe.

Polybutylene pipe also is totally unaffected by acid soil conditions or electrolysis. And it resists scale buildup from hard water that can block other plumbing systems.







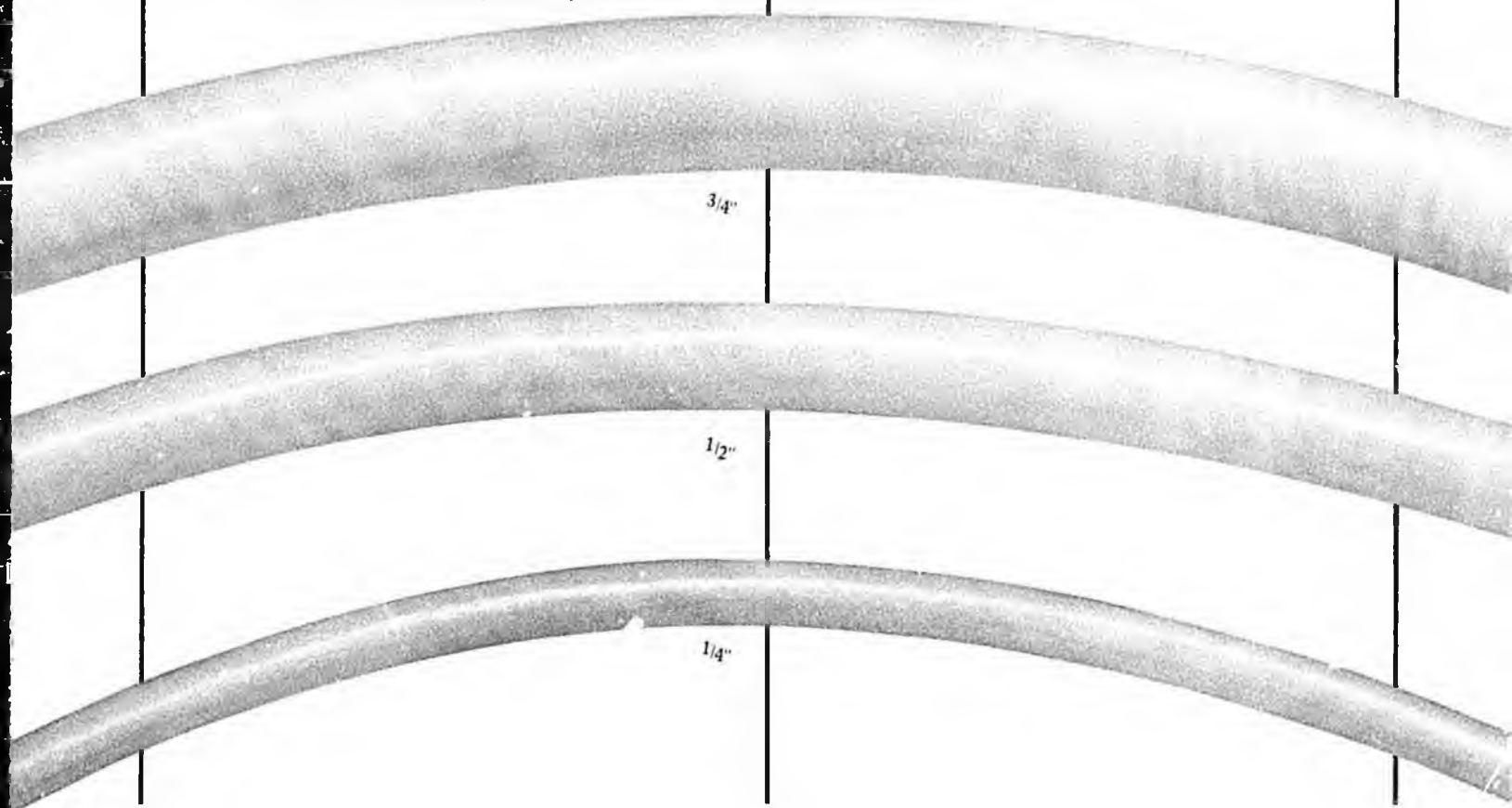


The Seal of Approval.

Plumbing pipe for hot water service made with polybutylene resin meets the following codes, standards and regulations:

- National Sanitation Foundation (NSF)
- Plastics Pipe Institute (PPI)
- National Standard Plumbing Code (NSPC)
- Southern Building Code Congress (SBCC)
- Building Officials and Code Administrators (BOCA)
- International Congress of Building Officials (ICBO)
- International Association of Plumbing and Mechanical Officials (IAPMO)
- Federal Housing Administration (FHA) UM-68
- HUD Mobile Home Construction and Safety Standard
- Canadian Standards Association (CSA)
- Manufactured Housing Institute (MHI)
- American Society for Testing and Materials (ASTM)
- American National Standards Institute (ANSI) A119,2/NFPA 501.C
- Most State and Local Codes.

Polybutylene pipe for both hot and cold water service is available from manufacturers in sizes ranging from ¼ inch to 4 inches in diameter.



TECHNICAL DATA

Applications

Since it was first commercially produced in 1967, polybutylene pipe has been used for a large variety of hot and cold water applications, including:

Plumbing and Heating

- Domestic Hot Water Supply
- Hydronic Heating
- Slab Radiant Heating
- Solar Heating and Cooling
- Commercial Hot Water
- Fire Sprinkler Piping
- District Heating
- Snow Melting
- Agricultural Soil Heating

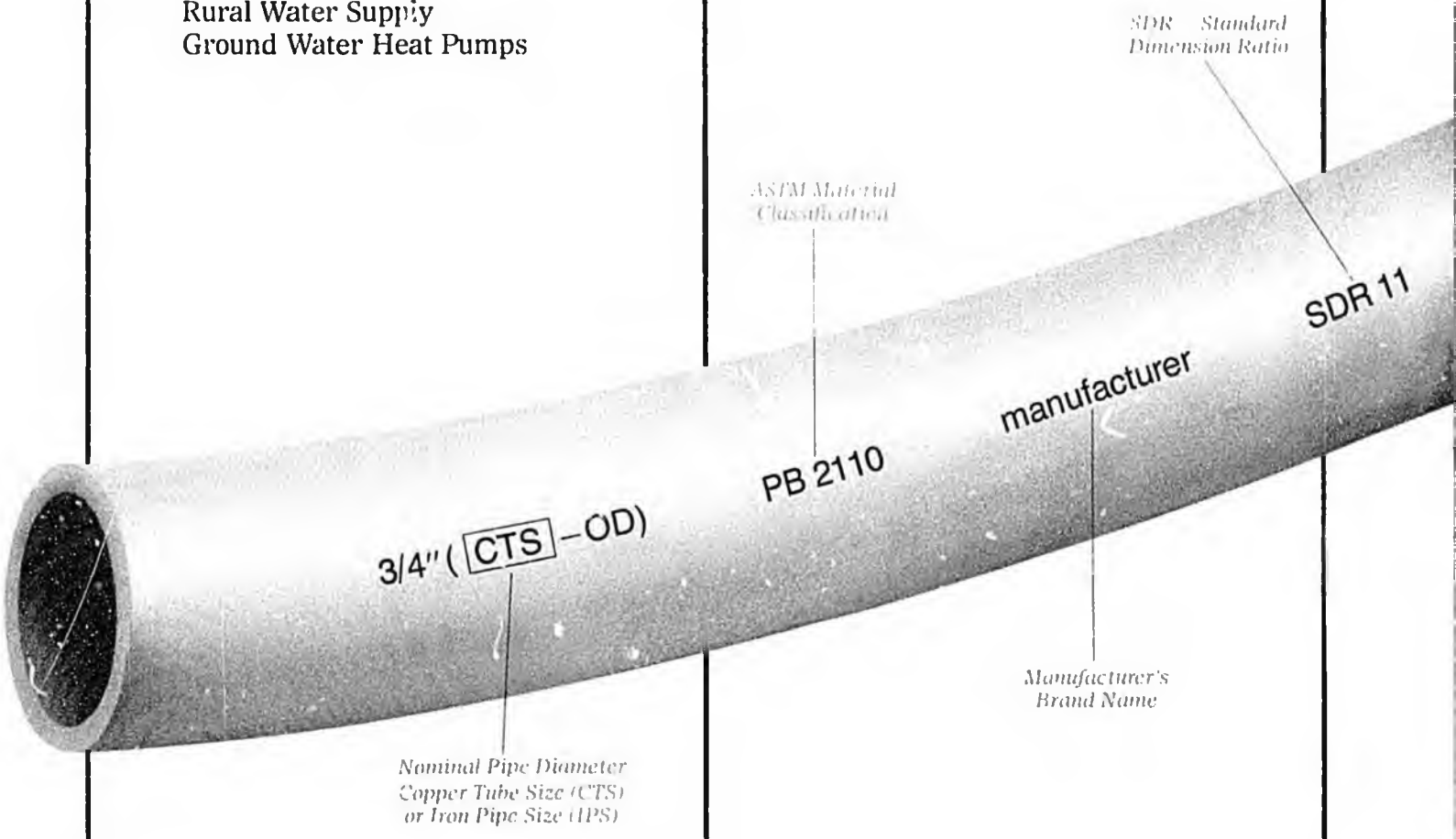
Water Supply

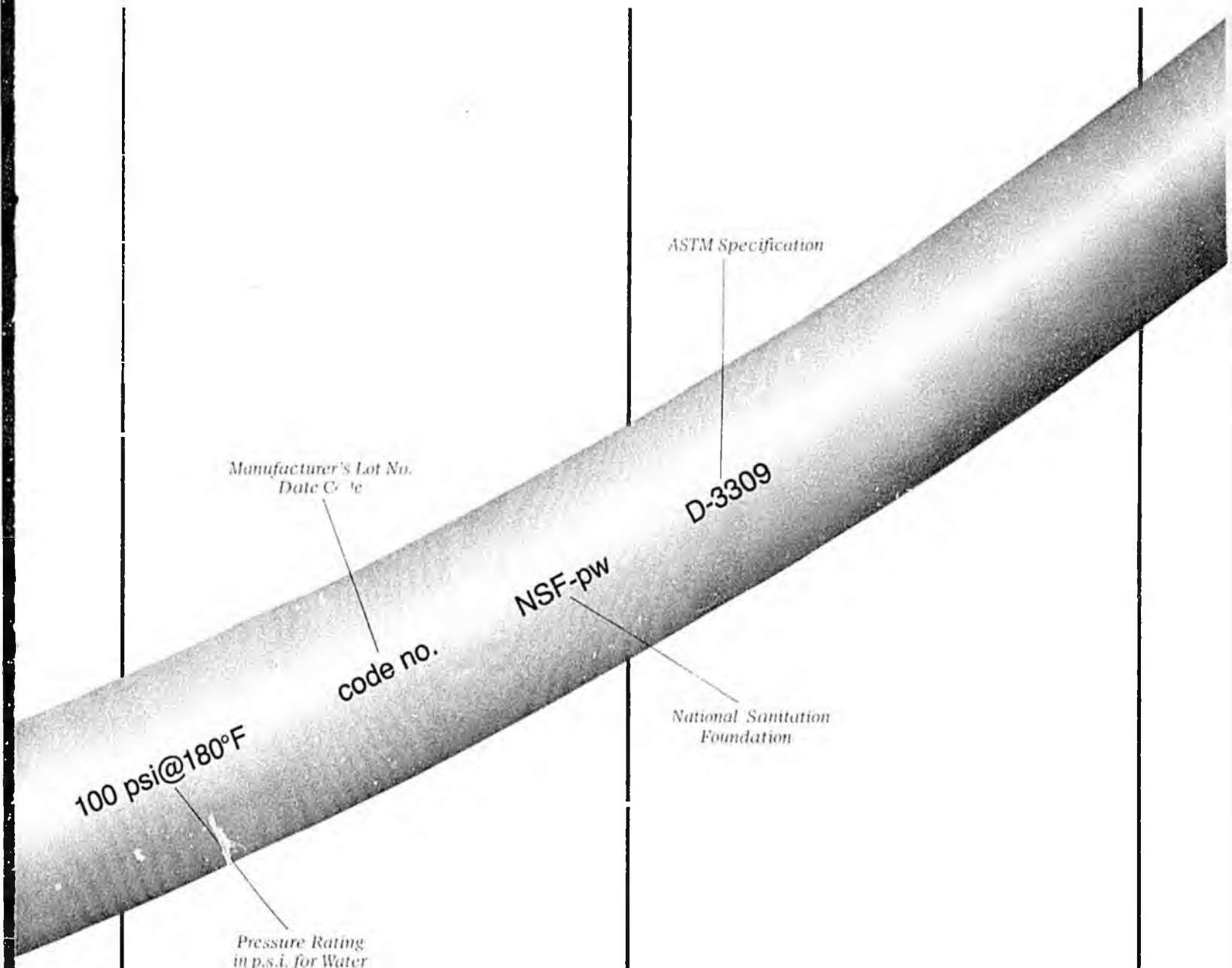
- Municipal Water Service Systems
- Yard Piping
- Deep Well Submersible Pumps
- Drip Irrigation
- Ditch Irrigation
- Rural Water Supply
- Ground Water Heat Pumps

Pipe Indentification

The following identifications are usually found at 3-ft intervals on every piece of polybutylene tubing:

1. Pipe size
2. Material designation
3. Manufacturer's name
4. Dimensional data
5. Pressure rating
6. Manufacturer's code
7. Code recognition
8. Appropriate standard to which pipe has been manufactured.




ASTM Specification
Manufacturer's Lot No.
Date Code
D-3309
code no.
NSF-pw
National Sanitation Foundation
100 psi@180°F
Pressure Rating in p.s.i. for Water

Pipe Storage

Thermoplastic materials such as Duraflex polybutylene resin are susceptible to ultraviolet attack as a result of continued outdoor exposure. The amount of ultraviolet damage will depend on the material, formulation, exposure time, geographic latitude, climate conditions, etc. Black grades of Duraflex polybutylene resin (4101 and 4121) are formulated for continuous exposure and can be stored outside. The other grades (4103, blue; 4127, and 4137, gray; 4128, beige; and 4129, brown) are not formulated for continuous outdoor exposure and should be stored under cover. Outdoor exposure of these grades should be limited to reasonable construction and installation periods.

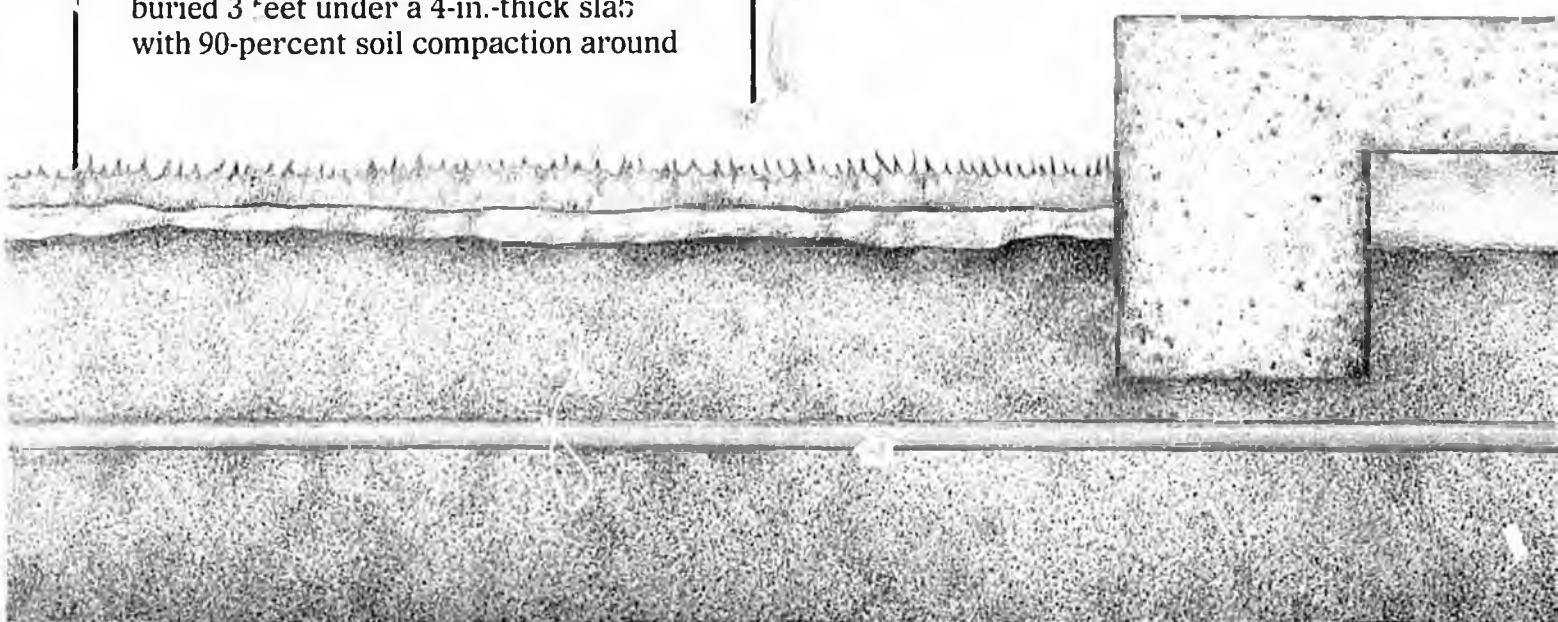
Buried Pipe

Running polybutylene pipe under a slab does not significantly affect its properties.

Polybutylene pipe buried under a slab is compressed by earth and slab loadings. The amount of compression depends on the temperature of the water in the pipe, the compaction of soil around the pipe, and the weight of both soil and slab bearing down on the pipe.

Under typical conditions (pipe buried 3 feet under a 4-in.-thick slab with 90-percent soil compaction around the pipe), the pipe is compressed by 1 percent at room temperature and 2 percent at 180°F. Both of these values are well within the design limit of 5-percent deflection. Because of its chemical resistance, Duraflex resin is inert to any chemical interaction with concrete and thus can be used safely within and through a slab. In addition, because it is immune to electrolysis it also can be placed in contact with supporting steel mesh. As a matter of good installation practice, fittings should never be used in or under a slab.

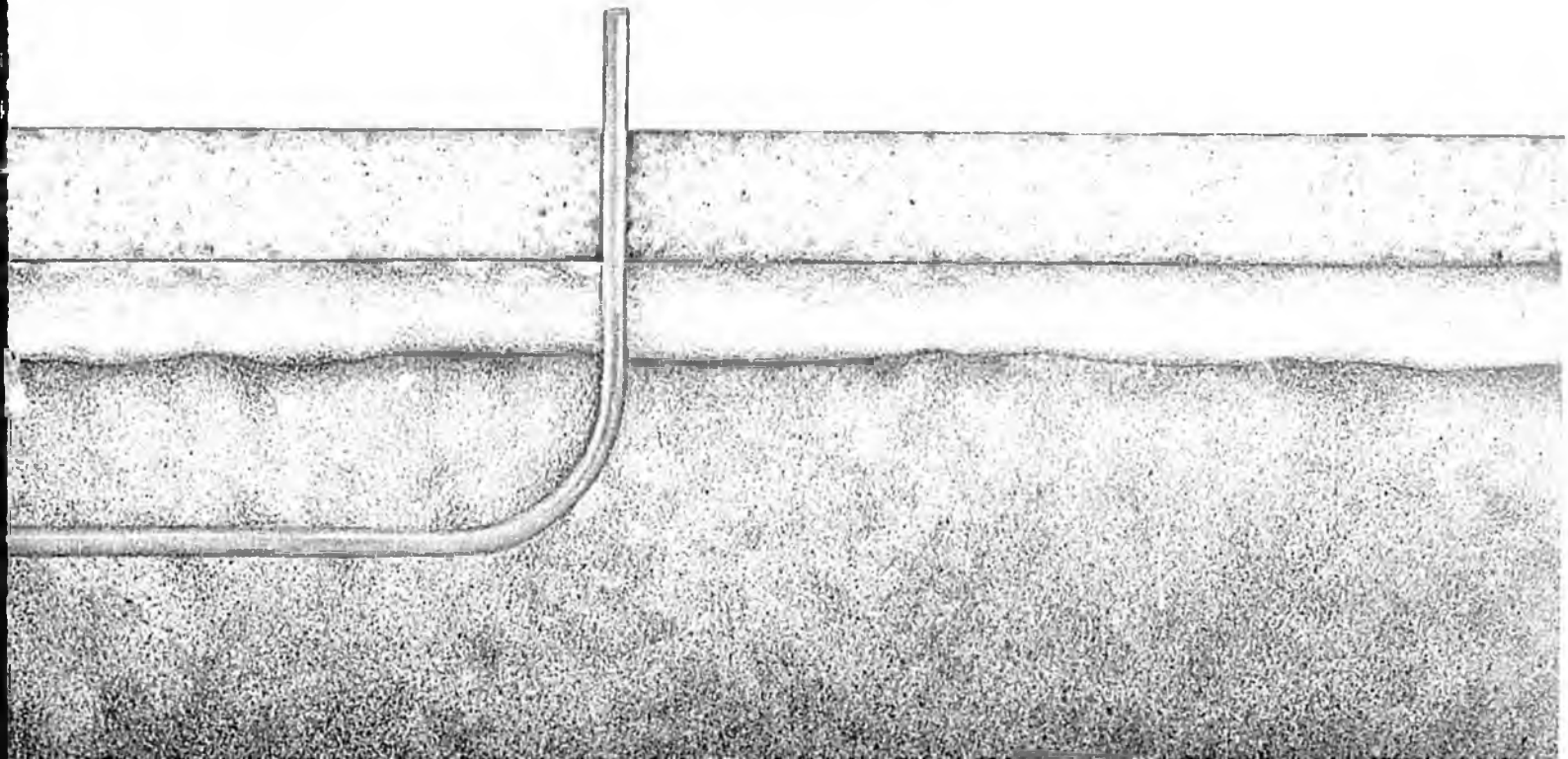
Underground use of polybutylene pipe in areas of known soil contamination or where there is high risk for potential chemical spills is not recommended. Polybutylene pipe should not be used under the slab or come in contact with soil in areas which are known to be contaminated by, for example, organic solvents or petroleum distillates. It should also not come in contact with soil near hazardous waste disposal sites or underground chemical or petroleum storage tanks. Overhead use in such circumstances is a safe alternative.



Freeze-Thaw Resistance

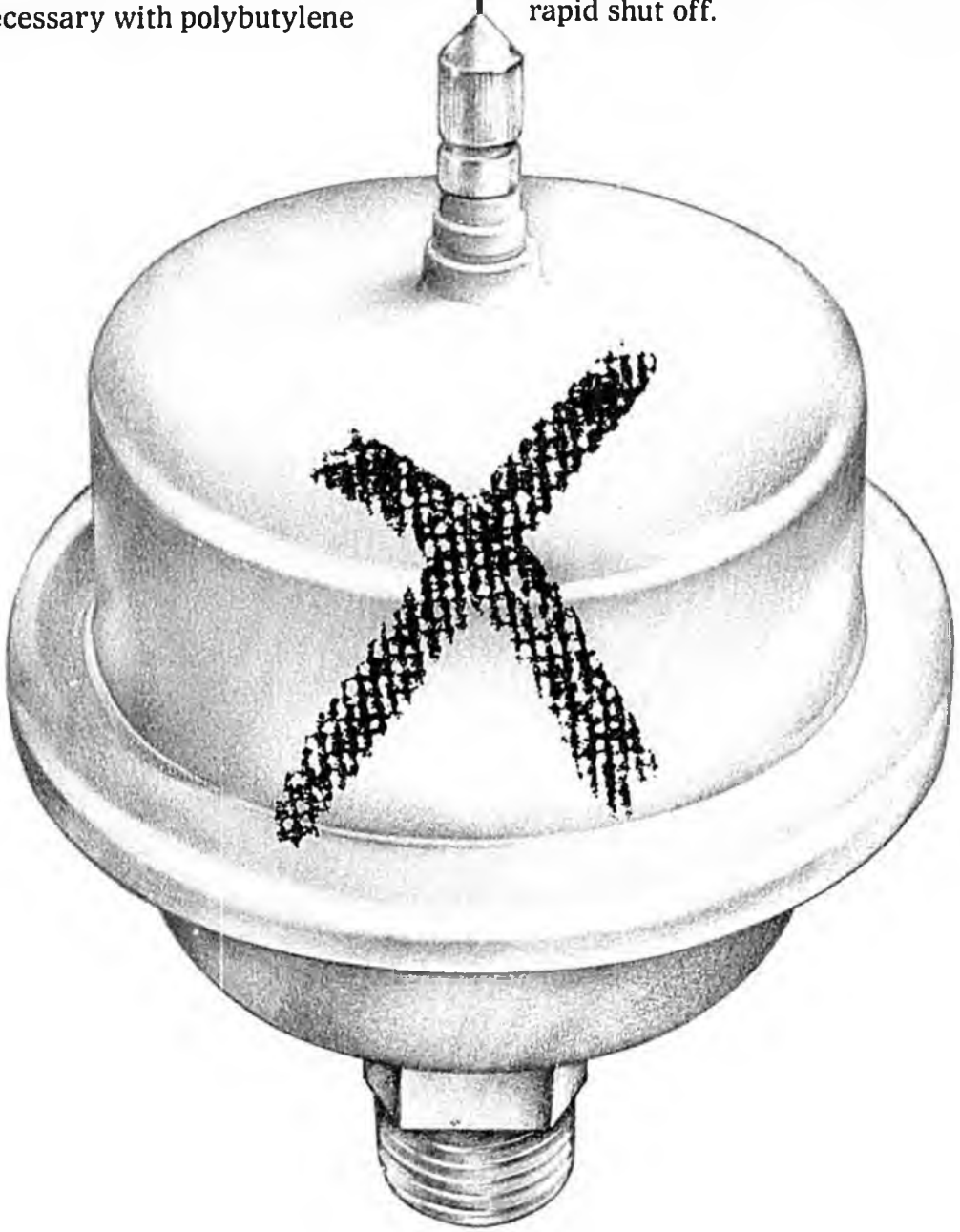
Properly extruded polybutylene pipe has sufficient elasticity and ductility to withstand the expansion of frozen water. To demonstrate this, three samples of ¾-in. CTS Duraflex pipe were frozen overnight and thawed daily for a six-day period. After six days, all of the samples were still intact and quick-burst tests showed no apparent loss of strength. Although polybutylene pipe cannot survive an infinite number of freeze-thaw cycles, it provides a far greater margin of safety against freeze breakage than any other plumbing pipe material. Even with polybutylene, good plumbing practices dictate that all plumbing systems should be protected against freezing.

Control Not Subject to Freeze-Thaw Cycle	Frozen Under 50 PSI Internal Pressure	Frozen Under 100 PSI Internal Pressure
Burst Pressure (psi)	Burst Pressure (psi)	Burst Pressure (psi)
490	485	490
495	480	485
505	490	495
497 *Average*	485 *Average*	490 *Average*



Water Hammer

Because polybutylene pipe is more flexible than either CPVC or copper, it is less affected by water hammer caused by rapid shut off. Water hammer arrestors are unnecessary with polybutylene pipe, although some local code authorities may still require their installation. The chart below shows the calculated pressure surge (psi) for polybutylene, CPVC, copper and galvanized pipe in a rapid shut off.



Velocity (fps)	Pressure Surge (psi) 2	4	8
Polybutylene pipe	14	30	59
CPVC	45	90	180
Copper	106	212	422
Galvanized Iron	110	225	464

Pipe Support

Being flexible, polybutylene pipe must be supported. For ½ and ¾ inch plumbing pipe, support intervals of 32 inches can be used. Longer support intervals can be used with larger pipe. If the pipe is passing through studs, the pipe should be sleeved at the beginning and end of straight runs and at significant changes of direction (plastic sleeves are available for this purpose).

Bending Radius

A minimum bending radius (ratio of the bend radius to the diameter of the pipe) of 10 is recommended. Bending more tightly can lead to kinking. If a kink occurs, it must be cut out of the system and replaced.

Hot Water Heater Considerations

Polybutylene tubing is easily capable of withstanding the malfunction of a water heater. It is made in accordance with ASTM D3309 and is designed to operate continuously at 180°F, 100 psi. This is within the expectations of any normal household plumbing system.

In the event of a hot water heater malfunction, polybutylene pipe may be exposed to a higher temperature and pressure for a short period. (Temperature/pressure relief valves normally are designed to release at 210°F and 150 psi). Tests conducted under the auspices of the National Sanitation Foundation have shown that at 210°F, polybutylene plumbing tubing has average burst values of over 275 psi and can sustain a pressure of 150 psi continuously for over 20 months without failure.

As a general precaution, polybutylene pipe should not be installed within 18 inches of a burner or direct source of heat.

Fire Potential

The smoke hazard from polybutylene plumbing is minimal, and the incremental contribution to a residential fire from polybutylene plumbing is *infinitesimal.*

The average three-bedroom house would require an estimated 15 pounds of polybutylene pipe for its total plumbing service. This same house would also contain *several thousand pounds* of other combustible products such as rugs, furniture, bedding, draperies, etc. In addition, the same house would contain *tens of thousands of pounds* of combustible construction materials such as wooden beams and flooring, shingles, weather stripping, etc.

Duraflex resin is a saturated organic polymer composed of carbon and hydrogen; therefore, with adequate air, it burns slowly and cleanly in a manner similar to a candle. Its combustion products are similar to those derived from burning other organic materials such as paper, cotton and wood, and less onerous than those obtained from burning wool, leather, or other complex materials.

Disclaimer

The information contained in this guide is based on data obtained by Shell research and is considered accurate. However, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. This information is furnished upon the condition that the person receiving it shall make his own tests to determine the suitability thereof for this particular purpose.

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Shell Chemical Company

DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY



Comparison tests confirmed: Installed cost of polybutylene plumbing was 44% less than that of copper.

DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY

Recent quantitative comparison tests have concluded that the total labor and material costs to install a plumbing system with Duraflex™ polybutylene pipe were 44% less than those of copper in virtually identical installations.

The tests were conducted in the Pleasant Valley subdivision located west of Fairfax, Virginia and Washington, D.C., by the National Association of Homebuilders Research Foundation, Inc., an independent research firm. Homes in the subdivision range from modest to luxury offering a variety of handsome energy efficient designs.

For the tests, plumbing installations in two similar, 2½ bath, single family homes were compared. One home had a full basement and was plumbed with copper plumbing using the traditional cut, fit and solder installation method. The other home had a crawl space and was plumbed with Duraflex* polybutylene plumbing pipe, using insert fittings and aluminum crimp ring connections. The houses were plumbed by a plumber who was experienced in copper installation and who had previously installed five plumbing systems using Duraflex polybutylene.

The polybutylene plumbed house had more cramped working conditions in one area and required slightly more pipe than the copper house because the crawl space limited direct routing. This meant a slight advantage for the copper installation. The only other difference in the two houses was the location of the water heater and the water meter.

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Objective and fair testing yields relevant results

The 44% cost savings realized in the polybutylene plumbed house are based on the material and time savings. Total installed material and labor costs for the polybutylene plumbed house were $138 less than the copper installation. It took 7 hours and 39½ minutes to plumb the copper house, but only 5 hours and 55½ minutes to plumb the polybutylene house. Material costs included all indoor supply piping and fittings running from the meter yokes to the fixture connections, but did not include valves.

Armed with a stop watch, a specially ruled recording book, a camera and a pen, Hila Anderson, Senior Industrial Engineer with NAHB Research Foundation, Inc., observed, measured, counted and recorded the work performed, actions made, and materials used by the plumber.

To ensure objective, comparable and applicable results, Anderson used several established sampling and factoring methods common in gathering and compiling this type of research data. These included an averaging of the plumber's efforts and conditions with other plumbers in general. Thus, the results are applicable for an adequately trained plumber to perform the installation with an acceptable amount of personal time and breaks.

NAHB Research Foundation, Rockville, Maryland, a wholly-owned subsidiary of the National Association of Home Builders which operates separately as an autonomous unit, conducted the study. Over 80% of their work is for clients other than the NAHB and its members. Anderson said, "We're interested in anything that helps the building industry, verifying a new product or technique, and telling the industry about it."

Strength and flexibility set Duraflex pipe apart.

The real difference between polybutylene pipe and other plastic pipe is the Duraflex polybutylene resin. Duraflex



Hila Anderson observed and recorded the plumber's actions and materials used.

is a durable, tough plastic. But unlike many other plastics, polybutylene is flexible rather than stiff or brittle. As a result, the pipe made from Duraflex resin can easily withstand household water pressures at elevated temperatures and its flexibility and light weight allow plumbers to curve it around obstacles and bends with fewer connections. Because it is chemically inert, there will be no problems with corrosion, electrolysis, or scale buildup.



Connections and fittings can be made by one of several mechanical methods which are easily learned and performed. Gary Peed, the plumbing contractor for the test houses, said, "The first time I put the pipe (polybutylene) in was slow, but you pick up how to work with it pretty easily. My time is much better now." Each of the installation methods takes advantage of the flexible nature of polybutylene to make quick, strong, and permanent connections. As Gary Peed puts it, "You don't have to solder anything or use any glue. There's less time, energy and equipment involved."

A durable pipe full of advantages.

How does Peed feel about polybutylene pipe in general? "I like it better than copper. It's easier, faster and it's lower in cost. I use it for almost all of my work now."

Other advantages to polybutylene pipe, both builders and plumbers cite: corrosion and scale resistance; self-insulating, thus energy efficient for hot water lines; and if water freezes in it, the pipe won't break.

Those were the reasons Don Crosen, Superintendent for R.J.L. Associates' Pleasant Valley subdivision, selected polybutylene pipe. Crosen has realized the cost savings which the NAHB Research Foundation tests revealed, stating: "We're saving on the average of about $150 to $200 per house." Another big advantage Crosen cited..."is customer satisfaction. That's very important to us. We want our owners to be happy with the house they buy. This polybutylene pipe helps us supply that satisfaction."

Comparison Tests—Results:

Materials	Copper System	Polybutylene System
Pipe	$156.93	$64.84
Solder & Flux	$ 20.73	negligible
Fittings	$ 21.79	$19.12
Suspension Clamps	$ 1.98	$ 4.81
TOTALS	$201.43	$88.77
Labor at $15/hr		
Cut & install pipe & fittings	(176.0 min.) $ 44.00	(146.5 min.) $36.63
Connect pipes & fittings	(162.5 min.) $ 40.62	(88.0 min.) $22.00
Misc.	(51.5 min.) $ 12.88	(53.5 min.) $13.37
Mounting Blocks	(41.5 min.) $ 10.37	(39.5 min.) $ 9.87
Set-up & Layout job	(28.0 min.) $ 7.00	(28.0 min.) $ 7.00
TOTALS	(459.5 minutes) $114.87	(355.5 minutes) $88.87

	Copper System	Polybutylene System
Total Costs Material & Labor for supply piping installation	$316.30	$177.64
Polybutylene Savings		
Time		104.0 minutes less to install than copper
Money (includes labor costs savings)		$138.66

Note: For each $1.00 wage rate differential increase above the $15/hour figure used in the comparison, polybutylene's advantage increases $1.73 in savings.



Test homes' subdivision superintendent, Don Crosen, cited customer satisfaction as a polybutylene pipe advantage.

Polybutylene pipe supplies customer satisfaction.

"One of the biggest complaints in a new house is noise in the plumbing," Crosen continued. "This pipe is quiet, no hammer, no vibration. You don't even hear water running. So polybutylene eliminates that source of complaints, and satisfies our customers."

Another problem solved by polybutylene pipe involves hanging the sheet rock. According to Crosen, occasionally a rigid pipe will get bumped hard enough during sheet rock installation to cause it to break, crack and leak. "Often that leak won't show up until after the construction is completed, or worse... after the owner moves in. That's an expensive repair. But because this polybutylene pipe is so flexible, it doesn't break if it gets bumped or knocked. So once again, customer satisfaction," he said.

Satisfaction for builders, too.

Crosen has found satisfaction with polybutylene pipe in many ways, summing up, "It's less expensive. Better for customers. Easier to install, repair and add extra fixtures to later. It won't corrode and minerals won't adhere to it. We get less call-backs for repairs because of polybutylene pipe. It's another way to please our customers."

Crosen added, "It's good for builders and supervisors, too. Supervisors have to deal with the problems. They're less problems with polybutylene pipe."

Come to Shell for answers

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February, 1983

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DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY



Duraflex polybutylene pipe used for advanced industrial slab heating application.

DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY

Pipe of Duraflex polybutylene resin was the key element in an advanced type of radiant hot water heating system installed in a British Columbia planer mill. The system is designed to provide comfortable temperatures even on extremely cold days.

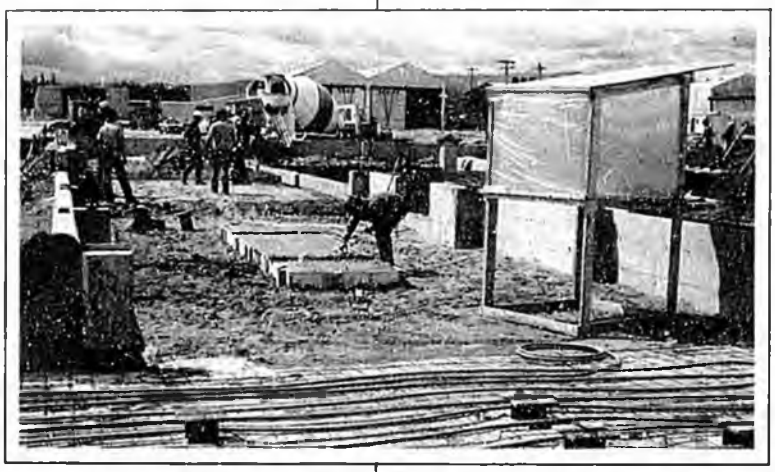


Left to right, Smith, Swaykoski, Crooks

More than 26,000 feet of pipe was used for the system in the new $5-million, 27,000-square-foot planer mill at Finlay Forest Industries in MacKenzie, B.C. The planer mill will produce one-half million board feet daily from the spruce, fir and pine forests that cover the area. The same radiant heating system employed in the Finlay Forest building would work equally as well in equipment maintenance shops, warehouses, churches and other public buildings.

At the Finlay mill, the Duraflex pipe* will be used to circulate a 50-50 mixture of ethylene glycol and water that is heated and pumped through the coils in the slab. An indoor/outdoor thermostat will control the temperature of the 1,320 gallons of liquid in the system. The thermostat offers a one-to-one ratio so that when the outside temperature is at freezing, the circulating fluid is at 100°F. Each time the ambient temperature drops one degree, the three-million BTU gas-fired boiler in the system automatically increases the temperature of the liquid by one degree.

The ethylene glycol/water solution is circulated at a rate of up to 250 gallons per minute by a 7½-hp, 480-v, 3 phase 60-cycle pump. A recovery unit that burns wood shavings will replace the gas-fired boiler later, according to Blain Crooks, development manager for Finlay Forest.



The radiant heating system using pipe made from Duraflex polybutylene was incorporated into the building's design because a conventional forced air system would have aggravated the problem of swirling sawdust in the mill. Consulting engineer George Nixon of Carroll, Hatch & Associates, Ltd. pointed out that the wood dust not only collects on and clogs filters, coils and fan-driven heaters, but also increases the risk of fire due to dust settling on a hot line.

The mechanical contractor for the project was Vic Swaykoski, owner of Doug's Heating (Northern) Ltd. of Prince George. His employees installed the pipe system, which is similar to eight other installations he has supervised in British Columbia saw mills.

"Slab heating and circulating warm-air systems might cost about the same to start with," Swaykoski said, "but six months down the road you'll be having to pay a premium for

*Duraflex™ is a trademark of Shell Chemical Company for its polybutylene resins. Shell Chemical does not manufacture pipe.

maintenance, to say nothing of the nuisance and hazards of circulating fine saw dust if you install a forced air system."

Swaykoski explained that the temperatures frequently reach 40 degrees below zero in MacKenzie, and occasionally drop to minus 60 degrees. "The heating system will go on about the first of October and



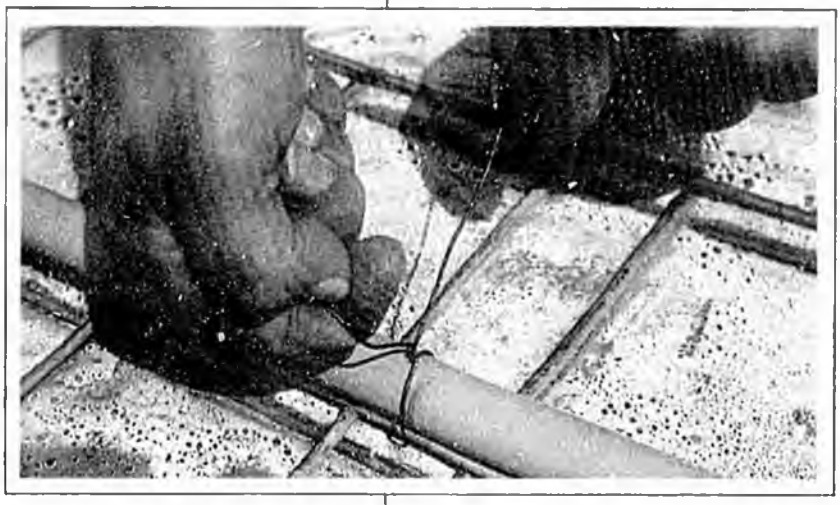
will operate continually until May," he said.

"Pipe made of polybutylene is the tube we use. It's the only plastic tube that will stand the hot water temperatures necessary to bring the floor heat up to at least 50 degrees," he said.



Smith, left, Swaykoski

Ease of pipe installation was cited by Swaykoski as an advantage for radiant heating systems. He said a two-man crew could lay 2,000 feet of the lightweight, flexible pipe in a single shift. He pointed out that the pipe can be curved in tight loops without kinking, thus eliminating the need for elbows and connections in the slab as required with copper or other rigid plastic materials. He added that polybutylene pipe is corrosion resistant and resists scale and sediment buildup inside the pipe, which could arrest the fluid flow. In addition, the pipe costs less than copper and it virtually eliminates hot spots in the floor because it transmits heat at a slower rate than copper.



Engineer Nixon claimed a system using polybutylene pipe could handle water with a temperature of 160°F or higher, but that the safe limit for polyethylene pipe was only 120°F.

Larry Smith, manager of Westburn Industrial Enterprises, who handled the distribution of the pipe to the contractor, said that, in his experience with polyethylene pipe in slab installations, the tubing tended to become brittle with the high temperatures of the antifreeze/water solution. "The heat carrying capability of polybutylene is much better than polyethylene for industrial applications," he explained.

During installation of the Finlay mill system, a concrete base of varying depths was poured first, with the depth depending upon the weight of the operating equipment planned for the area. After stringing the pipe of Duraflex polybutylene from 500-foot coils, installers tied the tubing to reinforcing steel wire mesh with twist ties.

The lines were connected to a series of four-inch manifolds before a second layer of concrete was poured. The mesh was held so that the pipe was two inches to two-and-one-half inches from the top regardless of the overall depth of the concrete. Swaykoski said if colder conditions had warranted it, the pipe could have been strung closer together to provide extra radiant heating through the slab.

Duraflex polybutylene is a resin manufactured by Shell Chemical Company. The one-half-inch and three-quarter-inch pipe used at the Finlay mill meets the requirements of the Canadian Standard Association (B 137.8) as well as most major codes and standards within the United States. The SDR 11 pipe has a 200-psi pressure rating at 73.4°F and a 100-psi rating at 180°F.

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June 1981

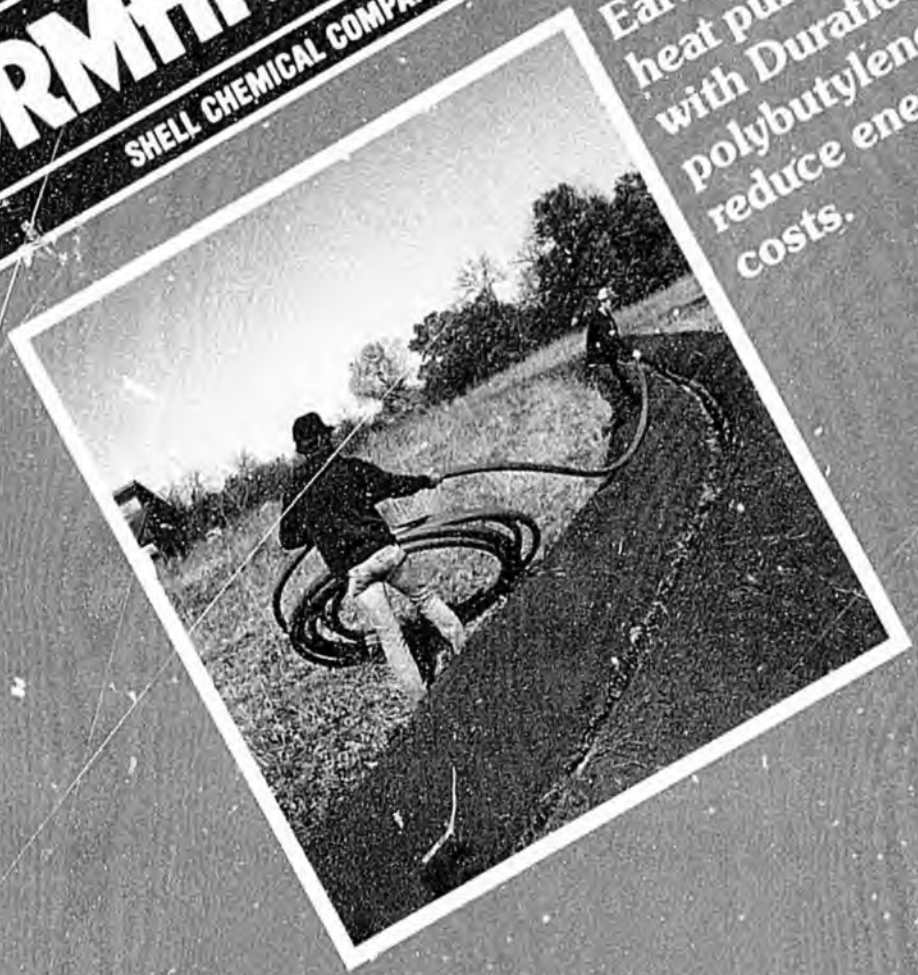
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DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY



Earth-coupled heat pump systems with Duraflex™ polybutylene pipe reduce energy costs.

DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY

A new generation of energy efficient earth-coupled heat pump systems has enabled several hundred Central Oklahoma families to slash their annual electric bills.

These systems extract heat directly from a few feet below the ground for heating or discharge heat into the ground for cooling. Exchanging heat with this milder and more stable natural heat source rather than with outside air enables the heat pump to provide more efficient heating and cooling than is possible with conventional heating systems or air-to-air heat pumps.

Whereas electric resistance heat has a typical coefficient of performance (COP) of only 1 and air-to-air heat pumps have a more efficient rating of 1.7, the earth-coupled systems have a COP of 3 or more. (The COP is the heating/cooling output divided by the energy input.)

The new closed-loop, earth-coupled systems require virtually no water because they recirculate the initial charge of water.

In contrast, the more widely used water source heat pump systems are open systems, using thousands of gallons of fresh well water daily.

There are two types of closed-loop systems. The horizontal type uses pipe buried 4 to 5 feet below ground in a trench. A low-wattage pump circulates water from the heat pump through the earth coil to exchange heat with the earth and then back to the heat pump.

The vertical closed-loop system uses pipe in a well as a vertical heat exchanger. Water is pumped from the heat pump through the pipe to the bottom of the well and back to the heat pump, exchanging heat with the earth. A key component of either system is the earth coil of flexible, lightweight Duraflex* polybutylene pipe.

Rigid PVC plastic pipe had been used in some of the first installations. This pipe, however, was found to be too brittle, cumbersome and expensive. Contractors then switched to flexible plastic pipe.



A long run of 2-inch Duraflex polybutylene square pipe lays flat alongside a trench with virtually no tendency to recoil.

The closed-loop, earth-coupled heat pump systems have been pioneered by Geosystems, Inc., a manufacturer and distributor of geothermal heat pumps and accessories in Stillwater, Oklahoma. Jim Partin and Carl Ledbetter are co-partners. Geosystems has installed thousands of closed loop systems in the United States and Canada for residential and commercial applications ranging from one ton to 60 tons.

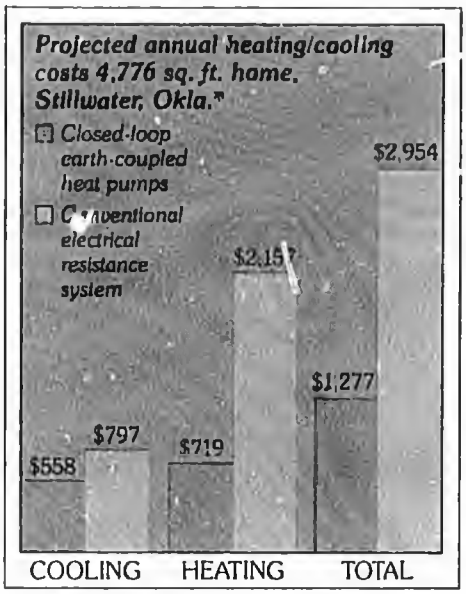
The company recommends polybutylene pipe for all earth couplings on the basis of a combination of cost effectiveness, ease of installation, and long life. Polybutylene pipe can be quickly installed from 500-foot coils, minimizing the number of joints and speeding the installation. Where temperatures warrant, glycol antifreeze or brine solutions also can be circulated through polybutylene pipe with no loss in performance. Duraflex pipe is inert and so resists corrosion, rust and scale build-up. In addition, it has exceptional resistance to environmental stress cracking.



A brass barbed fitting is inserted into the end of a coil of pipe and tightly secured with two stainless steel clamps.

"These systems use less electricity than an air-to-air heat pump and they don't take water from the ground it's a closed system. It needs only that one filling of water," Partin said.

The savings in electric power were confirmed by Bill Blair, Member Services Advisor, Central Rural Electric Cooperative. His records showed dramatic drops in power consumption when existing centrally air conditioned homes were converted to earth-coupled heat pump systems



*Projected by installing contractor, A C Service Co

For example, consumption in one Stillwater home for a July-August period totaled 7,405 KWH with a central air conditioning system. A year after the switch to an earth-coupled heat pump system only 4,438 KWH were required for the same period. Excellent results also have been achieved when such systems are used in conjunction with solar collectors.

Late in 1982, a unique forming process was developed for polybutylene pipe which produced a lighter, "square" configuration which further simplifies installation.

"Shell came up with the idea of a square pipe with its decreased wall thickness which is the first pipe I know of that was specifically developed with the earth-coupled heat pump installer in mind," commented Ledbetter.

According to him, the new configuration "is much easier to install. It's lighter so it's easier to handle and it rolls out evenly in the ditch."

"You can install polybutylene pipe in an earth-coupled system in about as cold a weather as a man can stand to work in. But you can't do that with polyethylene. The colder it gets the harder polyethylene is to work with and the longer it takes to get the job done. Unrolling a coil of polyethylene can be a real problem," he said.

The unique chemical structure of the polybutylene resin makes it possible to post form pipe into a square configuration. This shape not only makes it easier for the installer to lay the pipe in the trench but it also reduces any tendency of the pipe to recoil. Compared to polyethylene pipe, the square polybutylene pipe is at least four times easier to handle. This is due to a combination of its better flexibility as well as thinner wall, i.e. less material is required than with the same outside diameter pipe made of stiffer polyethylene.

The square polybutylene pipe was used initially for a new 4,776 square-foot home in Stillwater. Two men easily fed the coil of pipe from the bed of a truck into the trench despite 15-20 mph winds and temperatures in the low 40s. (See front cover.)

A series of three separate heat pump systems was designed for the house. For each of the three, a trench six inches wide by six feet deep was dug behind the house to accommodate 1,000 feet of pipe. Five hundred feet of pipe were placed in the bottom of each trench and the trench was then back filled with two feet of soil. The remaining 500 feet of the continuous loop of pipe was buried at the 4-foot level.

The coils of square 2-inch pipe were joined by brass barbed insert fittings secured by two stainless steel clamps on each side of the fitting (the excellent flexibility of polybutylene allows it to reround to accommodate the fitting.) The three separate loops were connected to individual 2½-ton Geosystem Heat Pumps to generate 40,000 BTUs per unit for heating and 30,000 BTUs for cooling.

Ledbetter's calculations indicated the house would require 3,700 heating degree days and 1,600 cooling hours of operation a year. The numbers were based on design temperatures of 0°F minimum



The key component of a closed-loop, earth-coupled heat pump system is polybutylene pipe shown here just before being covered in the bottom of a 6-foot trench.

in the winter and a 100°F maximum in the summer with an indoor temperature of 75°F.

To maintain this temperature 58,187 BTUs would be needed for cooling and 103,640 BTUs for heating. With electricity at 6 cents per KWH in 1982, the estimated

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cooling costs would be $797 and the heating costs $2,157 if a conventional electrical resistance system had been installed. Instead, with the earth-coupled heat pumps, the projected costs were only $558 for cooling and $719 for heating — an annual savings of $1,667.

Even before the development of the square polybutylene pipe and its significant contribution to simplified installation, a wide variety of successful earth-coupled heat pump systems using polybutylene pipe had been installed. These systems used both barb insert fittings and socket heat fusion fittings.

In one 1,100 square-foot house in Stillwater, a solar-assisted earth-coupled 2½-ton heat pump system was installed. In this system 288 square feet of unglazed solar collectors were mounted on the roof and coupled to a 250-foot deep geothermal well. The solar collectors and earth coil were filled with propylene glycol solution. The back-up heating system consists of an electric-ignition natural gas furnace. The system has a domestic hot water pre-heater with backup heat for hot water supplied by natural gas. In spite of numerous nighttime temperature readings below zero, the electric bill during one winter month was $40 and the cost for gas was only $12.

At a facility on the campus of Oklahoma State University, a 1,000-foot earth coil was used with a 3-ton heat pump, a 1,000-gallon insulated storage tank and integral solar collectors. On a summer day when the outside temperature was 106°F, the interior temperature was maintained at 72°F while the compressor required only 1.3 kilowatts of power, a fraction of that required with typical air conditioning systems.

Similar systems were used by the Stillwater Housing Authority in a housing project built for senior citizens. About 6,000 feet of polybutylene pipe were used in connecting a series of 250-foot vertical earth-coupled wells.

Before its initial use in closed-loop earth-coupled heat pump systems, the advantages of Duraflex pipe over other plastic and metallic materials already had been well established in cold water service, hot and cold water plumbing, industrial piping, and radiant slab heating. Now with its improved ease of handling in addition to its other advantages discussed above, the pipe has become even better suited for earth-coupled heat pump systems.

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DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY



Georgia water system switches from polyethylene pipe to 250 psi Duraflex polybutylene.

DURAFLEX™ POLYBUTYLENE

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Tough, 250 psi rated water service pipe made from Duraflex™ polybutylene resins is now the only pipe specified by a Georgia county water department for all connections and replacements of existing metallic or 160 psi rated UHMW polyethylene pipe.

Water pressure surges in hilly Gwinnett County contribute to cracks in polyethylene pipe and replacement with copper would be too expensive, explained Dan Pirkle, Distribution Superintendent for the county. The fast growing county, whose terrain rises from river bottoms to a peak elevation of about 1100 feet, is northeast of Atlanta.

The sheer force of gravity combined with the pressure of a new water system proved to be too much strain for the polyethylene pipe which had been installed since the late 1960s.

"Polyethylene started to be a problem four or five years ago. It became brittle, split under the combination of gravity flow and increased pump pressure running on the line. It'd break just like glass," Pirkle said.

He also said crews had to go back into some areas and replace polyethlylene sections as many as three or four times.

Pirkle began switching to Duraflex* pipe in the fall of 1980 and expected to have nearly 40 miles of the tubing in use within the first year.

In the early 1970s, average daily water consumption was about 3 million gallons a day (MGD). The department built a 60-mile loop of 48-inch main around the county and added 6 to 36-inch lines to accommodate the new Lake Lanier Water Treatment Plant which went on stream in 1977.



Two lines for separate homes spiral from double strap saddles.

For the last few years, new water meters were being installed at a rate of 400 a month and the plant and pumping station are now able to handle 45 MGD with a future capability of 240 MGD.

"The water system here was organized in 1959. They put in galvanized and now its 20-year life span is gone. We started using polyethlyene pipe about 1968 or 1969, but the 160 psi pressure is too low," said Pirkle, who has run the department for the last 10 years.

In 1980, Pirkle was presented information on 250 psi, SDR 9 Duraflex pipe that eventually convinced him that the tougher polyolefin material would handle the pressure without failure.



Gwinnett County's rolling terrain influences water pressure.

**Duraflex is a trademark of Shell Chemical Company for its polybutylene resins. Shell Chemical does not manufacture pipe.*

"So far we've put in 100,000 to 150,000 feet and we haven't had a problem yet. The crews claim it's easier to work with than polyethylene, is lighter, not as stiff and doesn't crimp," Pirkle said in the spring of 1981.

There are seven subcontractors who have crews working for the Gwinnett County Water System. They are required to use a double strap service saddle, usually 6" x ¾", on every tie in to the water main.

The materials for the mains range from cast iron to asbestos cement and prestressed concrete. Because 250 psi Duraflex pipe has the same wall thickness as 160 psi polyethylene, standard corporation stops can be used.

Duraflex pipe is bought on a low bid basis in lots of 50,000 feet in 500-foot coils. Out of 200,000 feet contracted for by the spring of 1981, about 15,000 feet is 1-inch pipe for connections in homes with 3 to 4 bathrooms and/or a swimming pool. The rest is ¾" pipe.

In a typical installation, the Duraflex polybutylene tubing is laid in a 3-foot trench from the main to the individual meter. (The frost line can go as deep as two feet in the county.) The pipe's flexibility minimizes the need for elbows and other fittings since the service line can match ground contours or be run around obstacles.

Plastic meter boxes with cast iron lids are set 18-20 inches from the surface. Installations usually are completed rapidly. The superintendent said 96 meters were installed by one 3-man crew in two weeks, including 20 in a single day when the main was on the same side of the street as the houses.

While this was abnormally high, another crew was observed recently to make three installations in about an hour's time. The ¾" lines were then tested at 40 gallons a minute even though a pressure reducing valve will limit the flow through the home meters to a maximum of 30 gpm.



Dan Pirkle stands by a stack of Duraflex pipe coils in the water department's warehouse.

When placement requires installation on the "long side," air and water pressure are used to bore through the red clay beneath the road bed before inserting the pipe. Casing is required only when boring under a state highway.



A fitting is tightened just prior to a pressure test at 40 gpm. Water service lines of Duraflex polybutylene pipe are blue coded for easy visual identification in common trenches.

Pirkle anticipates a heavy demand for all water service related activities for the county during the 1980s. The current capacity of the water treatment plant, pumping station and reservoir enable the county to be a major water wholesaler to surrounding districts. As the current 170,000 county population grows to 300,000 by the end of this decade, this excess capacity will diminish. Already the county is No. 1 in building permits in the 7-county Atlanta metroplex.

Gwinnett County is one of the newest to be added to the list of more than 250 water utility districts and cities putting Duraflex polybutylene pipe to work.

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September 1981

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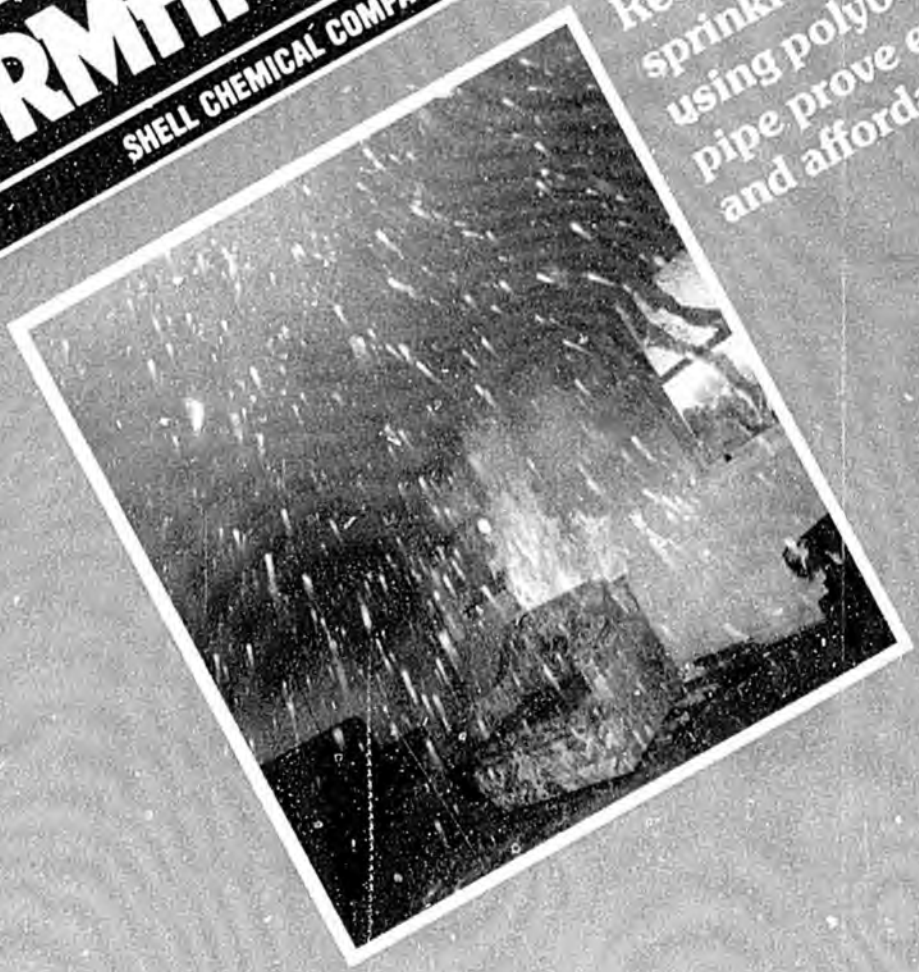
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DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY

Residential fire sprinkler systems using polybutylene pipe prove effective and affordable.



DURAFLEX™ POLYBUTYLENE

PERFORMANCE REPORT

SHELL CHEMICAL COMPANY

A revolutionary new fire sprinkler system combining fast response sprinkler heads and polybutylene pipe has repeatedly demonstrated that a significantly improved level of fire safety is now available at an affordable price.

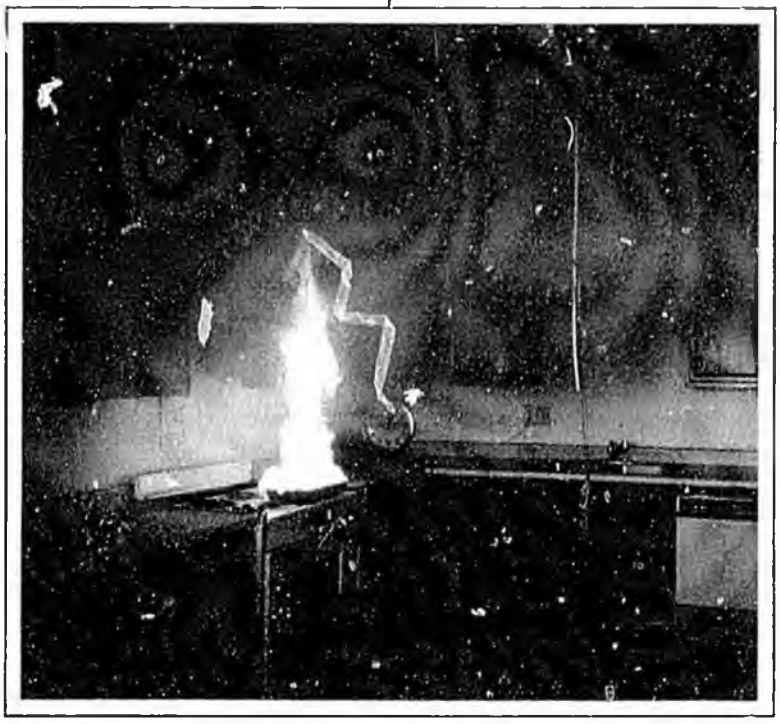
The vast majority of fire deaths in the United States occur in the home. Residential fires injure someone every 12 minutes and kill someone every 80 minutes. In addition, residential fires also cause five billion dollars in property damage annually, the worst record in the industrialized world.

Because of this tragic record, the Federal Emergency Management Agency—U.S. Fire Administration (FEMA-USFA) was empowered in 1974 to increase public awareness of the problem and to develop improved technology to reduce these appalling losses. Working in conjunction with private industry, studies were made which showed that conventional sprinklers would not work effectively in a residential environment. A new sprinkler head was needed that would respond to fires at least five times faster than the previously available sprinkler heads and spray water higher on the walls to combat the perimeter flames characteristic of residential fires. Due to the cooperative effort of FEMA-USFA and private industry, the fast response sprinkler head is now a reality.

Recognizing that the new sprinkler heads would not be widely used if their installation cost were too high, the USFA began looking for ways to reduce costs without compromising performance. In a report published in 1977, the need for a flexible high performance plastic pipe was identified as a primary means to reduce these costs. Since polybutylene was the only flexible hot water plastic pipe available, attention soon focused on it as the possible answer to USFA's need. Since that time, systems combining fast response sprinkler heads with polybutylene pipe have been tested and approved for residential use at Factory Mutual Research Corporation. Their effectiveness has also been demonstrated in over 100 burn tests held at various locations across the United States.

Tests prove system effectiveness

Quickly realizing the benefits that these systems offer, several far sighted communities



Eight fire tests at Scottsdale produced evidence that damages can be cut by an average of 85% when effective sprinkler systems have been installed.

life of a house or mobile home, this reduction in insurance rates can offset the cost of installing a sprinkler system constructed with polybutylene pipe.

Tax Savings. The State of Alaska has passed a law that reduces the taxable value of a sprinklered residence by 2% up to a maximum of $2,000.

Construction and Access Trade-Offs. Recognizing the value of the fast response sprinkler systems, local governments in some areas of the country are providing incentives for their installation. A leader in this area is Cobb County, Georgia which made several important changes in its building codes to encourage the acceptance of the new systems. These construction and access trade-offs provide additional incentives for builders to install the systems.

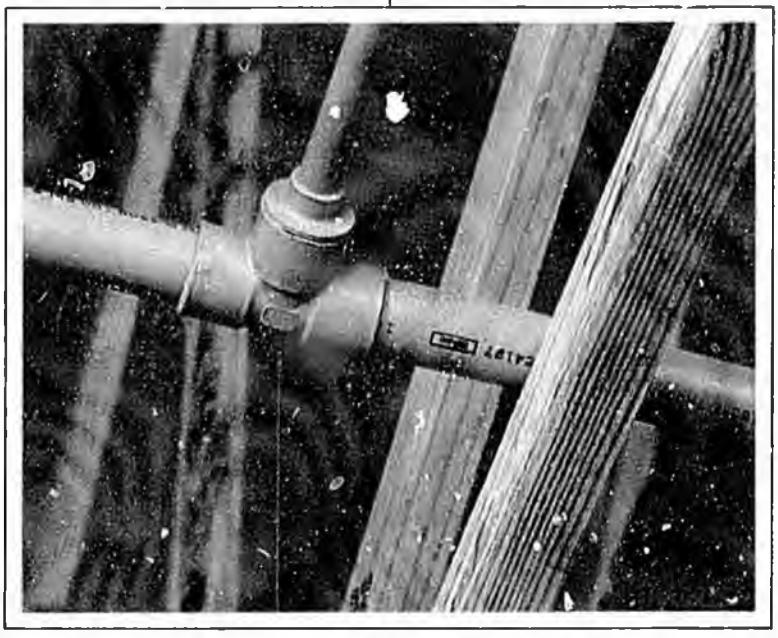
One example of construction trade-offs is the waiving of requirements for one-hour rated fire walls and fire doors in favor of normal gypsum board and doors. Savings are estimated at $23 per 1,000 square feet of walls and $111 for each door.

Cobb County's access trade-offs include the waiving of the requirement for a fire lane in certain instances where it would otherwise have been required. This allows developers to use land more effectively and profitably.

The economies realized through these trade-offs and the use of polybutylene pipe can reduce the net costs of the sprinkler system to zero. As a result, 90% of the new multi-family construction in Cobb County is now being sprinklered.

Installation recommendations

- Design residential sprinkler systems to conform to the NFPA 13D standard
- Install the system to minimize the possibility of freezing, e.g. install the pipe in inside walls or, if it is in the attic, directly on the dry wall under the insulation
- Use only high temperature rated pipe for residential sprinkler systems
- Use straight lengths of pipe rather than coils
- Follow manufacturer instructions on joining techniques
- Anchor pipe next to the sprinkler heads



The heat fusion method provides quick, dependable pipe fittings.

Miller of Miller Mechanical Co., has installed over 200 fire sprinkler systems with polybutylene pipe in new low-rise multi-family housing at a cost ranging as low as 45 cents per square foot. These costs will vary depending on the type of structure and sprinkler head spacing (14 foot spacing is standard in Cobb County).

In retrofit applications, even greater savings can be obtained. Grantham Fire Protection, Inc. of Phoenix, Arizona compared the overall costs of retrofitting black iron and polybutylene piped fire sprinkler systems into the same $70,000 homes. Material costs were roughly equal but installation time was reduced sharply. "Two men were able to retrofit the house with polybutylene in three days and it took four and a half days and three men to complete the black iron system," said Terry Glenn of Grantham.



Quickly assembled connections can be made with this specially designed heat fusion tool. This pipe joining technique results in significant savings in installation time and cost for sprinkler systems in both new and existing homes.

In San Clemente, a difficult retrofit in a wood frame house with tight attic clearances (8-30 inches) took two men less than a day to complete at a total cost of less than $1,000. Because of polybutylene's flexibility, Orvin Engineering was able to do 90% of the joints outside the structure, then curl the pipe into place. Jack Shaughnessy, Orvin executive vice president, commented that polybutylene pipe "proved worthy and relatively simple to install."



Sections of lightweight polybutylene pipe were connected outside, then easily fed through an attic opening, greatly reducing the time required to install a sprinkler system for the Scottsdale tests.

Safe, dependable, long-lasting systems

Polybutylene pipe is the only flexible plastic pipe approved for hot water plumbing by every major plumbing code in the United States and Canada. It is also the only flexible thermoplastic pipe that carries a 200°F pressure rating. As such, it can easily tolerate the high attic temperatures that can occur in the summer or the high temperatures to which it could be exposed during a fire.

At the other extreme of temperature, polybutylene's flexibility allows it to tolerate numerous freeze-thaw cycles without breaking. Although all sprinkler systems should be designed to avoid freezing (this would deactivate the system), freeze problems can occur. In such situations, polybutylene pipe will provide a margin of safety that rigid piping does not have.

Since polybutylene is plastic it resists the corrosion, scaling, and electrolysis that can affect metal pipe and because of its smooth inner walls, polybutylene pipe offers a high flow factor (C = 150) which it will maintain over its life.

Incentives for installing sprinkler systems

Insurance Savings. The Insurance Service Organization (ISO), the nation's largest advisory service for insurance rates, has recommended a 15% reduction in total insurance premiums for homeowners whose houses are protected by fire sprinkler systems. Filings to allow insurance companies to offer these reductions have already been made in over 38 states.

Over the average useful

across the country initiated demonstrations to gain local support for the new residential fire sprinkler systems.

One of the first tests conducted was in Cobb County, Georgia in 1981. A house in Smyrna was the site for a series of 15 separate test fires. The FEMA-USFA, Factory Mutual Research Corporation and the Cobb County Fire Department monitored the fires and the performance of the sprinkler systems in extinguishing them. Polybutylene pipe was used to connect the fast response sprinkler heads. The effectiveness of the system convinced local officials that such systems could successfully handle residential fires.

Building codes subsequently were amended authorizing the use of polybutylene pipe and NFPA 13D designs in sprinkler systems in multi-family dwellings. Several months later, the first such system in the United States was installed in a 2-story multi-family building. Fire Chief David Hilton of Cobb County estimated the cost of a conventional metal pipe fire sprinkler system would have been two to three times higher than the system installed.

Another series of tests was organized by the Rural-Metro Fire Department in Scottsdale, Arizona. The tests were conducted in typical $70,000 subdivision homes and simulated fire scenarios ranging from waste basket fires to fires as severe as a kitchen grease fire and a burning (dry) Christmas tree. Each of the fires was quickly extinguished, reducing damage by an average of 85% relative to the losses expected if no sprinkler system had been present.

The performance of the system prompted Scottsdale Administrative Fire Chief Bob Edwards to call the fast response, low cost residential fire sprinkler system "the most important fire protection breakthrough of the century."

Another series of tests in San Clemente, California culminated in a severe test of polybutylene pipe's ability to withstand high temperatures.





Before & After. In another series of tests, a wastebasket fire set in the corner of a room was quickly extinguished resulting in only minor damage.

In the test, the fire sprinkler system was drained of water and a fire was allowed to burn freely in the room below for 15 minutes. The pipe installed above the ceiling sustained no damage. Fire Chief Ron Coleman supervised the test series which he described as an "unqualified success."

Other successful tests of the fast response sprinkler/polybutylene pipe system have been made in Carmichael, California; Springdale, Arkansas; Fort Lauderdale, Florida; and St. Petersburg, Florida. Tests were also conducted by Factory Mutual Research Corporation which resulted in the approval of polybutylene pipe for residential fire sprinkler systems. This action also provides a nationwide approval for one and two family homes and mobile homes under the National Fire Protection Association standard 13D (1980).

How polybutylene pipe reduces costs

The light weight, flexibility, and ease of joining polybutylene pipe result in significant savings in installation time and cost for the sprinkler installer, particularly in retrofit applications. Compare the steps required to install a fire sprinkler system with black iron pipe or copper to that with polybutylene.

With black iron, the installation must be painstakingly designed to make sure all pipes are cut to the exact length; all wall or stud penetrations must be perfectly aligned and all threaded pipes scrupulously labeled so that the system can be properly assembled on-site. In addition, accommodations must be made to put black iron pipes in wall cavity areas. Although copper systems do not have all these requirements, they do require that care be taken to avoid the fire hazard associated with soldering.

By contrast, flexible polybutylene pipe is a more forgiving system that can normally be cut and assembled on-site at ground level and then snaked through structural members into place. In addition, the light weight of polybutylene pipe (one inch diameter pipe weighs less than ⅛ as much as black iron and less than ½ as much as copper) makes it even easier to transport and assemble.

In Cobb County, Herb

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DURAFLEX™ POLYBUTYLENE

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The 42-story Marriott Hotel was the first commercial high rise building in New Orleans to install a fire sprinkler system using polybutylene pipe.

New Orleans Marriott retrofits sprinkler system with polybutylene pipe

During the 7-month period from June, 1983, to January, 1984 a life-protection fire sprinkler system was quietly added to the 42-floor New Orleans Marriott Hotel with no interruption of room occupancy or complaints from guests. More than 3,000 sprinkler heads and five miles of polybutylene pipe were used by Grinnell Fire Protection Systems to retrofit the 1,300 sleeping rooms and hallways.

The Marriott Hotel was the first commercial high rise fire sprinkler installation in the New Orleans area to use polybutylene pipe. A variance in the local building codes was obtained to allow the flexible, high performance plastic pipe to be used.

The major hotel chain first became aware of polybutylene pipe about two years ago. By early 1984, 14 of their hotels already had polybutylene pipe in the sprinkler systems serving guest rooms. A spokesman for the hotel said the "Marriott plans to continue to use polybutylene pipe in its retrofit programs."

Sonny Scarff, a former fire officer

(continued on page 2)

Polybutylene pipe approved for sprinklers in Dallas

The installation of life safety fire sprinkler systems using polybutylene pipe is expected to expand greatly in Dallas. Public awareness of the need for sprinkler systems began to grow when on February 3, 1981, the Dallas Fire Department reported they could not extinguish fires in buildings larger than 7,500 square feet.

As a result of this report, a landmark study of the Dallas building code was launched later that year by Schirmer Engineering Corporation. The study eventually recommended more than 50 code changes to the Dallas City Council, most of which were intended to offset the increased construction costs resulting from mandatory sprinklering.

Referring to the Schirmer report, Dallas Fire Marshal Jerry Lambert commented, "The package as a whole provides the source of the funds necessary to pay for sprinkler systems by identifying building costs that can be eliminated when sprinklers are put in." The Dallas Fire Marshal is a strong advocate of the installation of sprinkler systems, which he called the "best possible protection" for controlling fires quickly.

The major code change proposed was a requirement for sprinklering all structures over 7,500 up to 35,000 square feet, depending on the type and occupancy of the building. To help offset the additional cost for installing sprinkler systems, a number of concessions were granted. Some of the major provisions included a reduction in the required fire protection rating of walls, reduction in smoke detector requirements for high rise buildings and atrium buildings, and reduction in the number of exits per floor in a building. In addition, polybutylene pipe also was

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"New Orleans Marriott" continued from cover

who has been the Director of Fire Protection for Marriott for the past nine years, organized and staged the September, 1982 sprinkler tests in Fort Lauderdale, Fla. that helped prove the worth of polybutylene pipe.

"When we started talking about retrofitting we felt we could take advantage of the new polybutylene pipe so we ran a series of fire tests," Scarff said, adding that the pipe "gives us the ability to install sprinkler systems the most cost-effective way because we can keep the



A heat fusion tool is used to connect the feeder pipe in the hall to the line extending to the sprinklers in each room.

hotel from being down. Secondly, the initial cost is 20-30 percent less. It's faster to use polybutylene pipe than conventional metal pipe."

Doc Adams, Director of Engineering for the hotel, believes the fact that the hotel was able to maintain room occupancy without interruption during the installation period probably saved a considerable amount in potentially lost revenues. "There was no interruption of room occupancy and we received no complaints while the system was under construction," Adams said. While the project took quite a bit of long range planning and coordinating with the installers from Grinnell, the job "was 95% complete in 10 months," he added.

Satisfaction with the project also was voiced by Charles Martin, Grinnell's Branch Manager. "We had Grinnell people come in from Florida and Colorado who had worked on similar installations in Marriott hotels in their areas. They helped train our crews and gave them excellent advice."

Martin said Grinnell designed a system that required only two pipe sizes, 1½-inch lines feeding a loop down both sides of the corridor with 1-inch pipe running to the sprinkler heads in the rooms.

"We were able to pre-fab most of the systems for the rooms on two small tables in a cramped area in the basement," he explained. "Therefore, less time was required on the floors. Because of the pipe's flexibility, the prefabbed pieces were transported easily to each floor in service elevators. Room installations required only three small holes to be drilled—one high on the hallway wall into the room, one in the hallway outside the bathroom and the third on the wall overlooking the sleeping area."

In a typical situation, installers would transport the materials to a selected floor between 8 a.m. and 9 a.m. As the guests left their rooms, the crews moved in to cut holes and shoot studs for the pipe hangers. Two ceiling panels were removed from the drop ceiling above the bathroom. A prefabricated pipe then was snaked in and curved around electrical installations and plumbing above the bathroom ceiling. Two sidewall fast-response sprinkler heads were installed in each room, one in the entry and one in the room itself. The tail end of the pipe section connected to the sprinklers stuck out into the hallway. It was trimmed to the proper length in a matter of seconds and heat fused to the prefabbed feeder pipes in the hallway. All of the pipe was connected and hung and the crew was clearing the floor by the time the guests began returning to their rooms late that afternoon.

With no need for any pipe dope, cutting oils, solder flux or torches, cleanup operations were minimal. Carpets and furnishings did not have to be covered. "Even when polybutylene pipe was exposed in the ceiling of the hallways, as it was for a period of time, it looked clean and neat and there was nothing threatening about it. I can't see anyone going into black iron again for installations such as this."

Matt Morgan, Grinnell's general foreman for the job, said he and his crews previously had worked only with metal pipe. But, he added, it took only about a week "to get adjusted to the polybutylene pipe and get up to speed." He added that he hopes to get other polybutylene jobs in the New Orleans area—"its light weight requires less muscle and energy to put in place."

"Where we really gained on this job is that usually, with black iron pipe, about 15 percent of the work is outside fabrication and about the same percent is engineering before you even get to installation. But with polybutylene pipe, the installers were able to do most of the pre-fab work. There was no need for engineering to go in and meticulously measure everything because we could cut to fit as we installed, and even curve and bend the pipe around obstacles when necessary," he explained.

A spokesman for the Marriott Corporation said that "we expected the pipe to live up to its advertised capabilities and it has done so. In testing, we use 250 psi for two hours. In fact, we've had fewer leaking problems after installations of polybutylene pipe than we have with black iron."

Sonny Scarff said the company saved "in the area of $300,000 to $400,000 in New Orleans because we were doing the rooms so much more quickly." An additional savings of $500,000 was obtained because of the reduced downtime. He said it took 14 days to retrofit a floor of 30 rooms in the Chicago Marriott in 1980 when black iron was used "while the same 30 rooms were done in four days in New Orleans" using polybutylene. Scarff figured current costs to retrofit the Chicago Marriott would be about $1,550 a room with black iron compared to an average cost of $800 a room with polybutylene pipe for the sprinkler system.



Pre-fab operations were set up in a small utility area of the hotel.

Polybutylene pipe chosen for fire sprinklers in desert resort's guest rooms



In the clean, dry air of the Sonora country desert foothills northeast of Phoenix, Arizona, a luxurious $200 million desert resort is being built. To help protect guests and property, fire sprinkler systems using polybutylene pipe were installed in all of the 120 casitas.

Any one of the four sprinkler heads installed in each casita is designed to confine, control and extinguish a fire quickly and to minimize the risk of a major conflagration that might spread throughout the complex. In a fire condition, one of the sprinkler heads would operate, releasing water in a wide spray pattern at a rate of 18 gpm. Only if the first sprinkler head could not control the fire would additional heads operate.

A 6-inch water line from Scottsdale serves the casitas, while the resort's golf course lake provides the water source for sprinkler systems in the restaurant, clubhouse and both tennis and golf pro shops.

"If they hadn't decided to put in a sprinkler system they would have needed a much larger water system," said Bob Edwards, Fire Chief of the Rural/Metro Fire Department in Scottsdale. In addition, without the sprinklers, fire lanes would have been required, which would detract significantly from the rugged beauty of the resort, aptly called "The Boulders", a Rockresort, Carefree, Arizona. The fire sprinkler system for The Boulders was designed and installed by "Automatic" Sprinkler Corporation of America, one of the largest contractors in the country.

Approximately 60 feet of sprinkler pipe is used in each casita. A portion of each system is heat-fused at the company's Scottsdale office and transported to the site. All the pipe sections required for one casita can be carried easily by one man to the installation site on the roof.

The 1¼-inch polybutylene pipe is placed on the flat roof (there are no attics) and fused to the 1-inch pipe segments below. In this joining method, a hot tool melts a thin layer of polymer on the inside of the fitting and on the outside of the pipe. The joint is formed when the pipe is pushed into the fitting. The joint that is formed *is* stronger than the pipe itself. The process takes about a minute.

After the sprinkler system has been installed, "Automatic" Sprinkler increases the water pressure to 200 psi and holds it for 24 hours, in order to check for any leaks. Any that are found can be repaired quickly. Later, an expandable foam insulation would be applied on the roof of the casita to cover the exposed pipe.

"Polybutylene's flexibility is the biggest thing going for it. You've got the advantage of going to a job site with a prefabricated section; then, if you find the building situation has changed somewhat, you can cut the pipe and make the adjustments easily. You don't have to worry about threading the pipe. Polybutylene saves you time and money and it is reliable," summarized "Automatic" Sprinkler Vice President Fred Benn III, of San Francisco.

The sprinkler installation at The Boulders is representative of a growing nationwide trend in construction, where life-safety protection can be provided at minimum additional cost because of construction tradeoffs.

Benn pointed to a condominium project in the Phoenix area where the decision to install sprinklers using polybutylene pipe "cost the developer less money to put up 220 condos with sprinklers than it would without them." According to Fire Chief Edwards, concessions at the project amounted to a savings of $275,000 and the system cost only $170,000. As he put it, "tradeoffs are the road to success" in increasing the number of sprinkler installations.

Edwards, who two years ago helped sponsor a major fire test demonstration involving polybutylene pipe in Scottsdale, said he felt the pipe was superior to other materials in ease of installation and durability. He cited the pipe's flexibility, fast fusion-joining method, resistance to cold and hot temperatures, and reduced labor costs for both new and retrofit installations. Following the Scottsdale fire tests, Edwards commented that the performance of the fast-response, low-cost system was "the most important fire protection breakthrough of the century."

Edwards is a strong advocate of sprinkler systems for saving lives, including those of firefighters, and property; but he also wants to reduce the taxpayers' burdens. In Scottsdale, when commercial and residential properties are sprinklered, insurance rates are

(continued on page 4)

("Dallas" continued fro n cover)



Two installers unroll a coil of polybutylene pipe along ceiling beams in an apartment at Alpha Point. A smaller coil, crimping tool and prefabricated drop pipes to sprinkler heads are visible in the foreground.

recommended for approval for concealed, wet, light-hazard fire sprinkler systems. [Editor's note: Since this story was written, these recommendations have been adopted by the City of Dallas.]

In the largest installation to date of polybutylene pipe in a fire sprinkler system in Dallas, more than eight miles of the flexible pipe have been used in the 324-unit Alpha Point Apartments, a series of 13 three-story buildings in northeast Dallas. Alpha Point is built on a slender rectangular tract of land next to the LBJ Freeway and did not qualify for a sprinkler exception because of inadequate fire department access.

Wm. H. LaDew, Inc., which began installing fire protection systems in 1931 and has put in more than 3 million sprinklers, was awarded the contract by the builder.

The Alpha Point project required about 3,200 fast-response sprinklers and more than 40,000 feet of ¾" and 1" polybutylene pipe. The individual one- and two-bedroom units, ranging from about 650 square feet to 900 square feet, each contain an average of 10 sprinklers and 125 feet of pipe.

After design of the sprinkler system, pipe and fittings were assembled at LaDew's plant and tagged for a specific portion of the sprinkler system before being delivered to Alpha Point. On the job site, a two-man crew, guided by the tags identifying the installation location, quickly installed the pipe above and along the beams in the ceiling. Because of the pipe's flexibility, far fewer attachments, elbows and tees were used than would have been needed with copper or black iron pipe. After the main and feeder lines were installed, short drops for the sprinkler heads were attached and the final tie-ins were made.

LaDew pressure-tested each installation at more than 200 psi. This pressure often was left on for two weeks or more, pending final construction of the building. By contrast, only a 2-hour pressure test at 68 psi is required to pass city inspections.

LaDew uses both the heat fusion and crimping methods of joining when installing polybutylene pipe in sprinkler systems. The former is used on the larger pipe and crimp fittings with copper rings are used for the ¾-inch pipe. Pipe sizing is determined by hydraulic calculations based on NFPA 13D requirements of at least 26 gallons per minute in any lateral line (two sprinkler heads operating in any room).

("Desert" continued from page 3)

reduced. On top of that, overhead at fire stations can be lowered so that city budgets for fire protection also can be cut.

Chief Edwards estimates there were 1,000 multi-family dwellings sprinklered during the summer of 1984, "with two times that number on the drawing board." He anticipates that new code changes will require all commercial buildings to be sprinklered, along with all dwellings other than one- and two-family homes. Scottsdale codes now require all commercial buildings 7,500 square feet and larger to be sprinklered.

The Duraflex Poly outylene Piper is published periodically by the Polybutylene Business Center of Shell Chemical Company and is available to anyone wishing to receive it. Comments and questions are welcome.

Address correspondence, including requests for additional copies, to Shell Chemical Company, Room 1220, One Shell Plaza, Houston, Texas 77002.

Printed in U.S.A. 1984,
Shell Chemical Company.

Where to buy fire sprinkler pipe and fittings

Shell Chemical does not manufacture pipe or fittings. The following independent companies supply polybutylene pipe and fittings for fire sprinkler installations.

Bow Plastics
104 Sharron Avenue
Plattsburgh, NY 12901
(518) 561-0190
Attn: Mr. Paul Stanfield

General Fire Protection
3095 Harris Street
Kennesaw, GA 30144
(404) 422-8600
Attn: Mr. Dick Gust

Trojan Plastics, Inc.
2211 N. 38th Street
Tampa, FL 33605
(813) 242-4211
Attn: Mr. John Hehn

Vanguard Plastics, Inc.
P.O. Box 346
McPherson, KS 67460-0346
(316) 241-6369
Attn: Mr. Keith Swinehart

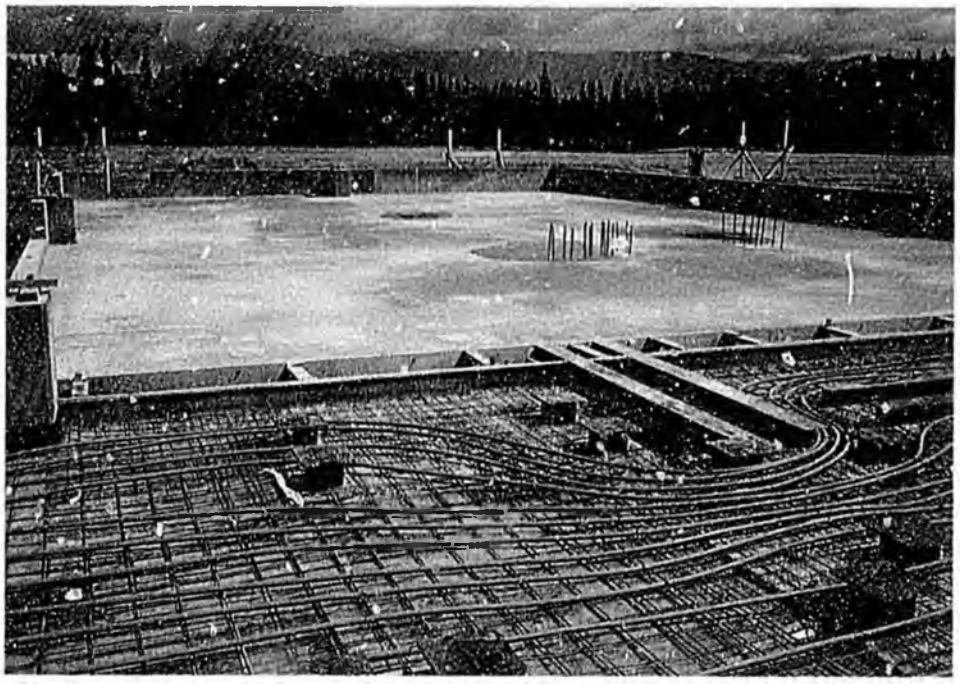
Wesflex Manufacturing Co.
1880 Garden Tract Road
Richmond, CA 94801
(415) 233-6670
Attn: Mr. Roger Reichart

DURAFLEX™ POLYBUTYLENE

PIPER

Published by Shell Chemical Company Volume V, Number 1, 1984

Effectiveness of mill's heating system depends on polybutylene pipe



The high temperature capabilities of polybutylene pipe enable a radiant slab heating system to provide a comfortable working environment in a Canadian planing mill even when the temperatures are 40 below zero.

A hot 50-50 mixture of ethylene glycol and water pumped through the pipe embedded in the slab radiates an even heat level throughout the 27,000 square feet in a MacKenzie, British Columbia mill.

The popularity of polybutylene pipe in the westernmost province of Canada for radiant heating of saw mills and similar plants has led to increased installations in small commercial buildings and homes, according to Larry Smith, manager, Westburn Industrial Enterprises, in Prince George.

Smith said that in his experience, other flexible plastic piping materials tended to become brittle with the high temperatures often required of the anti-freeze/water solution in cold weather. "Polybutylene pipe is by far the choice for radiant slab heating applications here," he added.

Since the system was installed at MacKenzie in 1980 Smith said that about three times as many installers "are capable of putting in this kind of system in this area" as three years ago. "More homeowners also are wanting to put in radiant slab heating systems. They feel they are more comfortable with this type of heating system."

Smith and Vic Swaykoski,

(continued on page 2)



Comfortable, cost efficient, underfloor heating systems based on circulating hot water through polybutylene pipe embedded in a floor are described in this new full color, 8 page brochure.

The brochure describes in detail the advantages of underfloor heating systems and their use in applications ranging from heating homes, offices and manufacturing buildings to melting snow and heating greenhouse seed beds. Installation techniques are illustrated and design information is also included.

To obtain a copy of this brochure, please write: Shell Chemical Company, Advertising Manager, P. O. Box 2463, Houston, Texas 77001.

"Duraflex"™ is a trademark of Shell Chemical Company for its polybutylene resins. Shell Chemical does not manufacture pipe.

(continued from cover)

mechanical contractor and owner of Doug's Heating (Northern) Ltd. of Prince George, played instrumental roles in the planing mill installation for Finlay Forest Industries. The large mill is producing about one-half million board feet a day.

The system uses an indoor/outdoor thermostat to control the temperature of the 1,320 gall... of liquid that is circulated at a rate of up to 250 gpm by a 7½-hp pump. The thermostat offers a one-t... ne ratio so that when the outside temperature is at freezing, the circulating fluid is at 100°F. Each time the ambient temperature drops one degree, the temperature of the liquid is automatically increased by one degree. A waste recovery unit burning wood shavings has replaced the gas-fired boiler initially used to heat the water/glycol mixture.

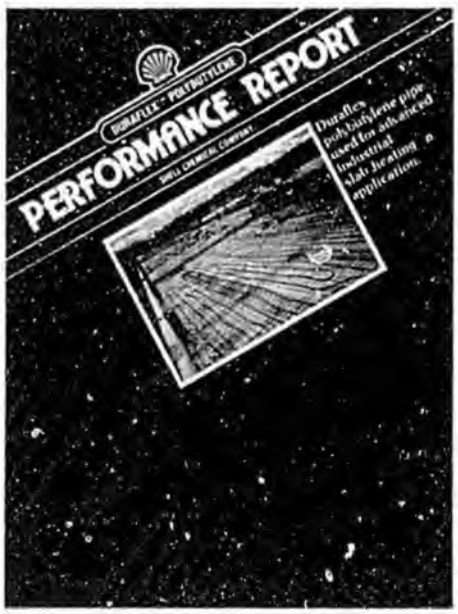
The radiant system also was selected because a conventional forced air system would have aggravated the problem of swirling sawdust in the mill. Consulting engineer, George Nixon, of North Vancouver, pointed out that the wood dust not only collects on and clogs filters, coils and fan-driven heaters, but also increases the risk of fire due to dust settling on a hot line.

Swaykoski, whose crews had installed eight other similar systems in mills before the MacKenzie job, said that "slab heating and circulating warm-air systems might cost about the same to start with but six months down the road you'll be having to pay a premium for maintenance, to say nothing of the nuisance and hazards of circulating fine sawdust if you install a forced air system."

"Pipe made of polybutylene is the tube we use. It's the only plastic tube that will stand the hot water temperatures necessary to bring the floor heat up to at least 50 degrees," he said, adding that temperatures occasionally plunge to minus 60 degrees in the area.

Ease of installation was cited by him as another advantage for polybutylene pipe in such systems. He said the lightweight, flexible pipe can be curved to a bending radius as tight as 10 times the outside diameter without kinking, thus eliminating the need for elbows and connections in the slab as required with copper or other rigid plastic materials. Swaykoski added that polybutylene pipe is corrosion resistant and resists scale and sediment buildup inside the pipe, which could arrest the fluid flow.

Additional information on this system is presented in the Product Performance Report shown below. For a copy, write: Shell Chemical Company, Advertising Manager, P. O. Box 2463, Houston, Texas 77001.



Above ground radiant slab system cuts home heating costs 25%

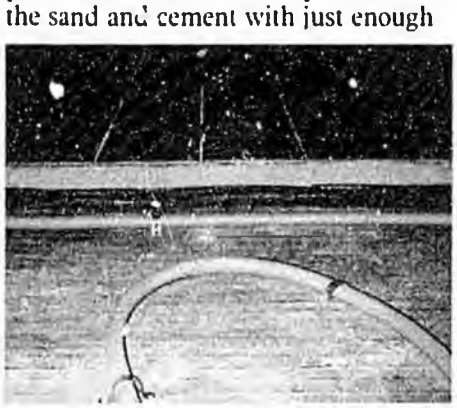
The concept of radiant slab heating is not new. Both homeowners and industry have benefitted from this energy-efficient heating method for years.

While most radiant slab heating systems are based on heating pipes embedded in a structural slab poured on the ground, a system installed in Colts Neck, New Jersey utilizes slabs poured above ground on wood joists. Wayne Pomanowski, owner and builder of the home, estimates that the system saved him 25% in energy costs over forced air heating during its first year of operation.

"The system provides the most even and comfortable heat available," he added.

This unique system consists of lightweight concrete poured over polybutylene pipe to form slabs on plywood surfaces. Pomanowski said the "above-ground slabs function only as heat sinks and don't serve as part of the structural strength of the house."

Installers used a dry mix concrete for the slab. The concrete was much less dense than the aggregate-type concrete used for structural strength and could be mixed with less water — about one part portland cement to two parts sand. "The whole key was to mix the sand and cement with just enough water to be damp and formable, but not wet," he said.



Close up shows a portion of the first floor before the concrete was poured and another area where glazed Italian tile covers the slab.

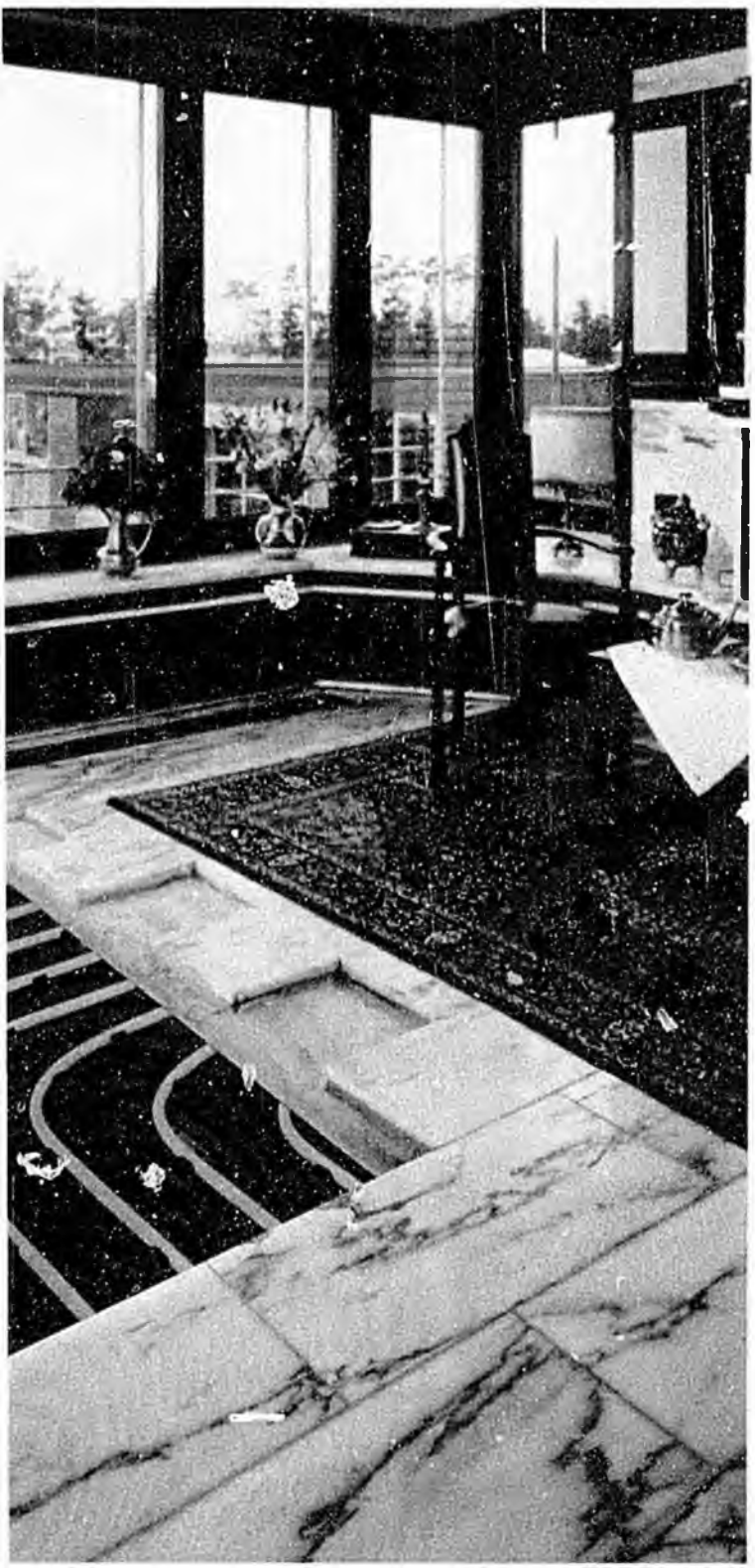
In order to accommodate the system, Pomanowski had to make some modifications in the home, which is a concrete block, standard construction two-story building with a basement. Floor joists were supported by a 10-inch steel "I" beam to provide adequate support for the plywood and joist sub-flooring under each lightweight slab. The joists are spaced 16 inches on center. According to Pomanowski, a builder and developer himself, these are simple modifications that can be incorporated into most home designs if they aren't already specified.

Pomanowski selected polybutylene pipe "because of its proven advantages in other successful radiant slab heating installations." Over the past decade, more than 400 million feet of polybutylene tubing have been used in radiant heating systems worldwide.

300-foot coils of 1-inch diameter

(continued on page 4)

et for radiant heating ns bolstered ropean technology



Spurred by the tremendous success which they have enjoyed in Europe, several European companies with extensive experience in underfloor heating systems are establishing operations in North America to promote installations of their radiant slab heating systems.

The two companies that are already established are headquartered in Germany. They are H. Kampmann GmbH, of Lingen, and Thermolutz GmbH & Co. of Reutlingen. A third company, Osterreichische Salen-Kunststoffwerke GmbH of Vienna is looking for representation.

Kampmann, which has been installing systems in Germany since 1973, opened a subsidiary in 1981 in Markham, Ontario, near Toronto. Thermolutz, which has over 10 years of experience established E. Wagner, P. O. Box 1585, Salt Lake City, Utah 84110 as an affiliate in 1982.

"There is a tremendous market in Europe for polybutylene pipe in underfloor heating systems. It is going extremely well right now in England, particularly with large municipal projects," pointed out General Manager Keith Moffatt, Kampmann Heaters (Canada) Incorporated.

Moffatt said installations in eastern Canada have been mostly commercial and industrial, including greenhouses and seed beds, while residential applications represent the major demand in the west.

"People want to feel safe with underfloor heating. That's why we have a 10-year, 10-million-dollar warranty," he said, adding that "for heating in North America, there's no way to go but up."

Both Thermolutz and Kampmann have produced literature dealing with product descriptions and applications, calculations of heating requirements, schematic layouts, installation instructions and other related data.

For copies of Kampmann's literature, write: Kampmann Heaters (Canada) Inc., 110 Ferrier Street, Markham, Ontario, L3Rz5. For product literature from Thermolutz, write: E. Wagner, P. O. Box 1585, Salt Lake City, Utah 84110. Literature from Salen can be obtained by writing Osterreichische Salen Kunststoffwerke GmbH, P. O. Box 100, Vienna, Austria.

("Above ground" continued from page 2)

and 400-foot coils of ¾-inch diameter polybutylene pipe were used in the Colts Neck installation. The 1-inch pipe was embedded in the first floor slab, which also radiates heat down into the basement.

Because heat rises from the first floor slab, less heating capacity was needed on the second floor. Therefore, ¾-inch pipe was selected for the second floor slab.

"Installing the pipe was easy and quick. We laid it out and fastened it to the floor over a mason lath and wire mesh. The floor had plastic sheeting over it to serve as a vapor barrier. After the connections were made, the concrete slab was poured over the pipe and wire mesh. The finished slab is 2½ inches thick," Pomanowski said.

Slabs in radiant heating systems can be overlaid with a number of different floor coverings. The first floor slab was covered with glazed Italian tile. The second floor was carpeted wall-to-wall. He offered this description of the layout:

"Each floor is about 1200 square feet. There are four zones, each with a separate thermostat that operates a corresponding circulation pump connected to the boiler header. Each zone contains about a 600-foot run of polybutylene pipe. The boiler is a conventional oil-fired model. A solar collection unit could also be easily adapted, using the boiler as a back-up. The whole system is simple and works on a principle similar to radiators.

"But there are no radiators or registers for the heat in the rooms. Other than the boiler and the thermostats, everything is in the floor. The polybutylene pipe releases heat from the circulating hot water to the slab, evenly and steadily, minimizing any hot spots. The heat transferred to the room from the slab is constant and comfortable.

In contrast to baseboard systems, furniture can be placed anywhere in the room without affecting the room's warmth.

"This system is an architect's dream, because there is nothing visible. The heat is ideal — very even and comfortable. And it is 25% less expensive to operate than forced air heating," he said.



Three-hundred-foot coils of 1-inch pipe were embedded in the first floor slab. Pomanowski said the system also served to effectively radiate heat into the basement.

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Printed in U.S.A. 1984,
Shell Chemical Company

Where to buy polybutylene pipe

Shell Chemical Company does not manufacture pipe or fittings. The following independent manufacturers supply plumbing fittings as well as pipe produced from Duraflex™ polybutylene resin:

Bow Corporation
104 Sharron Avenue
Plattsburgh, New York 12901
518/561-0190
Attn: Mr. Gus Ayers

Briggs Manufacturing Company
1500 Dale Mabry Highway
Tampa, Florida 33607
813/871-4304
Attn: Mr. Sterling Brown

Delta Faucet Co.
55 East 111th Street
P. O. Box 40980
Indianapolis, Indiana 46280
317/848-1812
Attn: Mr. George Davis

Trojan Plastics, Inc.
2211 N. 38th Street
Tampa, Florida 33605
813/242-4211
Attn. Mr. Brand Laseter

U.S. Brass
Qest Plumbing Systems
901 10th Street
Plano, Texas 75074
214/423-3576
Attn: Mr. Bill Smith

Vanguard Plastics, Inc.
P. O. Box 346
McPherson, Kansas 67460-0346
316/241-6369
Attn: Mr. Keith Swinehart

Wesflex Manufacturing Co.
1880 Garden Tract Road
Richmond, California 94802
415/233-6670
Attn: Mr. Roger Reichart

Wrightway Mfg. Co.
Beatrice Plumb Products Group
1050 Central Avenue
Park Forest So., Illinois 60466
312/534-0500
Attn: Mr. Ralph W. Arboe

DURAFLEX™ POLYBUTYLENE

PIPER

Published by Shell Chemical Company Volume IV, Number 3, 1983

Master plumber calls polybutylene pipe "Best Technology Available"

A Houston plumber who began using polybutylene pipe five years ago for plumbing repair and replacement of aging metal water systems said he has now made more than 500 installations and has not had a call-back or complaint.

"Soil in this area contains a high level of lime which encourages buried metal feeder line pipe to rust," says Laurence Klein of Klein Plumbing Inc. "Also, Houston water in general is high in mineral content. This encourages deposits and clogging.



Flexible, lightweight polybutylene pipe helps enable Klein to retrofit an entire plumbing system in half the time required to repair with metal pipe.

"Even so, most plumbing failures in this area, and particularly those inside the house, center on the mating of different metals," he continues. "For instance, hanging copper pipe on a steel or galvanized hanger with no insulation between the metal surfaces sets up an electrolytic action which can result in a perfect hole in the pipe."

When Klein came to Houston a few years ago, he discovered that there were thousands of homes 15-20 years old and older that were plumbed with galvanized steel pipe or combinations

(continued on page 3)

Improved piping simplifies earth-coupled heat pump installation

An innovative new pipe produced from Duraflex* polybutylene resin has reduced costs and greatly simplified the installation of horizontal closed-loop, earth-coupled heat pump systems.

Earth-coupled heat pump systems extract heat from the ground for heating or discharge heat into the ground for cooling. Exchanging heat with this milder and more stable natural heat source rather than with outside air enables the heat pump to provide more efficient heating and cooling than is possible with conventional heating systems or air-to-air heat pumps.

Dramatic drops in power consumption have been documented for homes which have converted to earth-coupled heat pump systems. Whereas electric resistance heat has a typical coefficient of performance (COP) of only 1 and air-to-air heat pumps have a more efficient rating of 1.7, the earth-coupled systems have a COP of 3 or more. As a result of their performance, thousands of these systems have been installed in residential and commercial applications ranging in size from one ton to 60 tons.

There are two types of closed-loop systems. The horizontal type uses pipe buried 4 to 6 feet below ground in a trench. A low-wattage pump circulates water from the heat pump through the earth coil to exchange heat with the earth and then back to the heat pump.

The second method is to use pipe in a well as a vertical heat exchanger. Water is pumped from the heat pump through the pipe to the bottom of the well and back to the heat pump, exchanging heat with the earth.

Both types require virtually no water because they recirculate the initial charge of water. In contrast, the more widely used water source heat pump systems are open systems using thousands of gallons of fresh well water daily.

Standard pipe made from Duraflex polybutylene resin has long been recommended by Geosystems, Inc., Stillwater, Okla., the company that pioneered closed-loop, earth-coupled

(continued on page 2)

*"Duraflex"™ is a trademark of Shell Chemical Company for its polybutylene resins. Shell Chemical does not manufacture pipe.

("Improved piping" continued from cover)
heat pump installations. Reasons: cost effectiveness, ease of installation and long life.

The availability of polybutylene pipe in 500-foot coils has been particularly advantageous for installers of the longer horizontal type systems because it minimizes the number of joints, thereby saving time.

Now, a recent development in the forming process for polybutylene pipe provides a new lighter, "square" configuration pipe which further simplifies installation.

"The new shape is much easier to install. It's lighter so it's easier to handle and it rolls out evenly in the ditch," pointed out Carl Ledbetter, Geosystems co-partner.

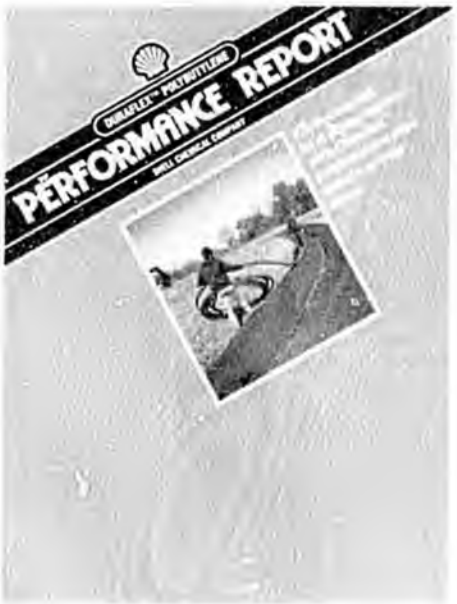
The unique chemical structure of the polybutylene resin makes it possible to perform pipe into a square configuration. This shape not only makes it easier for the installer to lay the pipe in the trench but it also reduces any tendency of the pipe to recoil.

"Shell came up with the idea of a square pipe with its decreased wall thickness which is the first pipe I know of that was specifically developed with the earth-coupled heat pump installer in mind," Ledbetter said.

The square pipe was used first in the heat pump system of a home of nearly 5,000 square feet. Two men easily uncoiled pipe from the bed of a truck into the trench despite 15-20 mph winds and temperatures in the low 40s.

"You can install polybutylene pipe in an earth-coupled system in about as cold a weather as a man can work in," Ledbetter stated. Based on the success obtained under these adverse conditions, Geosystems has now switched almost all of its horizontal systems to square polybutylene pipe.

Additional information on these systems is presented in a new Product Performance Report shown below. For a copy, write: Shell Chemical Company, Advertising Manager, P.O. Box 2463, Houston, Texas 77001.



Polybutylene proves ideal interconnecting pipe for solar heating systems in Carolinas



Six south-facing, medium-temperature collectors provide as much as a quarter of a million BTUs a day for domestic hot water, space heating and pool heating.

Nearly 60 miles of insulated gray polybutylene pipe were used last year by a North Carolina distributor to link medium-temperature drainback solar collectors with Aqua II Water Stove heating systems in homes and businesses.

After more than three years experience with pipe manufactured from Duraflex™ polybutylene resin, Distributor Tom Puckett of Clemmons, N.C. described the pipe as "a plumber's dream come true."

"It's easy to put in. It's lightweight to carry on a roof and the pipe has the high temperature capability that is required for solar systems.

"When we started," he continued, "we wanted a product that would be quick to install at a cost that wasn't outrageous. Solar space heating systems in general were expensive in the past and it was very advantageous for us to find a product like polybutylene to keep our installation costs down."

Puckett's system consists of a bank of Morning Star glazed solar collectors connected with polybutylene pipe to the Aqua II Water Stove, a storage tank that contains a non-pressurized open-vented fire box. The solar collectors feature high absorptivity electroplated black chrome surfaces that are capable of generating 934 BTUs per square foot of area every day in sunny weather. The wood burning Water Stove is used to supplement the solar system on cold, cloudy days.

(continued on page 3)

A small 1/12th h.p. pump (Taco) is all that is needed to push the water from the tank through the polybutylene supply line to the top of the collectors. The flow rate is 1¼ gallons per minute per panel. When not needed for heating, water is drained back to the tank in a return line to prevent stagnation and to avoid water freezing during the winter.

The solar collectors are equipped with 180°F cut off sensors. However, Puckett observed that, even when the Water Stove generated boiling water at 212°F there was never any problem with polybutylene pipe.

The solar collector/Water Stove system sold by Puckett is applicable to installations ranging from residences and swimming pools to businesses with a high demand for hot water such as laundromats and car washes.



Tom Puckett pulls back the insulation to reveal one of the 3/4" gray Duraflex polybutylene lines linking solar collectors with a 500-gallon Aqua Stove water tank.

When used for domestic hot water only, the system can save up to 90% of the heating costs and, when also used in a space heating system the heating bill can be cut approximately in half. This operating efficiency has already generated interest from 1500 miles away.

"There's a huge market out there for these systems and it doesn't matter whether you're rich or have a low income. These systems are getting the attention of both, as well as everyone in between," Puckett said.



A close-up view of a Water Stove's tank shows the small pump, hot air duct, insulated polybutylene supply and return lines, and, at the top, the domestic hot water line.

Solar energy systems also carry a tax credit incentive from the federal government and from many states.

"Write-offs amounting to 40% by the federal government and 25% by North Carolina have been extremely helpful to us in our business," Puckett said.

North Carolina's Energy Conservation Act grants homeowners and businesses a tax credit of 25% of the first $4,000 for installing solar equipment in a new or existing home. (For example, a $4,000 overall system would actually cost the homeowner only $1,400.)

As a result of these benefits, the sales of the solar/Water Stove system doubled from 1981 to 1982 with another doubling under way in 1983.



The installation advantages and performance properties of pipe made from Duraflex polybutylene resin in solar heating systems are presented in a full color, 12-page brochure. Cost saving features, benefits available to the solar installer, and installation guidelines for using the pipe in various types of collector systems are included.

To obtain a copy, write Shell Chemical Company, Advertising Manager, P.O. Box 2463, Houston, Texas 77001.

("Master plumber" continued from cover)

of galvanized and copper tubing.

"With relatively hard water and the soil conditions in the Houston area, I knew that many of these systems had to be failing daily and consequently there was a good market for a plumber who could fix them efficiently and economically," he said.

Klein rejected the traditional option of either replacing damaged pipe sections or installing metal pipe throughout the system. "I felt there had to be an efficient, quick repair method which would be reliable and long-lasting," he said.

"I started out patching, repairing and retrofitting in the conventional way with metal pipe and fittings, but it was frustrating," he said. "Retrofitting and repairing with metal is usually very time consuming and therefore expensive. A high percentage of people living in old homes where repairs are needed are not in high income brackets. Frequently, they can't afford to pay for extensive repairs and replacement without undue hardship. So they tend to have a plumber do only what is absolutely necessary to stop a leak or keep the water flowing."

This situation is very frustrating to Klein, who takes a great deal of pride in his work. If he does piece-meal patching on metal systems, a plumber can't guarantee his work.

"You can do a superb job of repairing a section and another part of the system may fail the next day or a week later," he says. "The customer who just paid you to fix his plumbing can't understand why it didn't stay fixed and doesn't want to pay for more work."

Klein experimented with polybutylene pipe and discovered that he could retrofit entire water systems with it in less than half the time required to repair or retrofit with metal pipe.

"With this system, I can completely replace a metal water system for a reasonable price and still make an attractive profit," Klein says. "I carefully test each installation before leaving the job to make sure it is right. Knowing I won't be wasting my time on problems and call-backs reassures me that the profit will be mine to keep. Customers are pleased with the lack of noise and the reliability of these systems, and my business has grown

(continued on page 4)

("Master plumber" continued from page 3)
rapidly because of people recommending me to their friends.

"And this way, I can guarantee my work."

Klein Plumbing also handles repair and maintenance plumbing for several large apartment and condominium companies in addition to its regular call-in business.

About three years ago he landed a contract to handle plumbing repairs for one of Houston's largest apartment operators.

"At the time their repair costs were running about $12,000 a month, including water leaks, pump failures and sewer failures," he recalls. Klein set up individual maintenance programs tailored to each apartment complex. He trained maintenance and repair employees to make minor repairs and perform preventive maintenance on equipment like pumps. The company's costs for outside plumbing repairs have dropped to only about $1,200 per month.



The corroded galvanized pipe (bottom) is typical of the problems Laurence Klein encounters in older water systems in Houston.

How does a master plumber feel about using polybutylene pipe in his craft?

"It's the best technology available," he says. "It extends my ability to perform and compete and lowers the overall cost while improving the quality of every job I do.

"Polybutylene pipe even lowers my insurance costs because I don't have to do torch work while soldering or brazing at the job site," he says. "However you look at it, it is the very best system available for the repair plumber and the consumer."

Code bodies grant approvals for polybutylene pipe

Recent code approvals for use of polybutylene pipe in hot and cold water plumbing, cold water service and other applications include:

Plumbing
State of Idaho
State of Massachusetts
City of Tucson, Arizona
Navajo County, Arizona
Baltimore County, Maryland
Douglas County, Nevada
Onodaga County, New York

Fire Sprinklers
City of St. Petersburg, Florida
City of University Park, Texas
City of Vancouver, Washington

Cold Water Service
City and County of Denver, Colorado

Heat Fusion Fittings
State of Utah

Where to buy polybutylene pipe

Shell Chemical does not manufacture pipe, but the following independent manufacturers produce pipe from Duraflex polybutylene resin:

Delta Faucet Co.
55 East 11th Street
P.O. Box 40980
Indianapolis, Indiana 46280
317/848-1812
Attn: Mr. George Davis

Trojan Plastics, Inc.
2211 N. 38th Street
Tampa, Florida 33605
813/242-4211
Attn: Mr. Brand Laseter

U.S. Brass
Qest Plumbing Systems
901 Tenth Street
Plano, Texas 75074
214/423-3576
Attn: Mr. B. E. Smith

Vanguard Plastics, Inc.
P.O. Box 346
McPherson, Kansas 67460-0346
316/241-6369
Attn: Mr. Keith Swinehart

Wesflex Manufacturing Co.
1880 Garden Tract Road
Richmond, California 94801
415/233-6670
Attn: Mr. Roger Reichart

Wrightway Mfg. Co.
Beatrice Plumb Products Group
1050 Central Avenue
Park Forest So., Illinois 60466
312/534-0500
Attn: Mr. Ralph W. Arboe

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DURAFLEX™ POLYBUTYLENE

PIPER

Published by Shell Chemical Company Volume V, Number 2, 1984

Large South Florida Subdivision being Plumbed with Polybutylene



100-foot coils of polybutylene pipe are quickly rolled out in 8-inch trenches before being covered with dirt, a plastic vapor barrier, wire mesh and concrete. Before the slab is poured the plumbing system is tested at 165 psi for four hours.

With quality and cost the key determinants for the plumbing to be used in South Florida, the builder and plumber at Holiday at Lantana chose a system based on polybutylene pipe and acetal insert fittings.

The system will be used for hot and cold water plumbing in 514 single-family homes being built by Hovsons, Inc. at Holiday at Lantana, a new community southwest of Palm Beach and about seven miles from the Atlantic Ocean. By January, 1984, 138 homes had already been either sold or were under construction.

The subdivision is the most recent of the approximate 6,000 homes plumbed with polybutylene pipe by Fort Lauderdale's Zicaro's Plumbing since 1979.

"My first look at polybutylene pipe convinced me that it had brought a new standard of quality that would improve the plumbing industry," said Nick Zicaro, general manager of the 15-year-old company which now has branch offices in Orlando and Clearwater.

Hovsons' goal at Holiday at Lantana is to build affordable housing with quality. To help reach that objective, President Hirair Hovnanian assigned Robert Mardigian, Vice President — Marketing & Sales, to research and evaluate the newest and most efficient building techniques. In the course of his study he learned about plumbing with systems built around polybutylene pipe and approached Nick Zicaro for a bid.

"We requested bids for both copper and polybutylene systems and found that our cost savings with polybutylene would be very good," Mardigian said.

Because there is no need for open flames to solder joints as with copper tubing, Mardigian estimates that he eventually will also be able to reduce his insurance costs at the subdivision.

Zicaro stated that "electrolysis and corrosion are constant problems here with metal and copper pipe. Hard water in south Florida can cause a raceway to put a pinhole in a copper system and you're always having leaks from joints when you put in copper. Polybutylene is inert, so it can resist

(continued on page 2)



Recommended methods for installing polybutylene tubing with insert fitting/crimp joints are described in a 16-page booklet recently published by the Plastic Pipe and Fittings Association (PPFA).

The booklet addresses such topics as materials identification, proper tool use, how to make good connections, good installation practices, and precautions which should be taken.

To obtain a copy of this booklet, please write to one of the system suppliers listed on the back page of this newsletter, or to: The Plastic Pipe and Fittings Association, 999 N. Main Street, Glen Ellyn, Illinois 60137.

*Duraflex™ is a trademark of Shell Chemical Company for its polybutylene resins. Shell Chemical does not manufacture pipe.

("Florida Subdivision" continued from cover)
the corrosive elements in water and is unaffected by acid soil conditions or electrolysis."

"Galvanized pipe and copper can clog from scale buildup from hard water, but there's no scale buildup with polybutylene," he added.

Using polybutylene pipe provides several other benefits as well. "Besides giving a builder a top quality system, one of my men can plumb a typical single floor, two-bedroom house in about five hours compared to eight for copper," Zicaro said. His company is now putting plumbing systems based on polybutylene pipe in about 2,000 homes annually.

While stressing the beneficial properties of the pipe, Zicaro also points out that it is simple to install, requires no soldering to connect joints and is available in long coils so no fittings are needed under the slab.

He estimates about 80% of his total potable water plumbing installations utilize polybutylene pipe and almost 100% of the retrofit jobs.

Zicaro's projects range from affordable homes to larger, more expensive custom homes, including one $600,000 home in south Florida which he recently plumbed with a system based on polybutylene pipe.

At Holiday at Lantana, coils of tubing are unrolled in trenches eight



Protective polyethylene sleeves are slipped over the polybutylene pipe and they are secured to a metal stake to prevent movement during the pouring of the slab or damage to the pipe during final stages of slab construction.

inches deep and staked in position. A protective plastic sleeve is placed over the tubing at slab penetrations to protect it from damage during framing operations. The tubing is then covered with dirt and a plastic vapor barrier and wire mesh are placed on the ground before pouring a 4-inch concrete foundation. A typical house requires about 80 feet of ¾-inch tubing and 120 feet of ½-inch tubing. Slabs are poured for four to five houses a day.

The system is hydrostatically tested at 165 psi for four hours after installation in order to detect any flaws in the installation. Zicaro cited another advantage for polybutylene: crews can be quickly and easily trained to install polybutylene pipe and insert fittings.

Holiday at Lantana offers prospects four models, all with two baths and two with three bedrooms. Living areas range from about 1100 square feet to more than 1400 square feet. Prices begin at $56,000 and go up to $62,000 with 5% down.

The homes include central air conditioning, wall-to-wall carpets, vinyl floors in baths and kitchen, cathedral ceilings, dishwashers, ovens, disposals and smoke detectors. The subdivision is expected to be completed in the spring of 1986.

Hovsons has built two other south Florida communities and has more than 4,500 homes under construction in south Florida and New Jersey. Some 11,000 homes already had been built by Hovsons in Toms River, New Jersey. Holiday at Lantana, however, is the first subdivision in which polybutylene pipe was used.

"We've been very well satisfied with the product," Mardigian said. "It cuts down on man-hours and cost of installation. You can bend it around easily and it doesn't corrode or crack. I think it's a great material to work with. It's really simplified the building process and the home buyers seem to be very receptive to it."

Polybutylene Plumbing Pipe Systems Survive Year-End Cold Wave

Polybutylene plumbing pipe saved thousands of home and apartment owners the cost and inconvenience of broken water pipes during the extremely severe cold spell over the 1983 Christmas holidays.

"It was a major disaster in this area," says Jack Smith of Sundance, Inc., a plumbing contractor in Marietta, Ga., where temperatures dropped to near zero and high winds pushed the chill factor to −50°F. "We had 500 to 700 service calls. They came in waves. But only one involved a system piped with polybutylene pipe. All the others involved breaks in copper and galvanized pipe. And we've installed hundreds of polybutylene piped water systems in this area."

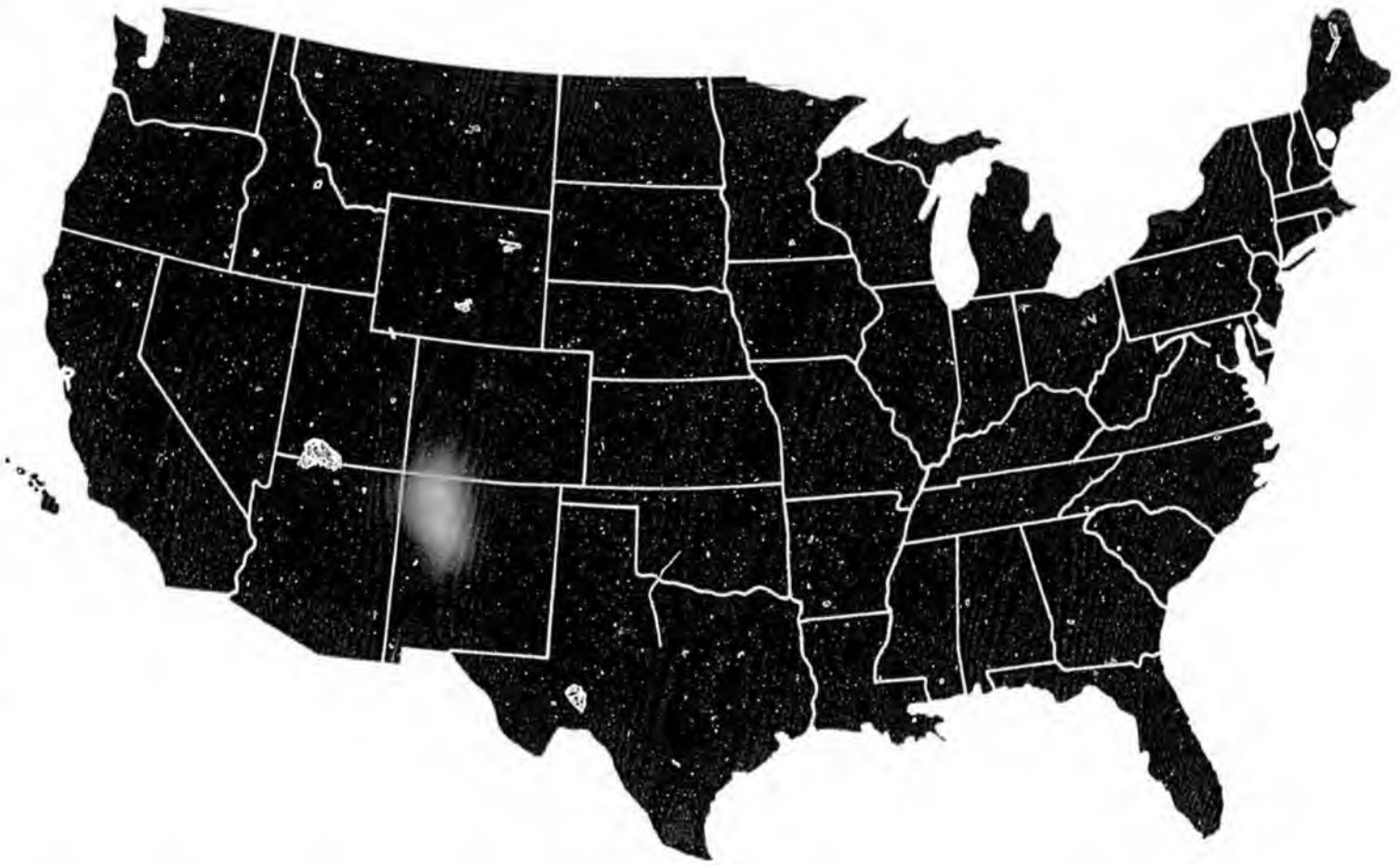
The experience with polybutylene pipe during the freeze in Cobb County, Ga., has fire and building code inspectors smiling. Cobb County, which is part of the rapidly growing Atlanta metropolitan area, has been a leader in changing building codes to allow the use of polybutylene pipe in hot and cold water plumbing and to authorize cost-saving building code modifications to encourage the installation of residential fire sprinkler systems.

"There were leaking pipes all over town — and one in an unheated area of a new school may have caused a

(continued on page 4)



This new Marietta, Ga. home was unoccupied and unheated when temperatures dropped to near 0°F. The plumbing system froze but when the thaw came there were no breaks or leaks in the polybutylene pipe.



Polybutylene approved for plumbing applications in most major cities

Plumbing systems incorporating polybutylene pipe for hot and cold water distribution have received code approvals in all of the national and regional plumbing codes in the United States and in over 75% of the nation's major metropolitan areas.*

Some 77 major metropolitan areas in 32 states are identified in the map above and listings below. An indication of the growing popularity of systems based on polybutylene pipe is reflected in the fact that a majority of these approvals have been granted in the past three years. During the last year alone, enough polybutylene pipe has been consumed in the United States to completely encircle the earth.

*The approvals shown above are based on Shell's best understanding as of May, 1984. Because codes continue to be changed and because the approvals may not cover all communities within the major metropolitan areas, a potential user should always check with his local authority before proceeding with an installation.

ALABAMA
- Huntsville

ARIZONA
- Phoenix
- Tucson

ARKANSAS
- Little Rock

CALIFORNIA
- San Diego
- San Jose

COLORADO
- Colorado Springs
- Denver

CONNECTICUT
- Hartford

DELAWARE
- Wilmington

DISTRICT OF COLUMBIA
- Washington, DC

FLORIDA
- Fort Lauderdale
- Fort Meyers
- Fort Walton Beach
- Jacksonville
- Lakeland
- Melbourne
- Miami
- Ocala
- Orlando
- Pensacola
- Sarasota
- Tallahassee
- Tampa
- West Palm Beach

GEORGIA
- Atlanta
- Augusta
- Savannah

HAWAII
- Honolulu

INDIANA
- Indianapolis

KANSAS
- Wichita

KENTUCKY
- Louisville

LOUISIANA
- Baton Rouge
- Lafayette
- New Orleans
- Shreveport

MASSACHUSETTS
- Boston

MICHIGAN
- Detroit

MISSOURI
- Kansas City

NEVADA
- Las Vegas

NEW JERSEY
- Asbury Park
- New Brunswick
- Newark

NEW MEXICO
- Albuquerque

NORTH CAROLINA
- Charlotte
- Greensboro
- Raleigh

OHIO
- Cincinnati
- Columbus
- Toledo

OKLAHOMA
- Oklahoma City
- Tulsa

OREGON
- Portland

PENNSYLVANIA
- Pittsburgh

RHODE ISLAND
- Providence

SOUTH CAROLINA
- Charleston
- Columbia
- Greenville

TENNESSEE
- Knoxville
- Memphis
- Nashville

TEXAS
- Abilene
- Austin
- Brownsville
- Bryan, College Station
- Corpus Christi
- Dallas, Fort Worth
- Galveston
- Houston
- McAllen
- Midland
- Odessa

VIRGINIA
- Newport News
- Norfolk
- Richmond

WASHINGTON
- Seattle
- Tacoma

("Cold Wave" continued from page 2)
quarter of a million dollars or more in damages by itself — but virtually no problems with the residential systems based on polybutylene pipe," says Lt. Jerry W. Grier of the Cobb County Fire Department. "We've got about 9,000 water systems and sprinklers based on polybutylene pipe in the county." Because of the dramatic difference in performance, the Cobb County Fire Department is now considering mandating polybutylene pipe for all sprinkler systems installed in the attic.

"We're very pleased with the performance of polybutylene," says Jim Bechtel, Senior Vice President of Post Properties, Inc., which is one of the largest builders and operators of multifamily dwellings in the Atlanta area. "We have 250 domestic water systems and 148 fire sprinkler systems based on polybutylene pipe in operation. There was only one break involving a system based on polybutylene pipe during the freeze."

"This freeze changed a lot of people's minds about plastic pipe," says Danny R. Gosdin, a field supervisor for Carroll & Boyd, Inc., of Jonesboro, Ga., a mechanical contractor for Pulte Homes. "We've installed hundreds of water systems based on polybutylene pipe, and during the freeze we had only one fitting push off from freezing, but virtually no water damage resulted. Yet, the first day after the hard freeze, we had 250 calls, all involving water systems made with copper or galvanized pipe. That makes you think this polybutylene pipe is pretty good stuff."

"Knowing what I know now, I'd pay more to have a water system piped with polybutylene than I would for a system made with metal pipe," says W. T. Anderson, who is director of inspections for Cobb County. In actual practice, polybutylene plumbing systems can be installed less expensively than copper systems, even at today's depressed copper prices.

In Houston, the same cold front dropped temperatures to a record low of 11 degrees on Christmas morning and held the area below freezing for more than 100 hours. According to preliminary estimates, freeze damages were expected to match or exceed damages caused by the wind and flooding from Hurricane Alicia last August. Some 5-10 percent of homes and apartments in the area experienced frozen and broken pipes.

"One apartment complex I repaired had over 180 breaks," says Laurence Klein, a master plumber who specializes in repair and replacement plumbing for large apartment and condominium operators. For several years, Klein has used polybutylene pipe to replace copper and galvanized pipe in water systems and during that time has replaced hundreds of metal water systems in the Houston area with polybutylene pipe.

"I did a good month's work in the week following the freeze, but didn't get a single call involving polybutylene pipe," he said. "The freeze really separated the good from the bad plumbing. Polybutylene isn't giving me very much repair business."

Wood Bros. Homes, Inc., one of the larger home builders in the Houston area which switched to polybutylene pipe for its plumbing a little over a year ago, also reported no complaints of breakage or water damage from occupants of some 250 to 300 homes constructed with the high performance plastic pipe.

"Our sales department, because of problems in the past with other plastic pipe, has been uncomfortable about our changing to polybutylene, and felt they were having to sell over it," says Trudy Starkey, who is purchasing agent for Wood Bros. "Since the freeze, that has changed and they now feel that it is a sales point in favor of Wood Bros. Homes."

Where to buy polybutylene pipe

Shell Chemical Company does not manufacture pipe or fittings. The following independent manufacturers supply plumbing fittings as well as pipe produced from Duraflex™ polybutylene resin:

Bow Corporation
104 Sharron Avenue
Plattsburgh, New York 12901
518/561-0190
Attn: Mr. Gus Ayers

Briggs Manufacturing Company
1500 Dale Mabry Highway
Tampa, Florida 33607
813/871-4304
Attn: Mr. Sterling Brown

Delta Faucet Co.
55 East 111th Street
P.O. Box 40980
Indianapolis, Indiana 46280
317/848-1812
Attn: Mr. George Davis

Trojan Plastics, Inc.
2211 N. 38th Street
Tampa, Florida 33605
813/242-4211
Attn: Mr. Brand Laseter

U.S. Brass
Qest Plumbing Systems
901 10th Street
Plano, Texas 75074
214/423-3576
Attn: Mr. Bill Smith

Vanguard Plastics, Inc.
P.O. Box 346
McPherson, Kansas 67460-0346
316/241-6369
Attn: Mr. Keith Swinehart

Wesflex Manufacturing Co.
1880 Garden Tract Road
Richmond, California 94802
415/233-6670
Attn: Mr. Roger Reichart

The Duraflex Polybutylene Piper is published periodically by the Polybutylene Business Center of Shell Chemical Company and is available to anyone wishing to receive it. Comments and questions are welcome.

Address correspondence, including requests for additional copies, to Shell Chemical Company, Room 1220, One Shell Plaza, Houston, Texas 77002.

Printed in U.S.A. 1984,
Shell Chemical Company.

SUMMARY SHEET

PLASTIC PIPE WATER SERVICE FAILURES

Breakdown of Costs:

LOCATION	COSTS
Memphis, Tennessee	6.2 million
Napa, California	$208,000
San Antonio, Texas	50 million
El Paso, Texas	2 million
Irvine Ranch, California	38.1 - 38.25 million
Germantown, Tennessee	1.2 million (estimate)
TOTAL:	97.5 - 97.65 million

SUMMARY OF PLASTIC PIPE

WATER SERVICE FAILURES

The following is a summary of plastic pipe water service failures which have occurred throughout the United States.

MEMPHIS, TENNESSEE

This community used polybutylene from approximately 1972 to 1979. The pipe was used primarily for water service lines to the hookup to individual residences. Failures were recognized as early as 1972, and included stress cracks, pinhole leaks and cramps and creases. The water utility discontinued use, and is replacing the pipe as it fails. Estimated cost to the community is 6.2 million dollars.

NAPA, CALIFORNIA

This community used polybutylene and polyethylene from 1972 to approximately January, 1982. Polybutylene was used exclusively from 1972 to 1978, and polyethylene from 1978 to 1982. The city experienced failures which included sidewall cracks, pinholes, penetrations by pebbles, splits on the sides, stress failures and sheer breaks at a fitting. The City of Napa is replacing the plastic pipe as it fails, and the use of plastic pipe has been banned by the City Council. Estimated cost for the failures is $208,000.

SAN ANTONIO, TEXAS

This community has used polyethylene and polybutylene 2110. Polyethylene was used from 1966 to 1970, and polybutylene from 1970 to 1978. The pipe was used as standard material for all service lines and was used exclusively for new services as a replacement for copper. The failures which were experienced included pinholes, splits and sheers throughout the system. The city is replacing the plastic pipe en masse. At first, they only replaced it as the pipe failed, but then decided it was necessary to replace the entire system because of the extent of failure. The estimated cost to the city, as determined from a lawsuit which has been filed, is approximately 50 million dollars.

EL PASO, TEXAS

This community used polyethylene, 3406, Hyd-molecular. It was used for approximately eight years and began to be phased out in approximately 1979. No plastic pipe is used at this time. The failures included fine stress cracks, longitudinal cracks, caused by stress on the pipe itself. The water utility is replacing the pipes as they fail, and is not doing mass replacement. The estimated cost for the failures is approximately 2 million dollars.

SUMMARY OF PLASTIC PIPE

WATER SERVICE FAILURES

(continued)

IRVINE RANCH WATER DISTRICT, CALIFORNIA

This community used polyethylene beginning in 1961 and discontinued use in approximately November, 1982. It was used primarily in new development areas, and was not used to replace copper unless the whole line had to be replaced. Failures included the pipe splitting in half, which was attributed to a stress problem, longitudinal cracking and soil conditions. In addition, there was a hardening and shattering of pipe. A management decision was made to replace the pipe as it fails. The cost from the failures is approximately 38.1 to 38.25 million dollars.

GERMANTOWN, TENNESSEE

This community used polyethylene and polybutylene from approximately 1973 to 1978. Ninety percent of the plastic pipe was polyethylene. It was installed primarily in all new subdivisions. Failures from the pipe included breaking due to brittleness and snapping, usually very close to the connection at the main or the meter where there was the most stress. The pipe split around the circumference rather than longitudinally. Costs from the failures are estimated, due to the fact that this community is also involved in a lawsuit against the manufacturer. Estimated cost is 1.2 million dollars.

TOTAL ESTIMATED COSTS FOR FAILURES FROM THE ABOVE JURISDICTIONS:

97.5 - 97.6 million dollars

1/11/83.

SUMMARY

CALIFORNIA DEPARTMENT OF CONSUMER AFFAIRS, FRIENDS OF THE EARTH, CONSUMER FEDERATION OF CALIFORNIA, STATE BUILDING AND CONSTRUCTION TRADES COUNCIL OF CALIFORNIA, AFL-CIO, and AILEEN ADAMS, (PLAINTIFFS)

vs.

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO). (DEFENDANTS)

Exhibit "A"

I. BACKGROUND ON THE PROBLEM OF PLASTIC PIPES

Recent tests in California have duplicated field and laboratory experiences of water utility districts and environmental health experts that polyvinylchloride (PVC), polyethylene (PE), and polybutylene (PB) water service lines can be and are permeated (infiltrated) by gasoline, petroleum distillates and industrial solvents.

The public health impact can be serious enough to require the removal of an entire underground network of plastic water service lines and may cause serious health consequences for its consumers. Because of the pervasive occurence of toxic chemical spills and soil contamination with residues of pesticides and herbicides, California will need to embark on a comprehensive analysis of the problem. The problem is amplified by the specter of frequently used garden and household products that may permeate these plastic pipe.

Permeation of plastic pipe by toxic chemicals is all the more serious because of the existing threat to water quality by the pipes themselves and the quality of our current water supply. The California Department of Health found that the pipes themselves leach large amounts of chloroform, carbon tetrachloride, DEHP and a host of solvents used to degrease and glue the pipes. If these toxic chemicals are added to the already high level of contamination of many water supplies, then a truly dangerous prospect

for the quality of our potable water systems emerges.

Since 1977, the State of California has reviewed industry requests for unlimited usage of plastic pipe for water distribution. Industry assertions of economic feasibility and product safety were thoroughly and comprehensively reviewed by California Departments of Health, Consumer Affairs, Housing and Community Development, Cal/OSHA, and the State Fire Marshal. The Department of Housing and Community Development(HCD) concluded, after extensive hearings and in consultation with these other state agencies, that there was substantial evidence that unlimited use of plastic pipe may have a significant effect on the environment.

These conclusions were reached because of the threat to workers who breathe the fumes of the glues, and the presence of toxic chemicals (dimethylformamide, tetrahydrofuran, DEHP, carbon tetrachloride, chloroform and many others) in drinking water passed through the pipe, and an equally dramatic conclusion of the State Fire Marshal that plastic pipe is high rise construction may pose an unreasonable fire risk.

Since plastic pipe was found to have a potentially adverse effect on the environment because of its threat to water quality, worker safety, and fire safety, state agencies in California will not allow its expanded use until all scientific and public health questions have been answered. The State Architect has also warned all the design professions and school districts throughout California

of the potential hazards of plastic pipe.

Because the International Association of Plumbing and Mechanical Officials (IAPMO) proceeded with the expanded use of plastic pipe in its 1982 Uniform Plumbing Code, a coalition of state public and private consumer groups, environmental and labor organizations sued IAPMO and forced a notice disclaimer at each location in the Code where plastic pipe is mentioned. The lawsuit is still in progress over complaints that IAPMO misrepresents its product evaluation to the general public.

Outlined below are some of the key issues being pursued in that lawsuit.

II. ISSUES IN LAWSUIT AGAINST IAPMO

Under current law, IAPMO has the authority to prepare a model code know as the Uniform Plumbing Code (UPC). The code is prepared every three years and is forwarded to Housing and Community Development (HCD) for action. HCD may make minor modifications. In the event HCD takes no action, the Model Code lapses into law in one year. The Code is then forwarded to the Building Standards Commission for final approval and publication.

IAPMO's voting membership consists of governmental jurisdictions and building officials of member jurisdictions. The UPC is approved at the IAPMO annual convention after recommendations from IAPMO's code change committee are presented to the members who come to the convention.

IAPMO's other major function is preparation of a Research Directory which lists products by the manufacturer's name. (Such "listings" are used by jurisdictions for substitutions of plumbing materials.) In order for a product to be approved, the manufacturer must submit a sizeable application fee, along with durability and strength tests and show compliance with certain standards, depending on the product.

In the case of plastic pipe products and solvents, the appropriate standard is the National Sanitation Foundation (NSF) Standard 14. One of the main problems with the standard is that it does not test for the leaching of organic chemicals (dimethylformamide, tetrahydrofuran, DEHP, carbon tetrachloride, chloroform, and more) from the plastic pipe products, nor does it test the permeability of the pipe. NSF 14 also does not test for fire safety performance with respect to either the increased fire-spread risks or the toxicity of the smoke.

Finally, NSF 14 is inadequate because plastic pipe does not have a 100% content requirement standard. Thus, each manufacturer varies the formula; only generic varieties of pipe (i.e. CPVC, PVC, ABS) are tested under Standard 14.

After one review of the manufacturer's application by the IAPMO Research Committee, the plastic pipe product is given the IAPMO seal or logo which declares that the product has been tested and meets minimum health and safety requirements.

The product is then listed in the Research Directory. Both the Research Directory and the UPC are heavily relied upon by contractors, builders, inspectors and others in the building and construction trades.

In 1981, IAPMO voted for nearly unlimited use of plastic pipe products for transportation of hot and cold potable water for its 1982 Code. By this time, HCD required, in accordance with the California Environmental Quality Act (CEQA), preparation of an EIR for such expanded use of plastic pipe.

Nevertheless, IAPMO proceeded to distribute its 1982 UPC with apparent approval of plastic piping products for transportation of potable water.

The Department of Consumer Affairs and a host of environmental and consumer groups filed a complaint alleging unfair business practices and negligent misrepresentation (Business and Professional Code sections 17200 and 17500).

The theory of the case is that IAPMO's representations in both the UPC and Research Directory that plastic pipe products are safe are, in fact, gross misrepresentations. IAPMO has no testing facilities or qualified chemists, toxicologists, or epidemiologists on staff. Voting on product approval for the Research Directory and the UPC is limited to voting members of IAPMO. Furthermore, IAPMO has totally ignored the substantial evidence amassed by HCD that substantial adverse impacts are a possibility

and that an EIR would be required before use of such plastic pipe can receive HCD approval.

The Department of Consumer Affairs immediately requested an injuction from the Los Angeles Superior Court to prohibit IAPMO from distributing the 1982 UPC without a warning of potential hazards. The Superior Court denied the motion, as did the Appellate Court. However, the Supreme Court granted an alternative wri forcing IAPMO to affix a warning to the UPC. That warning reads:

> NOTICE: An Environmental Impact Report is now being prepared in California to determine whether the use of CPVC, PVC, or PB plastic pipe for transporting potable water poses a danger to public health or the environment. At the time of this printing of the 1982 Edition of the Uniform Plumbing Code, the State of California does not permit any expansion in the use of such pipe beyond those applications permitted in the 1979 Edition of the Uniform Plumbing Code.
>
> For information on California restrictions, contact the State Housing Law Section of the California Housing and Community Development Department.

The trial on the underlying merits is now set for December 12, 1983 in Los Angeles Superior Court before the Honorable Judge Jack Crickard. The objectives of the plaintiffs are

best understood in light of the relief requested. Plaintiffs seek to require either IAPMO, or the product manufacturer through a contract with an independent laboratory approved or designated by IAPMO, to test each individual product for health and safety effects. Such health and safety effects should include:

1. toxicological testing of chemicals found in products or to have leached from products;

2. water chemistry testing of appropriate uses of such products;

3. permeation of organic and inorganic substances into potable water from either airborne or groundladen substances;

4. fire safety testing;

5. worker/installer safety assessment;

6. determination of durability to assure adequate service life.

Moreover, all Research Committee meetings should be opened to the public at large. Decisions by the Research Committee should be based on substantial evidence in the record. Findings should be prepared by IAPMO which show that the Research Committee has determined that the product does not create negative health and safety effects. Members of the Research Committee must not be limited to IAPMO members only, but rather must include public members, including but not limited to, those representing environmental and consumer interests. These public members shall

have voting privileges on the Research Committee.

IAPMO plays a critical legislative role and enjoys the economic and legal benefits of such a role. The time has come for them to assume the related burden of public responsibility.

ASSEMBLY

CALIFORNIA LEGISLATURE

ART AGNOS

ASSEMBLYMAN SIXTEENTH DISTRICT

DEMOCRATIC CAUCUS SECRETARY

CHAIRMAN
WAYS and MEANS SUBCOMMITTEE on HEALTH
and WELFARE

AGENDA

SUBCOMMITTEE #1 on HEALTH and WELFARE
OVERSIGHT HEARING on PLASTIC PIPE
WEDNESDAY OCTOBER 19, 1983
1:00 - 3:00 P.M.

Background

In July the Governor blue pencilled $200,000 for a study to assess the public impact of the permeation and infiltration of plastic pipe and pipe water mains by toxic chemicals. The study called for a comprehensive and independent literature search on permeation; the development of new test protocols to assess permeation: and risk assessment based on the likelihood and dose of human exposure to chemicals which could enter drinking water supplies.

The study designed by the Assembly was to be carried out by an independent contractor under the supervision of the Assembly Office of Research. It was to be completed by March 1, 1984, and it was funded entirely by the Hazardous Waste Control Account.

The Governor's veto message stated that the item was vetoed because it was more appropriate for the study to be funded by the pipe industry.

Major Issues

This hearing will address five critical issues relating to the plastic pipe issue.

1. How much do we know about the phenomena of permeation? Do existing studies and available information suggest that this is a serious health issue?

2. What type of studies are currently being done by industry? Are they comparable to the study proposed by the Legislature?

3. Is it prudent public policy to rely on the industries which manufacture plastic pipe and have direct financial interest in its use, to perform an important public health study?

4. Is there a legitimate need for an independent study of plastic pipe permeability? How should such a study be funded?

5. Are existing regulations being adequately enforced? Are there immediate steps that should be taken to limit or restrict the use of plastic pipe?

Witnesses

Mr. Richard Spohn, Attorney
Consumer Federation of America

Mr. Michael Paparian
Sierra Club

Mr. Marc Lappe
Coalition of Consumer Labor and Environment Groups

Resident
McColl Dump Site

Mr. Alan J. Olson
B. F. Goodrich Corp., representing the Vinyl Institute

Mr. Jim Blumencrantz
R & G Sloane, representing the Plastic Pipe & Fitting Association

Mr. Robert Harris, PhD, Co-Director
Hazardous Waste Research Program, Princeton University

Mr. Robert Fugina, Chief Deputy Director
State Department of Health Services

Mr. Harvey Collins, Chief
Environment Health Division - State Department of Health Services

SACRAMENTO ADDRESS
STATE CAPITOL
SACRAMENTO 95814
(916) 445-8253

DISTRICT OFFICE
1084 STATE BUILDING
350 MCALLISTER
SAN FRANCISCO CA 94102
(415) 557-2253

COMMITTEES
AGING
ELECTIONS AND REAPPORTIONMENT
RULES
WAYS AND MEANS

Assembly
California Legislature

ART AGNOS
ASSEMBLYMAN, SIXTEENTH DISTRICT

DEMOCRATIC CAUCUS SECRETARY
CHAIRMAN
WAYS AND MEANS SUBCOMMITTEE ON HEALTH AND WELFARE

PLASTIC PIPE AND PERMEATION; DOHS OVERSIGHT HEARING
OCTOBER 19, 1983

BACKGROUND PAPER FOR
ASSEMBLY WAYS AND MEANS SUBCOMMITTEE NO. 1
ON HEALTH AND WELFARE

Summary

This briefing document provides background information on the phenomena of plastic pipe permeation and discusses what the state has done to restrict the use of plastic pipe. The document is organized as follows:

I. Overview of the Issue ...pg 3.

A. Types of Pipe
B. Reports of Permeation
C. Related Public Health Issues
D. Jurisdictional Issues
E. Economic Interests

II. What is Known About Permeation? ...pg 6.

A. East Bay MUD
B. Lekkerkerk
C. Housing and Community Development EIR
D. McColl Dumpsite/Coyote Hills
E. Stringfellow Dumpsite
F. Department of Consumer Affairs
G. Shell Study
H. New Studies
I. Miscellaneous Notes

III. Does California Need an Independent Study of Permeation? What are the Issues?1 ...pg 14.

IV. Are Existing Regulations Being Adequately Enforced? Are there Immediate Steps that Should be Taken to Restrict the Use of Plastic Pipe? ...pg 15.

A. Existing Regulations
B. The Need for Emergency Regulations
C. The Need for an Information Program

I. Overview of the Issue

Permeation refers to the phenomenon by which chemical substances travel through the walls of plastic pipe from surrounding soils and contaminate fluids transported within the pipe. Permeation is of concern whenever drinking water is transported by plastic pipe through soils that are contaminated with hazardous substances. The evidence demonstrates that permeation does occur, although the data necessary to determine the extent and severity of the problem is not conclusive. Uncertainty rests both with the potential frequency of the problem and with the often unknown health effects resulting from chronic (long-term) exposure to low levels of toxic substances.

A. Types of Pipe:

There are three major types of plastic pipe commonly in use for water service. The types of pipe are refered to by their prime constituents: polybutylene (PB), polyethylene (PE) and polyvinylchloride (PVC). Pipe used for water mains is generally from two to twelve inches in diameter. Pipe used to service individual customers is two inches or less in diameter. Evidence indicates that the higher the density of the molecules of the plastics used in the pipe, the lower the permeability of the walls and the lower the rate of permeation.

B. Reports of Permeation:

Permeation has been reported in California and in the Netherlands and EPA data indicates that other states have also experienced permeation problems. Alleged incidents of permeation have been connected to contaminated soils in the vacinity of both the McColl and Stringfellow dumpsites. Permeation could also be a problem if plastic pipe is installed to carry drinking water near any of the hundreds of other identified California sites with known soil contamination.

The experience of one major California water utility demonstrates that the installation of plastic pipe in localized areas subject to soil contamination from the spillage of gasoline can lead to permeation. Other situations of concern include: a) cases in which pipe is installed in new housing developments located on old

agricultural lands that have been sprayed with persistant pesticides; and b) application of common pesticides in a residential setting. In summary, the preconditions for permeation may be a common feature of residential and urban settings.

C. Related Public Health Issues:

Permeation is only one of several public health issues related to the use of plastic pipe. One major concern is the contamination of tap water from the leaching of plasticizing agents which are used in the manufacture of plastic pipe, and of solvents and glues used in connecting pieces of pipe. There are also concerns about toxic fumes that are generated during structural fires. Leaching and plastic fumes are major issues in an EIR being developed by SRI International for the State Department of Housing and Community Development (HCD). By contrast there is no scientific study of permeation being carried out in California.

D. Jurisdictional Issues:

Jurisdiction over the use of plastic pipe in California involves a split at the property line of the individual homeowner. The laying of water mains and the delivery of water up to, and away from the property line is regulated by the Sanitary Engineering Branch of the Department of Health Services (DOHS). The use of plastic pipe inside of the property line and within buildings is regulated by HCD. The failure to properly evaluate the threat of permeation in the five years that DOHS has known of the concern, and the failure to take appropriate preventive action, is partially due to this split in jurisdiction. In larger part, DOHS's failure on permeation is a function of:

- o very poor follow through once regulations are developed;
- o a tendency to downplay the potential severity of public health threats and;
- o understaffing.

E. Economic Interests:

The debate on permeation is often clouded by the large economic interests involved in the issue. Plumbers unions have generally been opposed to the use of plastic pipe on several grounds including:

- o occupational health issues involved in using glues that contain synthetic organic compounds to join pieces of pipe and;

- o public health issues of fire safety, leaching and permeation.

In addition, plastic pipe is generally less expensive than metal pipe and is more easily installed, particularly by homeowners and other nonprofessional plumbers that can use glue and avoid the soldering necessary with metal pipe. Plumbers have not been vocal in raising potential health concerns with nonplastic pipe. Yet there are also occupational and public health issues related to the use of asbestos in pipe, and the lead and cadmium used to solder metal pipe.

II. What is Known About Permeation?

The following is a summary of incidences of contamination and studies related to permeation. Events are presented chronologically where possible.

A. East Bay MUD:

In the late 1970's the East Bay Municipal Utility District (EBMUD) began to receive complaints about drinking water tasting and smelling of petroleum. After investigating several complaints EBMUD concluded that gasoline and other petroleum distillates must have been present in soils into which plastic water mains and service pipes were installed, and that these chemicals permeated through the walls of the pipe and into the tap water.

EBMUD conducted laboratory studies demonstrating that permeation occurs when PE and PB plastic pipe is allowed to soak in a solution of gasoline diluted with water. Results of an identical test of permeation through PVC pipe were negative. Several of the first incidents of petroleum distillate permeation were linked to: (1) the uncontrolled drainage of materials used to clean motorcycles and the corrosion of asphalt, and (2) the contamination of soil caused by the spillage of gasoline from the tanks of automobiles parked on a steep hill.

A third reported incident of permeation in the EBMUD service area involved the presence of butyl mercaptan in tap water. Mercaptans are added to natural gas to produce an odor for safety reasons. The mercaptans apparently permeated from a natural gas service pipe made of PE and through a PE water pipe with which the gas pipe was in direct contact. EBMUD conducted a simple laboratory test of permeation using butyl mercaptan and PE pipe. Strong mercaptan odors were detected in several of the samples.

Several aspects of the EBMUD experience deserve note:

- Although one of the reported cases of permeation occurred on the premises of an operating chemical manufacturing plant, EBMUD did no test for substances other than gasoline and butyl mercaptan.

- o The EBMUD lab tests demonstrate that permeation occurs. There was no attempt, however, to quantitatively correlate concentrations of specific substances with the rate of permeation for each type of pipe.

- o EBMUD conclusions that permeation is not a common phenomenon because of the relatively low number of reported cases may be erroneous. As the utility notes, permeation will not likely be reported unless the taste or odor of the tap water is adversely affected. Thus there may be unreported incidents of permeation that involve substances at concentrations too low to be detected by end users.

- o A number of the EBMUD incidents involved contaminated soils on the property of the building involved. There is serious concern that the application of pesticides near a residence, particularly fumigation with lindane and chlordane for termite or ant control, may increase the likelihood of the permeation of service pipe running through soils within the property line. One consultant notes that it is common practice when fumigating for termites to deliberately spray both the soil and any pipes entering the house.

- o The EBMUD permeation experiences resulted in the 1979 promulgation of DOHS regulations prohibiting the use of plastic pipe in soils contaminated with petroleum distillates.

B. Lekkerkerk:

Lekkerkerk is a town in the Netherlands that experienced what appears to be the most serious reported incident of permeation. PE pipe was installed in Lekkerkerk in soils that were heavily contaminated with a variety of substances including known carcinogens. Many of the buildings were located on top of an old chemical waste dump. Trichloroethylene (TCE), for instance, was found in concentrations of from 140 to 160 parts per million (ppm). In 1980, 800 inhabitants were evacuated from 270 houses which were then put up on piles while the contaminated soil, totalling 150,000 tons, could be removed.

Dutch scientists subsequently did several studies of

permeation. One was a 1981 study of the permeation of gaseous methyl bromide through PE, PB and PVC pipe. An incident of suspected permeation involved this soil disinfectant which is commonly used in both the Netherlands and the U.S. PVC pipe was found to be the most resistant and of the three was the only one that did not permeate. These results are of concern in California because of the chemical similarity of methyl bromide to ethylene dibromide (EDB). Although EDB is now being banned for use by the EPA, the substance is very persistant and has been used for many years on California soils.

C. Housing and Community Development EIR:

The Department of Housing and Community Development is currently preparing an EIR on the impacts of expanding the legal uses for plastic pipe in residential buildings. Legal use is currently restricted to effluent and prohibits the use of plastic pipe to deliver potable water. Development of the EIR began in 1978 with the formation of a task force chaired by HCD and including representatives of DOHS, Consumer Affairs, Cal-OSHA, the Fire Marshall, the Pipe Trades Council (plumbers), the California Building Trades Council, a plumbers union and several manufacturers of plastic pipe. The study is being conducted by SRI International and funded by the Society of the Plastic Industry.

Although SRI identified permeation as an important public health concern, HCD does not want to include the issue in the EIR because:

- o the concern was brought up too late in the process;
- o too much basic scientific research is required before permeation can validly be evaluated in an EIR and;
- o the issue is outside of HCD's jurisdiction. Despite ongoing efforts of the Pipe Trades Council and a coalition of environmental and consumer organizations, it is not clear that the EIR is the proper forum for a study of permeation. The EIR focusses on the use of pipe in buildings and permeation occurs outside of residences.

D. McColl Dumpsite/Coyote Hills:

In 1981 residents of the Coyote Hills housing development near the McColl dumpsite began to complain of petroleum odors and tastes in their drinking water. Little was done at either the local or the state level to respond to these concerns. Two years later, during the summer of 1983, DOHS finally conducted water sampling and laboratory analyses of Coyote Hills tap water. Although DOHS concluded that permeation probably is not a problem in this Fullerton community, the report has been criticized by local residents and the Pipe Trades Council. Specific objections to the study include:

- o Water was only allowed to accumulate in the plastic service lines for two hours. Such a short period may not adequately reflect actual residential use, tending to understate any permeation.
- o No soil testing was done in the vacinity of the plastic pipe from which water entered the houses.
- o Instead of testing a random number of houses, essential for statistical validity, DOHS allegedly tested the first twelve houses they came across.
- o The Department never took the measurements of water flowrate necessary to assure that the sampled water came from the service pipe, where it was supposed to be static for two hours.

The Department found extremely low levels of one or more of three toxic organic compounds (toluene, styrene and tetrahydrofuran) in the water of three houses. The Department concluded that although the source of the substances is unknown, none of the substances is related to the oilfield wastes that contaminate the soils of the area, and that permeation is not demonstrated to be occuring. McColl residents will vociferously dispute the results of the DOHS study. The Department intends to do further water sampling at the Coyote Hills subdivision. The nature of this testing has not been announced.

E. Stringfellow Dumpsite:

Permeation has also become a concern at the Stringfellow dumpsite. In 1978 the regional water board released part of the liquid contents of one of the Stringfellow ponds during a heavy rainstorm in order to avoid a breaching of the pond walls. The effluent ran down the canyon and across a portion of the playground at the Glen Avon school. Synthetic organic compounds have recently been found in water from the school drinking fountains. It is possible that some of the Stringfellow wastes may have percolated into the school's soils and permeated plastic water service pipe.

F. Department of Consumer Affairs:

The Department of Consumer Affairs has been involved in the issue of permeation in several different contexts:

- In mid-1982 Dr. Marc Lappe, a consultant for Consumer Affairs during the Brown Administration, learned of the Lekkerkerk incident and obtained a copy of the EBMUD studies that had been part of the hearing record for the DOHS regulations. Lappe designed a protocol, working with Consumer Affairs and funding from the state Building Trades Council, to duplicate the EBMUD tests on petroleum distillates and to test a broader range of organic compounds including solvents and pesticides. As with the EBMUD studies, the aim was to qualitatively rather than quantitatively, demonstrate the threat of permeation. The work was conducted by AnLab, a independent laboratory in Sacramento, and the results were relesed by Consumer Affairs in December 1982.

The results included:

- o In testing permeation of pipe with soil saturated by gasoline, AnLab found that benzene (a potent carcinogen) accumulated in pipe at levels of up to 100 ppm in one week. The federal regulatory action level for benzene in drinking water is approximately ten thousand times lower.

- o In testing a range of pesticides, AnLab obtained negative results for chlordane, but positive results for lindane. This result raises serious questions regarding common methods of ant and

termite control that include spraying pesticides on water pipes.

- In the spring of 1983, Gus Koehler, then a research analyst with Consumer Affairs, learned of the experiences of McColl area residents. Koehler researched and wrote a paper entitled, "Plastic Water Pipe in Coyote Hills: A Case Study of Regulatory Failure", that became available in draft form in August 1983. The Koehler study is as an indictment of a state regulatory structure that is intended to protect the public health. The report demonstrates the ineffectiveness of the existing DOHS permeation regulations, due largely to lack of enforcement, and the finger pointing concerning the lack of soil testing prior to the installation of plastic pipe between the developer, the water agency and county health officials. Koehler has since been removed from his post at Consumer Affairs and shuffled to a desk with no phone in a different department.

G. Shell Study:

In July 1983 the Governor vetoed budget item 4260-001-014 which would have allocated $200,000 from DOHS' Hazardous Waste Control Account for an independent study of permeation. Department representatives testified in budget hearings that such a study would be useful.

DOHS is now working with Shell scientific staff at the firm's corporate headquaters in Houston to develop a protocol for a study to be both funded and conducted by Shell. Department spokepersons have indicated that Shell and DOHS are a long way from agreement about the initial protocol submitted by Shell. For example, Shell does not want to test soils contaminated above 1 part per million. In practice, soil is often contaminated at levels far in excess of this.

A number of questions are unanswered:

- o What was the impetus for the veto of the budgeted study and the Shell study? Did Shell offer to do the study or was the firm approached by the Administration?

- o How will the Shell study address the fundemental issue of permeation if it involves only one type of pipe, PB, of which Shell is the major manufacturer? Does the Department have any plans for more exhaustive study of permeation?

- To what degree will DOHS be able to exercise control over a study that is funded by Shell and is conducted in Texas? Will this study just be another example of suspect results from private testing by an affected industry?

The Shell study is already controversial. The Department contends that no actual work has been done by Shell and that only the protocol is now under discussion. The Pipe Trades Council asserts, however, that Shell has already conducted testing and is unhappy with the results. This controversy highlights the dangers of relying on a study such as Shell's as the basis for major public health decisions.

B. New Studies:

The results of several new studies are now becoming available including:

- Recent laboratory studies by a New Jersey utility, the American Water Works Company, strengthens the case on permeation. American Water Works conducted tests using substances present in low concentrations in the gaseous phase, rather than soil saturated with liquids. One major result is that PE, PB and PVC all were permeated by a gaseous solvent in periods ranging from one day to one week.

- AnLab, with funding from the Pipe Trades Council, has replicated its 1982 experiments using tighter controls to avoid any possible entry of substances through the joints between the pieces of pipe, rather than through the walls. The results, to be released at the hearing, include:

  - The degree and rate of permeation appears to be a function of identifiable chemical characteristics of a permeant. Constituents of gasoline, such as benzene, and chlorinated solvents permeate readily while pesticides permeate more slowly.

  - In order of the threat of permeation, PE pipe poses the greatest danger, PB pipe is of intermediate danger, and PVC appears to pose the least threat.

- o California Analytical Labs, also under contract to the Pipe Trades Council, is conducting tests on a carbon water filter from one of the McColl area houses sampled by DOHS. The results, also to be released at the hearing, indicate the presence of over thirty organic chemicals, including a number of benzene-related molecules. Some of the chemicals are known or suspected carcinogens. A number of the chemicals are related to crude petroleum and could probably be linked to the McColl wastes.

I. Miscellaneous Notes:

Ray Leonardini's group, the Pipe Trades Council and a coalition of organizations including Friends of the Earth, Citizens for a Better Environment and the Consumer Federation of California, is suing the International Association of Plumbing and Mechanical Officials (IAPMO). IAPMO is developing rules governing the installation and use of plastic pipe. Although the rules do not have the weight of law, it is common for IAPMO rules to be incorporated into state building codes. The suit is now in the discovery phase and is expected to go to trial in Los Angeles in December.

IAPMO contends that sufficient data exists to certify plastic pipes as safe. The plaintiffs assert that there is insufficient data and that the development of the rules is premature.

III. Does California Need an Independent Study of Permeation? What are the Issues?

There are significant drawbacks to relying on an industry organization to both fund and conduct a study of permeation. The Shell study will examine only PB pipe, of which the company is the major manufacturer. In addition, representatives of DOHS indicate that Shell and the Department are far from agreement on the protocol initially submitted by the firm. The State has little if any leverage over research funded and conducted by a private firm. Is the public good served by a prolonged study that addresses only part of the issue? The results of the Shell study will be inconclusive for all parties except Shell.

IV. Are Existing Regulations Being Adequately Enforced? Are there Immediate Steps that Should be Taken to Restrict the Use of Plastic Pipe?

A. Existing Regulations:

In 1979 the Sanitary Engineering Branch promulgated two new regulations relating to the permeation of plastic pipe. These regulations were the direct result of studies by East Bay MUD, and were added to Title 22, Article 5, Water Mains and Appurtances.

- Section 64624 (f) states that:

  "Plastic pipe shall not be used in areas subject to contamination by petroleum distillates."

- Section 64630 (g) states that:

  "Installation of water mains near the following sources of potential contamination shall be subject to written approval by the Department on a case-by-case basis:

  (1) Storage ponds or land disposal sites for waste water or industrial process water containing toxic materials or pathogenic organisms.

  (2) Solid waste disposal sites.

  (3) Facilities such as storage tanks and pipelines where malfunction of the facility would subject the water in the main to toxic or pathogenic contamination."

B. The Need for Emergency Regulations:

The scope of existing regulations appears to be inadequate to protect public health from toxic contaminants. Existing regulations apply only to petroleum distillates and exclude many solvents, pesticides and other toxic substances that can permeate plastic pipe.

Section 64624 should be expanded beyond petroleum

distillates to include all hazardous substances, including wastes. In addition the regulations could require:

- o certification that soil has been tested prior to installation of plastic pipe
- o that end users of water receive notice from the entity installing the pipe that plastic pipe has been used and that in the event of contamination of adjacent soils delivered water could become contaminated through permeation.

C. The Need for an Information Program:

The Department has no procedures to inform affected parties of the permeation regulations. A Department survey of water utilities found very poor knowledge of the regulations. It is unlikely that housing developers have any knowledge of the regulations. In the case of the alleged permeation in the vacinity of McColl, there were three forms of regulatory failure.

- o The contractor was unaware of Section 64624 which prohibits the use of plastic pipe in areas subject to soil contamination.
- o The water purveyor relied on the contactor to inform him of any soil contamination.
- o Despite the proximity of the McColl dumpsite the water purveyor did not request the Department's permission to install plastic pipe, in violation of Section 64630.

DOHS should develop procedures to:

- o Inform water utilities and contractors of their responsibilities under the permeation regulations.
- o Utilize data from a variety of sources within the Department, and from the regional water boards and the State Waste Management Board, to aid local governments in locating sites of known or potential contamination. This data base should include information on abandoned sites, underground storage facilities, solid and industrial waste disposal facilities and liquid waste surface impoundments.

PRESS INFORMATION

for

WAYS & MEANS SUBCOMMITTEE NUMBER 1
ART AGNOS, CHAIRPERSON

HEARING ON PLASTIC PIPE PERMEATION

1 p.m. Room 437

October 19, 1983

Presented by:

The Consumer Federation of California, Friends of the Earth, Citizens for a Better Environment, The Natural Resources Defense Council, and the California Pipe Trades Council

Coordinator:
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(916) 444-0223

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(1)

A STATEMENT OF CONCERN FOR A NEW PUBLIC HEALTH RISK POSED BY TOXIC SUBSTANCES THAT PENETRATE PLASTIC DRINKING WATER PIPES

Presented to

The Assembly Ways and Means Subcommittee Number 1
Art Agnos, Chairperson

by

The Consumer Federation of California, Friends of the Earth, Citizens for a Better Environment, The Natural Resources Defense Council, and the California Pipe Trades Council

October 19, 1983

We wish to alert the Committee to a new and previously underestimated source of environmental contamination. We are gravely concerned that California consumers may be unknowingly exposed to hazardous chemicals which may enter drinking water supplies from contaminated soils by migrating through the walls of permeable plastic water pipes.

The degree of our concern is heightened by two facts:

1) the increasing occurrences of soil contamination following accidental spills, leaks from underground storage tanks and, chemical migration from landfills [from the records of the Environmental Protection Agency we know of 58 episodes of major spills of gasoline or diesel oil in one month in California alone (January, 1983)]; and,

2) the increasing reliance of many municipalities on plastic pipes as the conduits for potable water.

In the past, such episodes of soil contamination had been thought to be rare and small in magnitude. From the EPA records we know that spills in the million-gallon range may occur monthly. In early May, 1983, the Regional Water Quality Control Board in Santa Clara reported a total of 57 major underground leaks from storage tanks containing industrial solvents and stripping solutions.

Municipalities either have been unaware of these problems or have underestimated its seriousness. San Francisco uses plastic piping in over 50 percent of its water service connections. The East Bay Municipal Utility District (EBMUD), in spite of having uncovered over a dozen such episodes since 1978, relies almost exclusively on polybutylene plastic pipe for its mains and recommends such use for service laterals.

Research done at the Anlab Laboratory in Sacramento under the supervision of Prof. Marc Lappe' of the UC Berkeley School of Public Health has shown that several major groups of hazardous chemicals can permeate different types of plastic pipe. Some of these pipes, such as polybutylene and polyethylene, are strikingly permeable to chlorinated solvents including some which are carcinogenic in animals.

At the Fairchild plant in San Jose, for instance, soils have been contaminated with chlorinated solvents like 1,1,1 trichloroethane and 1,1 dichloroethylene. Homes in the immediate

vicinity of the plume of contamination are plumbed with subsoil polyethylene (PE) and polyvinychloride pipe (PVC). PE has proven to be extremely permeable to these solvents, PVC less so.

Homes sold throughout California are commonly sprayed with lindane, a carcinogenic and teratogenic pest control agent which the EPA has just recertified for use as a structural pest control agent. The labels on several such formulations carry the instruction to spray directly on exposed pipes. Anlab studies show that prolonged contact (1-7 weeks) between PVC pipe and a concentrated lindane solution results in substantial contamination of water inside the intact pipe with this highly persistant pesticide.

Although it contains less toxic ingredients than lindane, the chemical of greatest concern remains gasoline because of its ubiquitous presence in the environment. In spite of studies done in 1978-79 by EBMUD which showed that gasoline will readily penetrate PE and PB (polybutylene) pipe, the level of concern of health officials for this now commonly recognized permeation event remains inexplicably low. A survey of water utility districts in California performed in the summer of 1983 by the Sanitary Engineering Branch of the State Department of Health Services showed that 62 percent of the representatives of districts which regularly recommend the use of plastic pipe for water lines knew nothing about State regulations which proscribed their use in the presence of petroleum distillates.

In spite of their familiarity with permeation problems with plastic pipe, the Department of Health Services failed to specify permeability when asked to indicate what public health concerns were properly within the scope of an Environmental Impact Report on expanded use of plastic pipe being conducted by the Department of Housing and Community Development. This omission is all the more questionable in the face of the fact that Robert Stephens, then the Department's head of hazardous substances, had just returned from an oversight mission in Holland where he had observed the most serious environmental episode involving plastic pipe permeation then known (Lekkerkerk).

Perhaps of greater concern, is the fact that the attorney for the Society for Plastics, Inc., failed to divulge any data about plastic pipe permeation when asked to do so by the Department of Health Services in March of 1981 following the first public reports of the Lekkerkerk event. It is clear from material submitted for the public record that such industry data were available.

Part of the lack of the Department's concern may have stemmed from the mistaken belief that problems of the magnitude of the Lekkerkerk episode (often called Europe's Love Canal) could not happen in the United States. But we know now of several episodes reported to American water districts and the EPA which have involved potential human exposure to extremely hazardous substances such as benzene as the result of permeation of plastic pipe.

Another explanation for Department passivity is the belief that the taste or odor of the water will alert consumers to the existence of a problem. Published data on odor thresholds for the chemicals of concern for permeation establish that consumers cannot be expected to detect them before they are already above the level of health concern.

A case in point is benzene, a human leukemia-causing agent. Data from the Anlab studies showed that this constituent of gasoline will readily go through PB and PE pipe walls and reach extremely high concentrations (100 ppm) after just one week of exposure. This observation could have predicted a permeation contamination episode in Columbus, Ohio, where seven people were exposed to levels of benzene well above those considered the threshold for regulatory action. For benzene in particular, the odor detection threshold is known to be substantially above this threshold, set by the EPA at 0.66 parts per billion (ppb). At 100 parts per million, the levels found by the Anlab work--albeit with pure gasoline--are over 100,000 times the action level.

The lack of response on the part of the plastics industry to the Department's request for data on permeation (March, 1981) is even less understandable, since several industry studies on the resistance of various plastics to attack by chemicals, show that they have known about the vulnerability of various plastics since the early 1960's. That they permitted water pipes to be constructed of these same materials without public disclosure of this vulnerability to appropriate public agencies is cause for concern.

Because of the gravity of the potential health hazards posed by these and other carcinogenic chemicals, and the uncertainties surrounding where and when health-threatening episodes may occur throughout the state, we believe that the following moratoria requirements and authorizations should be adopted immediately:

1) A specific moratorium on use of underground plastic

pipes for carrying potable water in and around high-risk sites in the state. These sites, to be specified by the Department of Health Services, Department of Food and Agriculture, and CalTrans, would include, but not be limited to, areas of proximity to present and abandoned hazardous waste disposal sites; land in proximity to underground chemical storage tanks; agricultural land where residual contamination with pesticides or soil sterilants may occur; and, rights-of-way at high risk for accidents or spills that contaminate soils with potentially permeating chemicals.

2) A requirement that soils at all major construction sites and rights-of-way [illegible] which contractors intend to use plastic pipe be monitored prior to use to determine the presence of significant levels of permeating chemicals.

3) A directive to the Department of Health Services to rigorously enforce relevant statutes and regulations dealing with the siting of water mains and service laterals.

4) A notification requirement that householders whose service lines have been plumbed with plastic be warned of the health risks associated with permeation of toxic chemicals from contaminated soil.

5) A requirement that CalTrans and other emergency agencies notify local water utilities known to use plastic pipe of any spill or leakage of hazardous chemicals which can permeate plastic piping (A model notification request for PCB permeation of PB pipe was recently developed by the North Marin County Water District).

6) A requirement that the Department of Food and Agriculture monitor agricultural soils for residual contaminants which can permeate underground plastic irrigation pipes and thereby recontaminate crops or workers (examples include DBCP and dichloropropanes). And

7) An authorization for the Department of Health Services to modify its existing regulations proscribing the use of plastic pipe where petroleum distillates are present to encompass all classes of chemicals known

to permeate plastic pipe.

We believe that the health and welfare of California citizens will be substantially served by taking the steps outlined above to offset the real and potentially damaging health threat posed by the permeation of plastic water pipes by toxic organic chemicals.

INCIDENTS OF PERMEATION OF PLASTIC WATER SUPPLY LINES

SITE	NUMBER OF EPISODES
East Bay Municipal Utility Districts, Oakland, California: Reports of at least twelve specific incidents of potable water being contaminated by gasoline distillates via permeation of plastic pipe. Specific types of plastic pipes permeated are unknown at this time.	12
Marin Municipal Water District, Corte Madera, California: Episodes of gasoline permeation of PB pipe at two residences.	2
North Marin County Water District, Novato, California: Permeation of PB pipe by gasoline (accident near meter) at a residence.	1
State of Delaware: Department of Health and Social Services Division of Public Health reported an episode of permeation at a shopping center of PE pipe by Tetrachloroethylene (PCE).	1
Columous, Ohio: Shopping center, 2492 Morse Road, Columbus, reports of permeation of PE by gasoline distillates. Adverse health effects reported.	2

INCIDENTS OF PERMEATION OF PLASTIC WATER SUPPLY LINES
(Continued)

SITE	NUMBER OF EPISODES
Chattanooga, Tennessee:	
Permeation of a residential plastic service line by gasoline.	1
Lekkerkerk, Nederlands:	
See attached description. 800 Inhabitants evacuated; 270 homes contaminated.	270

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FOR IMMEDIATE RELEASE
October 19, 1983

(3)

A new danger associated with the use of plastic pipe was revealed today in Sacramento at an Assembly committee hearing. Laboratory tests have shown that lindane, a carcinogenic chemical commonly sprayed on or near pipes for the control of termites and other structural pests, will penetrate the walls of some plastic pipe and contaminate drinking water according to Dr. Marc Lappe of the U.C. Berkely School of Public Health.

Testifying before an Assembly Ways & Means Subcommittee chaired by Assemblyman Art Agnos (D-San Francisco), Lappe urged the state to adopt an emergency regulation to prevent the application of lindane on or near plastic pipe.

Under California law, all structures must be treated for termites before sale or resale. The average home in California is resold every four years, according to Lappe, and lindane is the second most common chemical used for the required treatment. Lappe speculated that, by the year 1990, most Californians will have drunk water from lindane contaminated pipes.

Lappe warned the committee that "the state departments which are responsible for health and environmental protection need to conduct comprehensive examinations of plastic pipe permeation and do a better job of coordinating information amongst themselves." The testing for lindane permeation was recently completed under Lappe's supervision by an independent laboratory in Sacramento. Previous research had indicated that gasoline and other toxic chemicals commonly spilled, dumped, or sprayed in or on soil will permeate plastic pipe.

"Despite the reports of gasoline permeation episodes by three different California utility districts and independent confirmation of my findings by the American Water Works Service Co in New Jersey, the state has attempted to ignore this serious health hazard," Lappe charged.

Agnos had called the hearing in response to an unreleased report by the Department of Consumer Affairs that the Department of Health Services and other agencies had failed to properly protect drinking water quality in a housing tract developed near the McColl hazardous waste site in Fullerton. The hearing also questioned the Governor's veto of a Budget Bill appropriation which would have commissioned a study of pipe permeation.

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LINDANE

Common Name: Lindane

Synonyms: Hexachlorocyclohexane; gamma benzene hexachloride; BHC

Uses: Fumigant in homes and gardens* (See attachments); control of body lice

*Approximately 29,000 pounds of Lindane were used for structural pest control in California in 1981. Pesticide Use Report, Dept of Food and Agriculture, State of California, 1981.

Type of Chemical: Organochlorine (chlorinated hydrocarbon)

Chemical and Physical Properties: Colorless; persists in environmeant for approximately 10 years**

** An Assessment of the Health Risks of Seven Pesticides Used for Termite Control. Committee on Toxicology, Board on Toxicology and Environmental Health Hazards, Commission on Life Sciences. National Academy Press, Washington, D.C. August, 1982.p.3.

LD_{50}: Acute oral: 88 mg/kg. in male rats*

*Thomson, W.T. Agricultural Chemicals, Thomson Publications, California. 1977.

Antidote: No antidote available

Acute Health Effects: As an organochlorine, lindane may disrupt the function of the nervous system, principally that of the brain. Acute symptoms may include headache, disorientation, apprehension, weakness, muscle twitching and convulsions. Chlorinated hydrocarbons are fat soluble and may be stored in human body fat.

Morgan, D.P., 1977. Recog. & Mgmt. of Pesticide Poisonings, U.S. EPA, Washington, D.C.

A 2-year-old boy developed aplastic anemia after playing with a dog treated with lindane solution for mange.

Vodopick, H. "Cherchez la Chienne: Erythropoietic Hypoplasia After Exposure to -Benzene Hexachloride." JAMA, 234(8), 850-851, 1975.

Lindane can be absorbed through the skin.

Chronic Health Effects: Lindane has been shown to cause cancer in rats and mice.

Reuber, M.D., 1979. "Carcinogenicity of Lindane." Environ. Res. 19(2): 460-481.
Reuber, M.D., 1979. "Carcinomas and Other Lesions of the Liver in Mice Ingesting Organochlorine Pesticides." Toxicol. Annu. 3:231-256.

Lindane has been found to be mutagenic in human cell cultures and plant root tips.

Vachkova-Petrova, R.(Inst. Hyg. & Occup. Dis., Med. Acad., Sofia, Bulgaria), 1978. Mutagenna aktivnost na pestitsidite. (Mutagenic activity of pesticides). Khig. Zdraveopaz. 21(5):496-605. (Bulgarian).
Kolmark, F.G. "The Induction of Cytogenetic Changes and Atypical Growth by Hexachlorocyclohexane." Science, 109, 467-468.

Long-term administration of lindane to rats resulted in decreased fertility and produced teratogenic, carcinogenic and central nervous system effect.

Petescu, S., V. Dobre, M. Leibovici, Z. Petroscu, S.A. Ghelberg, 1974. "The Effects of Long-Term Administration of Organochlorine Pesticides (Lindane, DDT) on the White Rat." Rev. Med. Chir. 78(4):831-842.

CAUTION

May be fatal if swallowed. Harmful if inhaled or absorbed through the skin or eyes. Do not swallow or inhale vapor or spray mist or allow contact with skin, eyes or clothing.

Avoid contact with food or feeds.

If swallowed, induce vomiting by giving the victim 1 Tablespoon of table salt in a glass of water. If on skin, remove contaminated clothing and wash with soap and water; if in eyes, flush with running water. Call a physician in all cases of suspected poisoning. Do not use in dairy barns or milkhouses.

Do not use in edible products areas of food processing plants, restaurants or other areas where food is commercially prepared or processed. Do not use in serving areas while food is exposed.

This product is toxic to fish, birds, and other wildlife. Keep out of lakes, streams, or ponds. Do not contaminate water by cleaning of equipment, or disposal of wastes.

Apply this product only as specified on this label.

NOTICE — Recommendations for the use of this product are based upon information believed to be reliable at the time of printing. The storage and use of this product being beyond the control of Los Angeles Chemical Company, no guarantees expressed or implied are made as to the effects of such, or the results to be obtained, if not used in strict accordance with the recommendations and established safe and sound practice. The buyer assumes all responsibility including any injuries and/or damages resulting from its misuse as such, or in combination with other products. No recommendations are made under abnormal storage or use conditions, or under conditions not reasonably foreseeable to the seller.

EPA REG. NO. 962-366 AA

EPA EST. NO. 962-CA-1

LACCO

HI-LIN

CONTAINS 1 LB. LINDANE PER GAL.

FOR SPOT APPLICATION ONLY

ACTIVE INGREDIENTS:	
Lindane (Gamma Isomer of Benzene Hexachloride)	12.9%
Xylene	78.4%
INERT INGREDIENTS	8.7%

CAUTION

KEEP OUT OF REACH OF CHILDREN

KEEP CONTAINER CLOSED. DO NOT LEAVE IN SUNSHINE.

Do not reuse empty drum. Return to drum reconditioner or destroy by perforating or crushing and burying in a safe place away from water supplies.

WARNING — FLAMMABLE!

KEEP AWAY FROM HEAT OR OPEN FLAME

See other precautions on the back/side panel

LOT NUMBER

NET CONTENTS

1 GALLON

DIRECTIONS

MANUFACTURED BY

LOS ANGELES CHEMICAL COMPANY

DIRECTIONS

LACCO HI-LIN is prepared for use against certain household and structural pests as listed below. Dosages are given in terms of fluid quarts of this product.

HOUSEHOLD: 1 quart in 25 gallons as a coarse, wet spray or with a paint brush as directed for the control of the following pests. Repeat as needed to maintain effective control. May cause staining in some cases.

ANTS: Apply to ant trails, door sills, window frames, openings around water pipes, heat ducts, electrical outlets, baseboards and other areas where ants may enter rooms.

ROACHES, WATERBUGS: Apply to infested cracks, hiding places and adjacent exposed surfaces where pests may crawl when not in hiding.

MOSQUITOES: Apply to doors, door sills, screens, window frames, and other areas where the pests frequently alight.

SILVERFISH: Apply to baseboards and areas behind shelving, bookcases and storage spaces.

FLEAS: Apply to infested areas around baseboards, windows and door frames, wall cracks, sleeping quarters of household pets and localized areas of floors and floor coverings; place fresh bedding in animal quarters after treatment and do not apply directly to pets.

DIRECTIONS (Continued)

FLIES: 1 quart in 8 gallons of water. Apply to doors, door sills, screens, window frames, and other areas where pests frequently alight.

STRUCTURAL: 1 quart in 25 gallons of water, pre-construction. Apply as a coarse, wet spray, or with a paint brush. Inspect treated areas annually for signs of infestation.

SUBTERRANEAN TERMITES: Slab construction, use a solution of 1 quart to 3½ gallons of water. For treatment before gravel or cinder fill has been added, apply 1 gallon of solution per 10 square feet of soil surface. Where fill has already been added, apply 1½ gallons per 10 square feet. Conventional construction, use a solution of 1 quart to 3½ gallons of water. Apply to trench 6 inches wide and up to 30 inches deep for buildings with deep foundations along both sides of exterior and interior foundations, around piers and under utility entrances; placing about 1/3 of the solution in the bottom of the trench with the remaining 2/3 mixed into the soil as the trench is backfilled. Use 2 gallons of solution per 5 linear feet for trenches not over 15 inches deep and 4 gallons per 5 linear feet for trenches exceeding 15 to 18 inches in depth. On voids of unit masonry walls, apply to 125 linear feet, from the surface of the soil to the footing.

CAUTION

Do not use in dairy barns or milk houses.
Keep container closed.
May be absorbed through skin.
Avoid inhalation and skin contact.
In case of contact, wash immediately with soap and water.
Avoid contamination of feed and foodstuffs.
Do not use on household pets or humans.
Harmful if swallowed.

DO NOT LEAVE IN SUNSHINE. DO NOT USE, POUR, SPILL OR STORE NEAR HEAT OR OPEN FLAME.

DESTROY OR RETURN THIS CONTAINER WHEN EMPTY.

Do not reuse empty drum. Return to drum reconditioner or destroy by perforating or crushing and burying in a safe place away from water supplies.

DIRECTIONS

LACCO LIN-O-FLY is prepared for use against certain household pests, listed below. Use as a spot treatment inside dwellings. Do not use as a general space spray or broadcast vapor. Use a coarse type spray.

ANTS: Spray around doorways, windows and cracks or openings of any kind in floor, walls or ceiling where ants might enter the room. Pay particular attention to space behind baseboards, under sinks, in cupboards and behind built-in drawers. Repeat as needed for complete control.

FLIES, MOSQUITOES: Spray to heavy dampness on and around doors, around windows, on screens and any surface on which flies or other insects congregate. Repeat often as necessary to maintain maximum killing value.

SPIDERS, CENTIPEDES: Spray infested baseboards, corners, behind pipes, storage or dark areas. Pay particular attention to basements or areas under houses, garages and storage sheds. Repeat often as needed to maintain killing efficiency of treatment.

EPA REG. NO. 962-375 AA

EPA EST. [illegible]-CA-1

LACCO

LIN-O-FLY

KILLS FLIES WITH LINDANE

ACTIVE INGREDIENTS:	
Lindane (Gamma Isomer of Benzene Hexachloride)	.50%
Deodorized Kerosene	95.10%
Toluene	4.25%
INERT INGREDIENTS:	.15%

CAUTION!

KEEP OUT OF REACH OF CHILDREN

SEE CAUTION STATEMENT TO LEFT.

LOT NUMBER 3351 CTTD214

NET CONTENTS 1 GALLONS

MANUFACTURED BY

LOS ANGELES CHEMICAL COMPANY

DIRECTIONS (Con't.)

CRICKETS: Spray baseboards, floors of closets and storage places. Spray thoroughly around doorways and openings of any kind through which crickets might enter. Repeat each 2 to 4 weeks during heavy cricket infestations.

ROACHES, WATERBUGS: Spray around doors, windows, and into any cracks or spaces (such as around drain pipes) through which insects might enter. Pay particular attention to areas behind built-in drawers and cupboards. Repeat as needed to maintain control.

CARPET BEETLES: Spray infested areas of carpets and surrounding floor. Spray dark corners and into cracks where insects might hide. Repeat as needed.

CLOTHES MOTHS: Clothing, blankets and other woolens to be protected should be cleaned and thoroughly sprayed so as to dampen all surfaces. Pay particular attention to seams, cuffs and pockets. Dry thoroughly and place in good tight storage. Treated items should be dry cleaned before being used as clothing or bedding.

FLEAS: Spray infested areas carefully. Direct spray into cracks, crevices and other hiding places in out houses, yards and kennels, so that all infested areas are dampened. Repeat at monthly intervals. Do not use in human habitations. Do not spray animals. Dry treated areas carefully before allowing pets to re-enter.

SILVERFISH: Spray baseboards, behind drawers or shelving, book cases and storage areas. Repeat as needed to maintain efficient control—usually about each 2 to 3 months.

NOTICE: Recommendations for the use of this product are based upon information believed to be reliable at time of printing. The use of this product being beyond the control of LOS ANGELES CHEMICAL COMPANY, no guarantee, expressed or implied is made as to the effects of such or the results to be obtained if not used in accordance with directions or established safe and sound practice. The BUYER must assume all responsibility including injury and/or damage resulting from its misuse as such or in combination with other products.

Environment Di. :torate

ENV/WMP/80.Sem.15

To: [illegible]
Seminar on Hazardous Waste
"Problem" Sites

English only

(4)

EXPERT SEMINAR

ON HAZARDOUS WASTE 'PROBLEM' SITES

Case of Lekkerkerk

(Contribution by Mr. Strybis)

The attached paper is submitted for consideration at the expert seminar on hazardous waste "problem" sites, OECD, Paris, November 5-7, 1980.

It has been specially prepared by Mr. Stybis, Netherlands.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

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Lekkerkerk

One of the most serious cases of soil pollution in the Netherlands is the case of Lekkerkerk.

Lekkerkerk is a village north east of Rotterdam on the river Lek in a reclaimed coastal swamp area. Around 1970 for the expansion of this village the ditches in the expansion area west of the village were not filled up with crushed peat, straw and saw dust, as usually is done for building purp in marshy polders, but for financial reasons with the building and demolition wastes. Among these, chemical wastes and waste oil were dumped illegally, partly in drums (of which more than a thousand have been found until now) and probably partly unpacked. Soon after the houses on this "ground" were built and inhabited complaints arose about bad smells in the houses, while at a number of places gas and water tubes in the ground were so badly affected by polluted grondwater that they broke.

After the fainting of two workmen in a pit dug for inspection of gas pipes an investigation was started in 1978. From this resulted that soil and grou water in this new part of the village were badly polluted by aromatic hydrocarbons, mainly xylene, toluene and ethylbenzene (solvents widely used in the paintindustry) that, as later appeared, floated as a film on a layer of oily waste material on the groundwater.

Because of the low permeability of the peat soil and because of the fact that Lekkerkerk lies in an area behind the dike of the river Lek where the groundwater wells up, the pollution had not spread laterally nor vertically to the subsoil. But when in april 1980 further investigations showed that not only the atmosphere inside the houses contained relatively high concentrations of aromatic hydrocarbons by evaporation from the soil, but that these polluting compounds also penetrated through the network of PVC and PCE tubes in the ground for the distribution of drinkir water as a result of which the quality of this water could not be guarante any longer, in the interest of public health it was decided that at the shortest possible notice all pollutions should be removed. This cleaning operation is now in progress and reached the world press for because of t some 800 inhabitants had to be evacuated from their 270 homes for abou six to nine months.

The operation is complicated by the fact that for social and financial reasons the aim is to save the 270 houses that are built on piles, some of concrete, others of wood.

The following works have been carried out or are still to be carried out.

1. All pavements, trees and other vegetation, street lights, garages, tubes and cables in the ground have been removed and if polluted have been destroyed. Only the houses were left standing.

2. The canal around the concerning part of the village was dammed off from the surrounding surface waters to prevent possible spreading of pollutions during the operation. By steel barrages the subsoil of the quarter was divided into five compartments to reduce spreading of pollutions from uncleaned territory into cleaned territory and to reduce the quantities of groundwater that have to be pumped away during the operation.

3. The groundwater level in the compartments was lowered by pumping for the time of the operation to a level just under the pollutions so that work can be done under dry conditions, which makes grading and concentrating easier. Well from the river Lek is opposed by a number of deep well pumping stations.

4. All polluted materials deposited on the original surface and in the ditches are removed and transported to a combustion installation for domestic and chemical wastes at Rotterdam to be burned. All polluted water thas is pumped out of the compartments is led to a temporary purification installation on the spot, where it is purified and finally led through active carbon filters before it is drained into the river Lek. Saturated active carbon sludges and chemicals separated from the water are burnt at the combustion installation in Rotterdam.

5. Underneath the houses the removal of soil and polluting substances is done by special drilling and dragging machines that can work horizontally. To prevent leaning to one side of the houses work is done two opposite sides at the same time. Houses on wooden piles are kept up straight by temporary steel constructions for additional support while work underneath them is going on.

6. After removal of all wastes and polluted soil (estimated on 75.000 tons of which 2.000 drums) the depressions are filled with clean sand, for which was chosen "flugsand" to prevent differential setting of the ground afterwards. Flugsand is a light vulcanic sand from the Eifel area

in Germany, which has about the same volumeweight under water saturated conditions as peat. Next clean topsoil is brought up. After that the infrastructure of the quarter can be reestablished and the groundwater is raised to its original level again.

It is expected that the inhabitants can return to their homes on a new clean subsoil between november 1980 and february 1981. The costs of the whole operation are estimated to be more than 140 million guilders.

(5)

Anlab
ANALYTICAL LABORATORY
A DIVISION OF DEWANTE & STOWELL

1914 S STREET, SACRAMENTO, CALIFORNIA 95814 • 916-447-2946

PERMEATION OF ORGANIC COMPOUNDS IN PLASTIC PIPE

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Anlab
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1914 S STREET SACRAMENTO CALIFORNIA 95814 • 916 447-2946

September 15, 1983

Mr. Ray Leonardini
555 Capitol Mall, Suite 435
Sacramento, CA 95814

The results of the pipe study are in the report enclosed.

The findings indicate that certain organic chemicals can permeate through plastic pipe under the conditions of the study.

Sincerely,

Tom Ikesaki

Tom Ikesaki

TI:et
Encls.

ABSTRACT

Four potable water service pipes were tested for permeability to specific organic compounds. These organic compounds were used in concentrated form in these tests and may not be representative of normal applications. Three series of test designs were used. Successive tests were designed to reduce the possible effect of pipe joints to the inward migration of chemicals through the pipe material.

Three groups of chemicals were tested; chlorinated solvents, pesticides and gasoline in Polybutylene (PB), Polyethylene (PE), Polyvinylchloride (PVC) and Copper (CU) pipes.

Permeation by small molecular weight chlorinated solvents was pronounced for polyolefin pipes (PB & PE), less for PVC. Trace contamination of joined pipe systems (PVC and Copper) was also found. Controls with no joints in pipes showed that PVC but not Copper was permeable to specific molecular weight chemicals.

For systems showing permeation, the rank order of chemicals was related to molecular weight and polarity, with constituents of chlorinated solvents, gasoline (benzene and substituted benzenes) showing the greatest permeation effect in polyolefin and chlorinated pipes, respectively. The rank of pipes according to decreasing permeability is: Polyethylene, Polybutylene, Polyvinylchloride and Copper.

Results indicate the presence of organic chemicals from other sources such as pipe joining and sealing compounds, and a group of chemicals that appear to have been extracted as specific plastic pipes were permeated.

(6)

SOME FREQUENTLY ASKED QUESTIONS CONCERNING PIPE PERMEATION

ANSWERS PREPARED BY THE CALIFORNIA PIPE TRADES COUNCIL

Q. WHAT IS PIPE PERMEATION?

A. Pipe permeation is the phenomena whereby toxic substances seep through pipe material causing the contamination of the drinking water which is carried by those pipes. This occurs most commonly with pipe which is buried in soil.

Q. WHEN WAS PIPE PERMEATION FIRST DISCOVERED?

A. That is hard to answer. Pipe permeation was not widely reported until the Department of Consumer Affairs released test results in December, 1982, which showed that plastic pipe can be permeated by a number of carcinogens. The test was sponsored by the California Pipe Trades Council and was conducted by Anlab, an independent testing laboratory in Sacramento. The investigation leading to that test, however, revealed that the East Bay Municipal Utility District had recognized permeation as early as 1978 and had reported its findings to the Department of Health Services. Further, the president of the Society of the Plastics Industry (a major trade association of plastic resin and plastic product producers) stated, in response to DCA's permeation announcement, that the findings "are not new, since they have been identified long ago . . . ."

Q. IS ONLY PLASTIC PIPE PERMEABLE?

A. As far as we know, the only testing for permeation has been conducted with plastic pipe and the only reported instances of pipe permeation have involved plastic pipe (although metal pipes have been used as test control, but were not permeated). We believe, however, that all pipe materials should be tested to make absolutely certain that public health is protected. The Budget Bill item (#4260-001-014) which would have appropriated funds for a permeation study called for the testing of all pipe materials. It was vetoed by the Governor.

Q. WHICH CHEMICALS CAN PERMEATE PLASTIC PIPE?

A. No one knows for sure how many different chemicals can permeate plastic pipe, nor under which conditions the permeation is most likely to occur. Among the toxics discovered to permeate, however, are some known carcinogens and some which are known to cause liver and kidney damage, mobility impairment, birth defects, lung congestion, nausea, and anemia. Until a comprehensive test is conducted, we simply won't know which chemicals permeate at hazardous levels. The Anlab test found the following will

permeate:

1, 2 dichloropropane
1, 1, 1 trichloroethane
trichloroethylene
1, 1 dichloroethane
1, 1 dichloroethylene
Ethyloxirane
Benzene
Methylpyrole
Butane
Toluene
Xylenes
Trimethylbenzenes
Tetramethylbenzenes
Ethylbenzene
Chloroform
Lindane

(An attachment to this series of questions & answers, excerpted from "The Merck Index" shows some of the common uses of these toxic chemicals.)

Q. WHY DID THE GOVERNOR VETO THE PIPE PERMEATION STUDY?

A. In his veto message, the Governor stated, "I am eliminating the $200,000 legislative augmentation for the study of the permeation and infiltration of toxic chemicals into pipe and pipe water mains. I believe it is more appropriate for this study to be funded by the pipe industry."

Q. WHY SHOULDN'T THE INDUSTRY BE REQUIRED TO FUND THE STUDY?

A. We're talking about a potentially serious health hazard which could affect millions of Californians. It requires a thorough and objective examination. Just as statistics can be manipulated, so can test protocols and results. Although the plastics industry acknowledges that they have known of the permeation phenomena for some time, the industry has not been at the forefront of any effort to restrict the use of plastic pipe to safe applications. Further, the president of the Society of the Plastics Industry, while referring to the permeation tests financed by the California Pipe Trades Council, stated, "There should be serious questions about the validity of a report funded by a source opposed to the product it is testing." We concur that privately funded tests may have a credibility problem and we also assert the same logic used by the S.P.I. president should discourage reliance on tests funded by advocates of products. The potential health hazard related to permeation is simply too serious to have its examination and evaluation financed, designed, or conducted by any organization other than one that is thoroughly and unquestionably objective.

Q. WAS THE TEST FUNDED BY THE PLUMBERS UNIONS (CALIFORNIA PIPE TRADES COUNCIL) A RELIABLE TEST?

A. The objective of the test was to determine whether or not certain chemicals could permeate plastic pipe. The test did not replicate "real-life" circumstances. It used highly saturated sandy soil in a controlled environment in order to accelerate the results. The test did prove that, under those conditions, plastic pipe is permeable. We know that a much more expensive and sophisticated test, such as the one which the Governor vetoed, is necessary to accurately determine which chemicals will permeate and under which soil conditions the permeation will occur. The plumbers' test was not designed to be the "last word"; its purpose was to provide sufficient evidence of the problem in order to prompt responsible parties (such as the State) to conduct a comprehensive and objective test.

Q. WHO BESIDES THE PLUMBERS UNIONS HAVE HAD EXPERIENCE WITH PERMEATION TESTING?

A. Apparently the East Bay Municipal Utility District conducted some limited testing after their initial discovery of permeation. We have recently learned, also, that testing has been conducted by the American Water Works Service Co. in New Jersey and that the company's results have shown findings similar to our own. None of this testing, however, has been nearly as comprehensive as the one which would have been conducted pursuant to the Budget Bill provisions. Strangely, although the Department of Health Services has jurisdiction over the regulation of public drinking water distribution systems and although the department has been aware of the permeation phenomena at least since 1978, DHS has never shown any interest in permeation testing until now.

Q. HASN'T A PERMEATION TEST BEEN CONDUCTED BY THE CITIZENS FOR SAFE DRINKING WATER?

A. No. The Citizens for Safe Drinking Water did widely report its discovery of lead leaching in copper pipe. The test was conducted at a few locations in Sacramento. The City of Sacramento subsequently tested the same water taps and found no evidence of leaching. The only known member of the Citizens for Safe Drinking Water, by the way, is a public relations representative for the Plastic Pipe & Fitting Association, a trade association which has worked closely with the Society of the Plastics Industry. This front organization has never announced the conduct or the results of any permeation studies.

Q. ASIDE FROM LABORATORY TESTING, WHERE HAS PERMEATION OCCURRED?

A. It may have occurred at the Coyote Hills tract near the McColl hazardous waste site in Fullerton. Further testing needs to be

conducted there to know for certain. The most dramatic permeation episode occurred at Lekkerkerk, a town in the Netherlands. There, 800 inhabitants were evacuated when 270 homes were contaminated by toxics in the soil which permeated plastic pipes and conduit. All other known instances have been in the U.S. The East Bay Municipal Utility District has reported 12 episodes of gasoline permeating PB pipe, two episodes of gasoline permeation of PB pipe have been reported by the Marin Municipal Water District in Corte Madera, one identical episode has been reported by the North Marin County Water District in Novato, Tetrachloroethylene (PCE) has permeated PE pipe in Delaware, gasoline distillates permeated PE pipe in Columbus, Ohio, and gasoline permeated plastic water service lines in Chattanooga. Undoubtedly, there have been a number of other permeation episodes that have gone unrecognized or unreported.

Q. AREN'T THE PLUMBERS SIMPLY OPPOSING PLASTIC PIPE BECAUSE THE INSTALLATION OF PLASTIC PIPE REDUCES LABOR COSTS?

A. The advocates of plastic pipe want you to think that is the reason. Actually, there are minimal economic considerations related to the plastic pipe issue. As you know, SRI International (formerly Stanford Research Institute) is currently producing an environmental impact report (E.I.R.) for the Department of Housing & Community Development which relates to the expanded uses of plastic plumbing pipe. The initial review draft produced by SRI (the final report will not be completed until next year) reports on page IV.F-1 that the proposed expanded use of plastics in home construction would amount to a labor savings of only about $50 per single family residence. The E.I.R. does not include a review of the permeation phenomena, so no accurate costs are available on the labor cost differential between the installation of underground plastic pipe and the installation of alternative materials. However, since plumbing the interior of a house is much more complicated than simply laying pipe in a trench, we can assume that the impact on labor costs -- if subsurface plastic water lines were to be restricted -- would be negligible.

Q. WHY THEN, ARE THE PLUMBERS SO CONCERNED ABOUT PERMEATION?

A. Members of the plumbing trades drink water too. Historically, our membership has been very active in the promotion of technologies to deliver pure water and to provide adequate sanitation. Our initial examination into the plastic pipe issue had been prompted by a fear that the health of plumbers had been severely endangered by the use of adhesives required for the bonding of plastic pipe, just as, 30 years ago, our fear that working with asbestos was causing cancer amongst our membership led to our investigation into the dangers of that material. Our continuing examination of plastic has uncovered the other dangers of the material, i.e., permeation, leaching, and fire toxicity.

Q. HOW COME THE E.I.R. DOES NOT INCLUDE AN EXAMINATION OF THE PERMEATION ISSUE?

A. We think it should. Unfortunately the proponents of the E.I.R. were unaware of the permeation issue when the scope of the study was being determined by the E.I.R. Task Force membership (although at least two of the participants, the Department of Health Services representative and the Society of the Plastics Industry spokesperson, were apparently well aware of the issue but chose not to reveal it) and it was therefore never included in the E.I.R.'s original work plan. When permeation eventually became a public issue, various environmental and labor organizations, some legislators, and even the Department of Health Services requested that an evaluation of pipe permeation be included in the E.I.R. Despite the strong evidence that this problem needs a careful analysis, the Department of Housing & Community Development acceded to the demands of the plastic industry and refused to permit the inclusion of a permeation study.

Q. WHAT REASONS DID THE DEPARTMENT OF HOUSING & COMMUNITY DEVELOPMENT GIVE FOR REFUSING TO INCLUDE PERMEATION TESTING AS AN ELEMENT OF THE E.I.R?

A. The department contended that underground pipes are outside of their jurisdiction. That contention is not true. While water mains are the responsibility of the Department of Health Services, the subsurface pipes which carry water from the meter (usually at the property line) to the structure are within the jurisdiction of DHCD. Clearly, if a plastic water main can be permeated, so can a plastic service line carrying water under a residential yard. DHCD has frequently sided with the plastic industry representatives during E.I.R. Task Force disputes, so the department's refusal was not surprising.

Q. WHAT IS THE MAGNITUDE OF THE PROBLEM?

A. No one can know for sure, but we believe it can be a problem with enormous consequences. Until a comprehensive test is completed, we can not know with absolute certainty which chemicals will permeate plastic pipe, which soil conditions contribute to it, nor how long it takes for permeation to reach truly hazardous levels. The vetoed study could have given us those answers. Its possible, however, to speculate with some assurance about the magnitude of the problem:

The E.I.R. draft prepared by SRI estimates that over 25% of all Californians will live in homes plumbed by plastic pipe within the next 25 years if the proposed new uses of plastic are approved. It is safe to estimate that at least that many, and probably many more, will also be served by underground pipe systems which include at least some plastic. (The manager of the San Juan Suburban Water District in Sacramento County has estimated that 98% of the new homes in his district have plastic water lines from the house to the main.) Consider also that

there are thousands of recorded toxic spills each year in California (every one of them could eventually trigger some permeation activity), that there are now tens of thousands of California homes near hazardous waste sites (such as the Coyote Hills tract near McColl), and that many new communities are projected for development on land which had formerly been contaminated by pesticides. The potential for extreme danger is high; its time for clear answers.

Q. IS ANYONE BESIDES THE CALIFORNIA PIPE TRADES COUNCIL ACTIVELY SUPPORTING PERMEATION TESTING?

A. There is, of course, considerable support within the Legislature. Additionally, the California Pipe Trades Council is part of a coalition of organizations which have been actively pushing for permeation testing. Other members of the coalition include the Citizens for a Better Environment, the Consumer Federation of California, the Friends of the Earth, and the Natural Resources Defense Council. Additionally, the Sierra Club has taken strong supportive positions.

The Merck Index. 9th Edition, Merck and Company, Inc., New Jersey, 1976.

1,2-Dichloropropane-Uses: solvent, dry clearing fluids, degreaser, insecticidal fumigant mixtures

1,1,1-Trichloroethane-Uses: metal cleaning

Trichloroethylene(TCE)-Uses: solvent, paints, degreaser, dry cleaning

Benzene-Uses: solvent, varnishes, petroleum products

Butane-Uses: petroleum products; synthetic rubber

Toluene-Uses: solvent, insecticidal fumigant mixtures, petroleum products

Xylene-Uses: solvent, insecticidal fumigant mixtures, petroleum products

Chloroform-Uses: solvent, cleaning agent

Trimethylbenzene: found in petroleum products

Tetramethylbenzenes: found in petroleum products

Ethylbenzene: found in petroleum products

Investigation of
Plastic Pipe Permeation
by Organic Chemicals

November 1984

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EXECUTIVE SUMMARY

In the past several years, with the increased use of advance analytical techniques, there have been numerous reported instances of drinking water contamination from the permeation of plastic service lines by organic chemicals, principally gasoline. At least two such cases have occurred within the American System. Because a variety of plastic pipe materials are in use for both water company and customer service lines, the Materials Management Committee requested that an investigation be conducted to determine the extent to which these contaminants will permeate pipe materials.

A study was carried out during 1983 and 1984 at the Belleville Laboratory which tested five different pipe materials: iron, copper, polyethylene (PE), polybutylene (PB), and chlorinated poly(vinyl chloride) (CPVC) against permeation from three different organic chemicals (trichloroethylene (TCE), chlordane and gasoline. In order to simulate worst case environmental conditions the study was carried out using two concurrent pipe exposures; one exposing the pipe to a vapor environment and a second exposing separate pipes to a soil containing the organic chemical. The studies were carried out in three phases, one for each organic chemical, for a minimum exposure of 10 weeks.

The results of the investigation show that all plastic pipe materials were permeated by trichloroethylene and gasoline, but not by chlordane. The CPVC pipe was somewhat more resistant to

permeation than the PE or PB pipe. No permeation occurred in either the iron or the copper pipe.

This report is hereby submitted to the Materials Management Committee for their consideration of a policy addressing the use of plastic pipe materials within the American System.

INTRODUCTION

In the past several years there has been an increasing awareness of the potential for plastic pipe to be permeated by organic chemicals. Numerous incidents have been reported in the literature and at industry meetings. This awareness has no doubt resulted from improved analytical capability and availability. Several years ago the response to taste and odor complaints may have been limited to more traditional tests for bacteria and inorganic chemicals. Today, a complaint which might suggest the presence of an organic chemical will probably be tested for volatile organic chemicals or other more sophisticated analysis. The introduction of organic contamination through pipeline permeation can not only cause complaints, but could also make the water unsafe for consumption.

A. Case Histories

The East Bay Municipal Utilities District in Oakland, California reported in 1979 that at least four instances of apparent petroleum distillate penetration of PB water service lines had been encountered by their field personnel (1). Later laboratory testing confirmed this supposition to their satisfaction. Another case was recently reported from Washington State in which PB service line to a commercial establishment was permeated by gasoline (2). In this case, the soil surrounding the pipe installation was contaminated with gasoline. A case in Maryland was reported in which concentrations up to 5,500 ug/L of

toluene were found in a water sample collect from service line consisting of both PE and PB (3). The soil surrounding the service line was contaminated with gasoline as a result of a leaking underground storage tank that had been abandoned.

Similar incidents were reported by the Alabama Department of Environmental Management (4). One incident, typical of most reported cases, started with a complaint of an unusual odor which resulted in the collection of a sample for organics analysis. The organics detected could not be traced to the water source so service pipe permeation was suspected. During replacement of the PB service pipe the soil excavation released a strong fuel odor. Further investigation revealed that this site was the fuel storage yard during construction of the subdivision and the soil was still saturated with diesel fuel. A second incident reported in Alabama occurred as a gasoline truck accident spilled fuel which then saturated the soil and permeated PB service pipe. In this instance the spilled gasoline travelled under the road bed to permeate another service line 60 feet away.

In the past 2 years there have been two occasions within the American System where permeation of potable water system service line materials by petroleum products has been suspected. Both occasions were similar in that the water company became alerted by a customer complaint of odor in the drinking water. The first instance occurred at a private residence in Chattanooga, Tennessee where the customer service line was 3/4 inch PE. The investigation was initially confounded because the problem was temporarily

corrected by flushing the customer's plumbing. The customer's service line was replaced with copper after it became known that gasoline had leaked from the customer's car in the vicinity of the line. Traces of gasoline could be observed in the ditch during the line replacement. A section of the PE line was taken to the water company laboratory where it was filled with plant tap water. After two weeks exposure, the water was found to contain toluene (3100 ug/L), benzene (520 ug/L) and ethylbenzene (440 ug/L), all of which were absent in the plant tap water, but are constituents of gasoline.

A similar instance occurred in Darien, Connecticut where a customer complaint of gasoline odor resulted in sample analysis which showed benzene (>100 ug/L) and toluene (>50 ug/L) in the tap water. As in the other case, the odors were absent after flushing and when the homeowners' plumbing was in daily use. Samples collected after the system had not been in use for 2 days contained approximately 16 ug/L benzene and a gasoline odor. The customers' 1 1/4 inch PE service line was replaced with copper after it was determined that an abandoned underground gasoline storage tank on the customers' property had developed a leak and saturated the ground surrounding the line.

B. Laboratory Investigations

In order to confirm the supposition that plastic pipe can be permeated by certain organics, a number of laboratory studies have been carried out by various groups. As a follow up to one case history described earlier the East Bay Municipal Utilities District carried out tests in 1978 which found that PB and PE were

permeated by gasoline in one week when exposed to gasoline soaked vermiculite (1). In the same study Poly(Vinyl Chloride) (PVC) was not permeable to gasoline during a six week exposure.

As a follow up to drinking water contamination in the Netherlands, the industry research group, Keuringsinstituent Voor Waterleidingartikelen (KIWA), investigated the influence of methyl bromide on plastic pipe (5). Methyl bromide is widely used as a soil disinfectant in horticultural areas. Their study was set up with PE, PVC and metal pipe connections submersed in a 100 ppm solution of methyl bromide. No permeation was found through the metal pipe connections or the PVC pipe after 8 weeks. The methyl bromide did permeate the PE pipe within one week.

Tests have also been conducted by a private laboratory in California as part of an effort to limit the use of plastic pipe in the State (6). These tests showed permeation by various solvents (1,1,-Dichloroethylene, 1,2-Dichloroethane, and Trichloroethylene) in both PE and PB pipe. PVC pipe was also tested but there was joint (solvent weld) failure presumably due to the solvent exposure. No plastic pipe (PE, PB or PVC) was permeated by various herbicides and pesticides (2,4-D, Banvel-D, Dinoseb and Chlordane)after 3 weeks exposure to a 100% solution.

Currently, testing is being carried out at the Battelle research laboratory for The Vinyl Institute (7). The Phase I study concluded that jointed pipe of all type tested (iron, asbestos and PVC) is subject to solvent (toluene, hexane, and 1,1,1-trichloroethane) permeation through joint gasket materials. However, it should be noted that the gaskets used in this study

were probably standard water pipe gaskets, not one of several specialized impermeable gasket materials which are available (8). For unjointed pipe, the toluene permeated PVC pipe within six weeks. Hexane and 1,1,1-trichloroethane did not permeate the unjointed PVC pipe during the 42 day test period. A summary of the results of these studies cited is presented in Appendix I along with the results of our investigation.

C. Study Objective

Several types of plastic pipe are used throughout the American System. PVC pipe is used occasionally for mains, and both PE and PB tubing are used in many locations for service lines from the main to the meter or curb. It is quite likely that all types of plastic pipe, i.e. PVC, CPVC, PE and PB are used in the System for customer service lines. Because of concerns over the permeation of service line by organic chemicals, the Materials Management Committee requested that System Water Quality conduct a research investigation.

The objective of the study was to determine the extent and nature of permeation of several different organic compounds through the types of service line material in use in the American System. Service lines were examined, rather than mains, because the greater surface area to water content ratio in the smaller diameter service line will make the impact of any permeation more severe. Perhaps more significant, the daily static water conditions experienced in residential service line would magnify the impact of any permeation. Additionally, plastic pipe materials

are more widely used for service lines than for distribution mains.

SUMMARY OF RESULTS

1. Iron and copper pipes were not permeated by any of the organic contaminants (TCE, chlordane, and gasoline) in either the soil or the vapor environments.

2. PE pipe was permeated by TCE within 1 week in both the soil and vapor exposures. Gasoline permeation occurred within 1 day in the vapor and 3 weeks in the soil exposure. The chlordane did not permeate the PE pipe.

3. PB pipe was permeated by TCE and gasoline within 1 day and not by chlordane within 10 weeks. Results were the same in both the soil and vapor environments.

4. CPVC pipe was permeated by TCE within 1 day in the soil environment and not until 14 weeks in the vapor environment. Gasoline permeation occurred within 6 weeks in the soil environment and not at all in the 14 week vapor exposure. The chlordane did not permeate the CPVC pipe.

RECOMMENDATIONS

As a result of this investigation it is recognized that certain organic chemicals will permeate the plastic pipe materials used within the water works industry. Consequently the following recommendations are made:

1. As a follow-up to this investigation sampling for organic contamination should be carried out at multiple specific locations where plastic service lines are being used (Water Company and/or customer) and the potential for ground contamination is high, e.g. gasoline service stations. Sampling should also be conducted at industrial locations where organic vapors may permeate customer plastic plumbing.

   The purpose of this work is to evaluate the susceptability of plastic pipe in current use. The work could be carried out by System Water Quality at a selected company within the System.

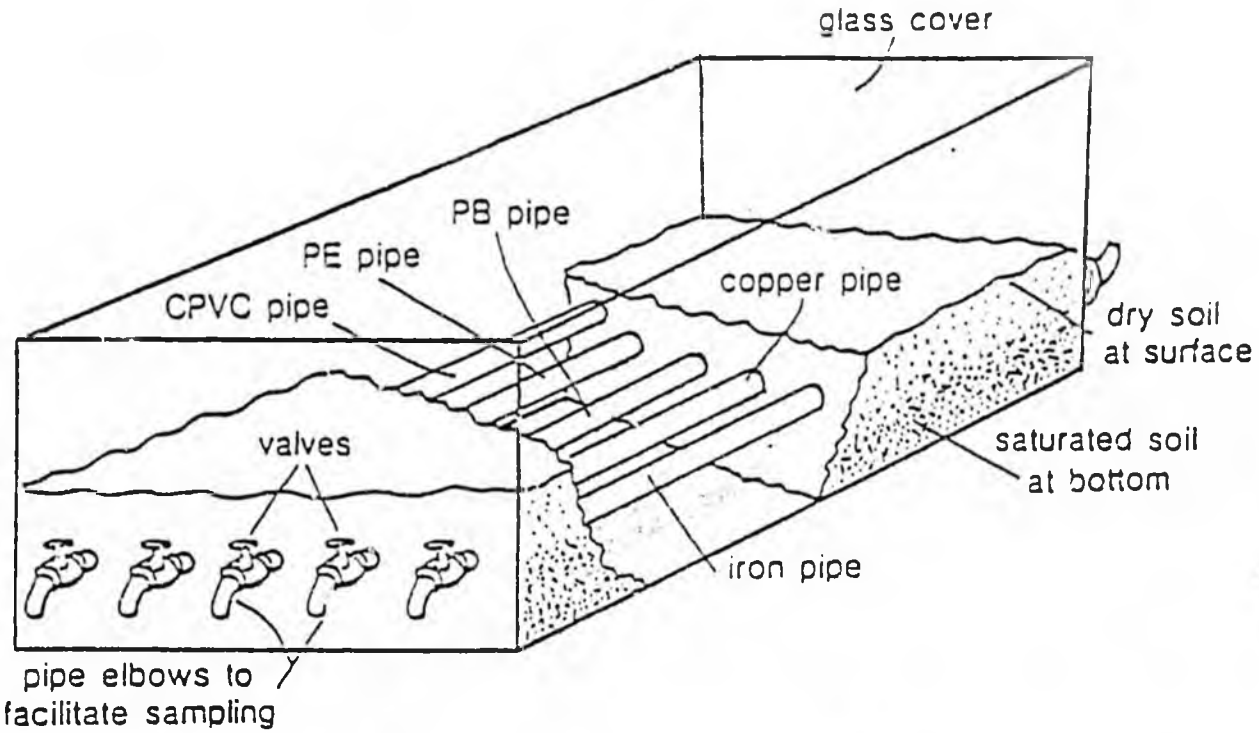
2. A policy concerning the use of plastic materials for service line should be developed for use within the American system. The policy should address the types of pipe used and any limitations on their use as a result of potential permeation or pipe damage from ground contamination.

EXPERIMENTAL

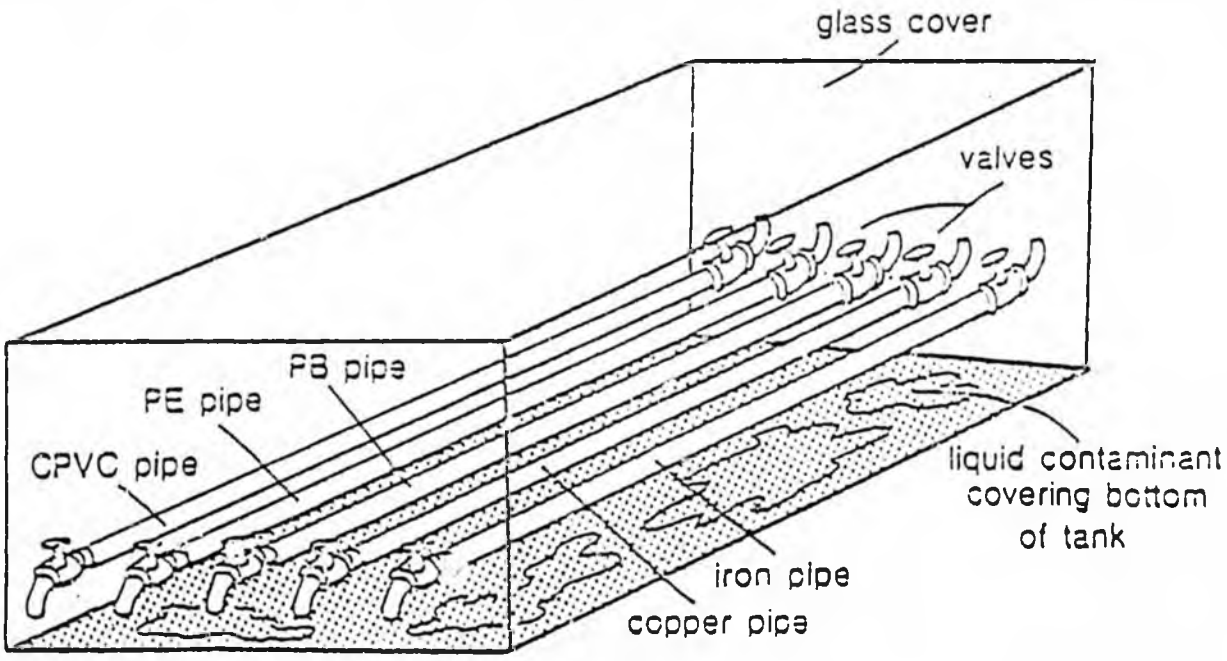
A. General Description

The objective of this study was to understand the extent and nature of the permeation of various organic chemicals through service line materials. The conditions of exposure were designed to simulate worst case field conditions. Because of concerns over the effects of industrial environments on plumbing materials two exposure tanks were used. One involved exposure of the five different pipe materials to a vapor environment. The second was performed separately but concurrently with exposure of the five different pipe sections to a moist soil environment to which sufficient contaminant was added so the pipe was above the saturated soil, yet still within the moist capillary zone. Three organic compounds (gasoline, trichloroethylene and chlordane) were investigated separately in each study. The contaminated environment (and the pipes) was contained in enclosed glass tanks, with the pipes extending through the end walls of the tanks (see Figure I).

Each phase of the project (gasoline, chlordane and trichloroethylene) lasted for a minimum 10 week exposure with water samples analyzed at 4 intervals during the exposure period. The pipe systems were all unjointed 3/4 inch lines filled with tap water. After each exposure interval the pipe contents were removed for analyses, and fresh tap water was again placed in each pipe for the next exposure interval. Plastic pipe materials were also used for controls by placing PB, PE and CPVC pipe sections



Soil Exposure Tank



Vapor Exposure Tank

Figure 1: Glass Pipe Exposure Tanks

outside the contaminated environment. These were sampled in an identical manner to the exposed pipes.

B. Pipe Materials

The following pipe materials were used for the study:

1. Iron, 3/4 inch galvanized.

2. Copper, 3/4 inch rigid.

3. Polyethylene, 3/4 inch, 100 psi pressure rating, standard dimension ratio 15, material:PE3408 meeting ASTM specification D2239.

4. Polybutylene, 3/4 inch, standard dimension ratio 13.5, 160 psi pressure rating, meeting ASTM specification D2666.

5. Chlorinated poly(vinyl chloride), 3/4 inch, standard dimension ratio 11, 100 psi pressure rating at 180 degree F, NSF approved for potable water, meeting ASTM specification 2846, manufacturers code 028302121.

The iron and copper pipes were flushed with hot tap water at the completion of each phase. The plastic pipes were replaced with new pipe for each phase of the study. Three control pipes (CPVC, PE and PB) were placed outside the tanks and sampled in an identical manner.

C. Exposure Tanks

The exposure tanks were 15 gallon capacity glass tanks with plastic frames. 5 holes were drilled 3 inches off of the bottom in each end to allow passage of the test pipes. The pipe holes were initially sealed with a latex caulk. A silicone caulk was used in the second (chlordane) phase, and a "Permatex" caulk was used in the gasoline experiments after the silicone leaked. The tanks were covered with a glass top which was sealed with a rope caulk.

The soil exposure tank was filled with approximately 5 inches of native Illinois soil to provide approximately 2 inches of cover above the pipes.

D. Test Compounds

The compounds used in the investigation during the three phases were as follows:

Phase I - Trichloroethylene, 98% purity

TCE is a member of a family of unsaturated chlorinated aliphatic compounds. It is a solvent widely used in the industrial degreasing of metals. 1983 production was estimated at 130,000 metric tons per year. It is often used in small industrial operations and thus, combined with its relatively high occurrence in groundwater when compared to other synthetic organics, was the basis for its selection in this study.

Phase II - Grab Termite Control, 72.0% Chlordane.

Chlordane is a pesticide which, because of its toxicity, has had its registration cancelled for most applications. However, it

is still used commercially for termite control through subsurface injection into the soil. Because this use may place the compound in contact with customer service line it was selected for study.

Phase III - Gasoline, Super Shell Unleaded.

Gasoline is the most widely used organic chemical in the world. Commercial gasoline is a mixture of C_4 to C_{12} hydrocarbons. Ordinary grades contain paraffins, olefins, napthenes and aromatics, all in substantial concentrations. Leaking underground storage tanks and surface spillage make this the most likely organic compound to come into contact with underground potable water piping.

E. Exposure Tank Loading Procedure

The exposure of the pipe systems to the contaminants was intended to simulate environmental conditions. The intent in the soil system was to add sufficient contaminant to pass down over the pipe system and provide a saturated zone at the tank bottom and a moist capillary zone surrounding the pipes.

The vapor exposure tank, which was designed to simulate a worst case industrial environment, had sufficient contaminant added to provide a covering over the bottom of the tank, but still be well below the pipe sections. The table below shows the amounts of test compounds added to each tank.

Test Contaminant Added To Exposure Tanks

	vapor	soil
phase I - trichloroethylene	150 ml	1225 ml
phase II - chlordane	400 ml	1490 ml*
phase III - gasoline	1890 ml	1890 ml

* an additional 7500 ml of distilled water was added

In all phases there was sufficient test contaminant added to cover the entire tank bottom throughout the vapor studies. In the phase I and phase III soil studies the test contaminant percolated to the tank bottom leaving the desired capillary zone at the pipe level. In the phase II (chlordane) soil study the contaminant seemed to be adsorbed in the top 5 inches of soil, so an additional 7500 ml of distilled water was added in an effort to release the material to the tank bottom.

F. Sampling Procedures

The charging of the system and the sampling procedures were identical during each phase of the study. To charge the system each pipe was flushed, the end valve closed, then the system pressure end closed, thus leaving the pipe full of tap water at system pressure. No effort was made to maintain the system pressure. Previous efforts by East Bay MUD (1) and Battelle Laboratory had systems designed to maintain pressure, but internal pressure had no apparent effect on permeation. To remove the contents of the pipe after the exposure interval, the test system was elevated (using hydraulic jacks) at one end and the test pipes were drained. In order to facilitate complete draining of the pipes,

elbows (one up and one down) were fitted on the pipe ends (See Figure I). This was not successful in the plastic pipes due to some curvature, primarily in the PE and PB pipes. The PVC pipes also became distorted in some phases as a result of softening. Because of the pipe curvature the sample volume varied, however there was always sufficient sample volume to reach the desired detection limit.

The time interval of exposure varied slightly between phases as seen in the table below:

Exposure Day of Sample Collection

	No. 1	No. 2	No. 3	No. 4
phase I (TCE)	Day 1	Day 8	Day 39	Day 99
phase II (Chlordane)	Day 1	Day 8	Day 40	Day 70
phase III (Gasoline)	Day 1	Day 22	Day 44	Day 99

G. Analytical Methods

All analytical work was conducted at the AMWSCo., Inc., Belleville Laboratory. The analytical methods used during each phase of the study are described below:

Phase I - All samples were analyzed for TCE using EPA Method 502.1, "The Determination of Halogenated Chemicals in Water by the Purge and Trap Method". Analytical detection limit was 1 ug/L.

Phase II - All samples were analyzed for chlordane using Method 509-A, pp. 555-565, "Standard Methods for the Examination of Water and Wastewater", 14th Edition. Analytical detection limit was 1 ug/L.

Phase III - In order to quantify the extent of permeation, the major aromatic components in gasoline (xylene, ethylbenzene, benzene and toluene) were quantified in all samples using EPA Method 503.1, "The Analysis of Aromatic Chemicals in Water by the Purge and Trap Method". Analytical detection limits were 1 ug/L.

Selected samples were analyzed using Gas Chromatograph/Mass Spectrometry, EPA Method 624.

RESULTS AND DISCUSSION

The permeation by organic chemicals through plastic materials is well known outside of the water works industry. For example, permeation of polymer films (polyethylene) by oxygen is essential in the meat-wrapping industry. One study of polymer films used for landfill liners showed that the same chemical can permeate various film materials at different rates, and similarly different chemicals can permeate the same material at widely different rates. The study showed that acetone permeated low density polyethylene more easily that polybutylene, but that the opposite was true for xylene. Additionally the permeation by xylene was one hundred times greater through both materials than acetone (9). Before the waterworks industry was reporting plastic pipe permeation, there were laboratory observations that polyethylene sample containers could be permeated by laboratory solvents.

The permeation of organic chemicals through plastic pipe occurs in three steps; (1) sorption of the chemical into the pipe, (2) diffusion through the pipe, and (3) desorption from the pipe. The factors which will control the permeation are the concentrations of the chemical on either side of the pipe wall, the molecular size and activity of the chemical and the polymer (pipe) characteristics (10).

In this investigation we were primarily interested in determining the extent, if any, of permeation by certain specific organic compounds. The results are presented in three sections,

one for each contaminant exposure, TCE, chlordane and gasoline. Within each section the discussion of each pipe will address, (1) the physical characteristics during the exposure, and (2) the permeation results in both the soil and vapor exposures.

Analytical results are presented graphically in Figures II through X and in numerical detail in Appendix II. The control pipe data (PE, PB and CPVC) are presented along with the results from pipe of the same material. Lines connecting the data points in the Figures are presented for visual clarity, however in most cases they do not truly represent the level of permeant present at the corresponding day of exposure. The reason for this is that the entire pipe content was removed for each sample collection and replaced with fresh tap water containing zero permeant levels. Therefore the actual data line would drop to zero after each sampling point and rise up to the next data point. However, since the rate of rise was unknown, and the Figures are intended to be more qualitative than quantitative, the data points are connected for simplicity. In those cases where permeation did occur the rate of rise in the permeant level would likely approximate the initial breakthrough usually seen in the first and second samples.

Because of the wide range in the concentration of the permeating chemicals (<1 to 1,000,000 ug/L), the data is plotted on a log scale. This allows the difference in concentration at the low end of the range to be seen. The table below shows the

relationship of the log concentration as plotted on the Y axis in the figures.

Log Concentration (ug/L)	Actual Concentration (ug/L)
-1	0.1
0	1
1	10
2	100
3	1000
4	10,000
5	100 000
6	1,000,000

Data which were below the detection limits (1 ug/L) are presented midway between the -1 and 0 Log concentration lines.

A. TCE Exposure

The results of the TCE exposures are presented graphically in Figures II, III, IV and V.

Iron Pipe - There was no apparent physical impact in either the soil or vapor exposure. The analytical results of the samples withdrawn at the end of 1, 8, 39 and 99 days of exposure are presented in Figure II. There was no detectable TCE in any of the samples collected indicating that there was no permeation of the iron pipe.

Copper Pipe - The results of the copper pipe exposures were identical to the iron pipe and are presented in Figure II along

FIGURE IIA. TRICHLOROETHYLENE

PERMEATION OF IRON AND COPPER PIPE.

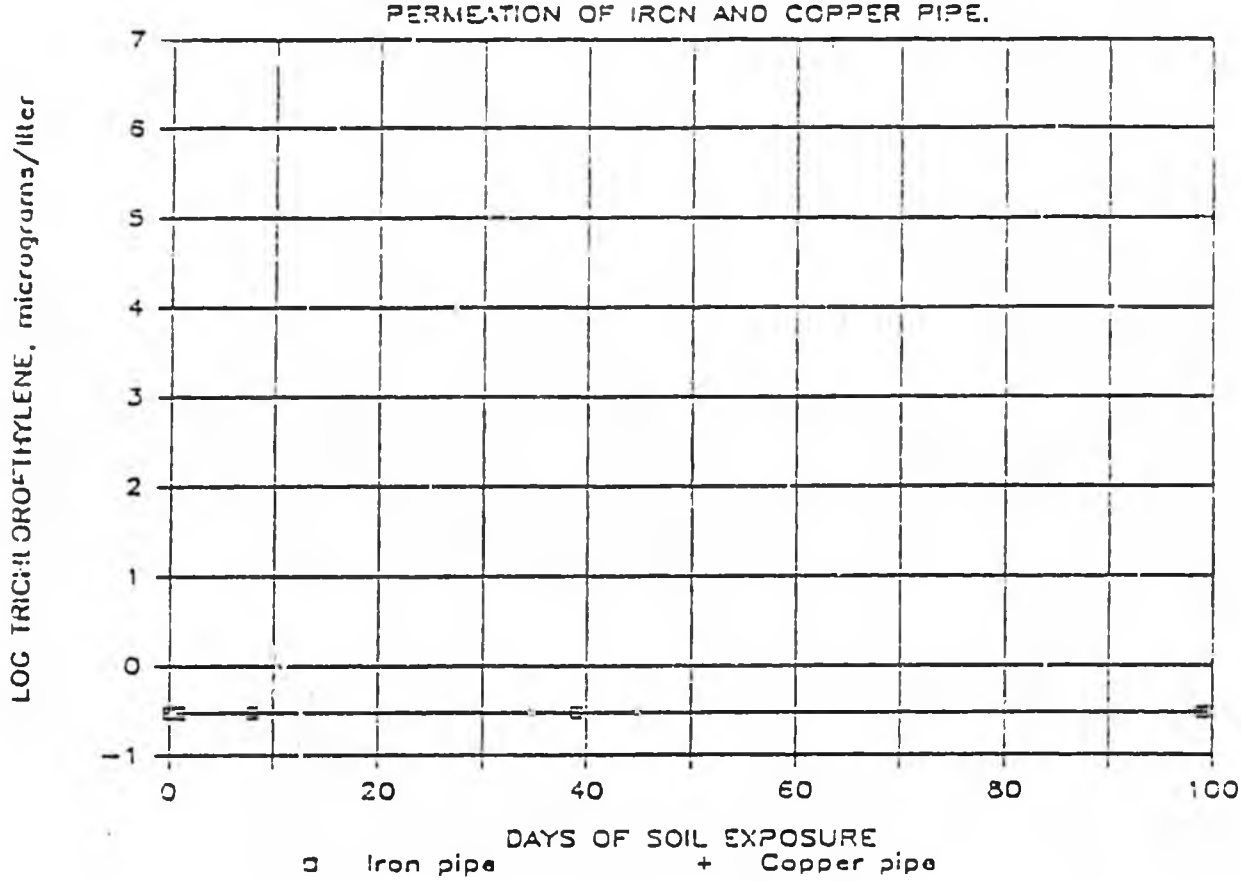


FIGURE IIB. TRICHLOROETHYLENE

PERMEATION OF IRON AND COPPER PIPE.

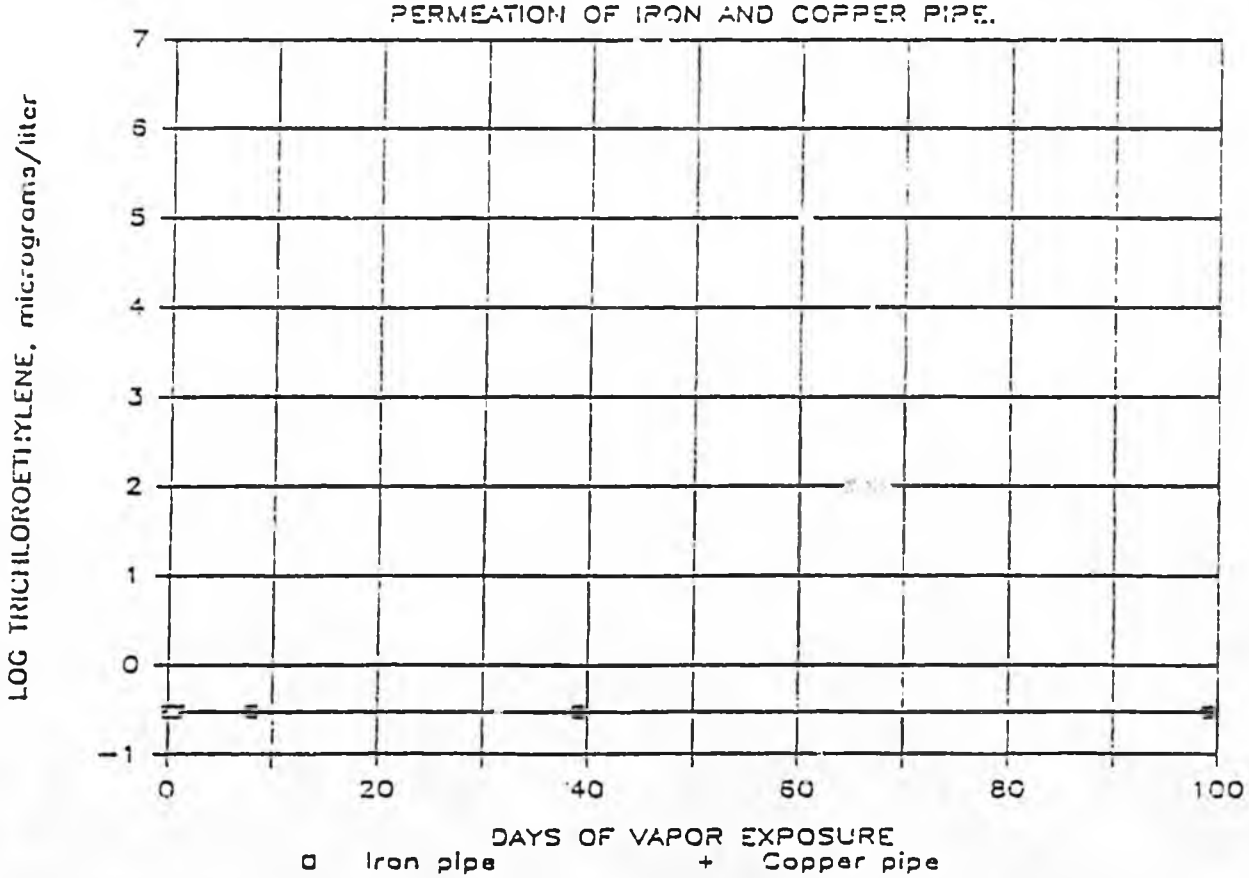


FIGURE IIIA. TRICHLOROETHYLENE

PERMEATION OF POLYETHYLENE PIPE

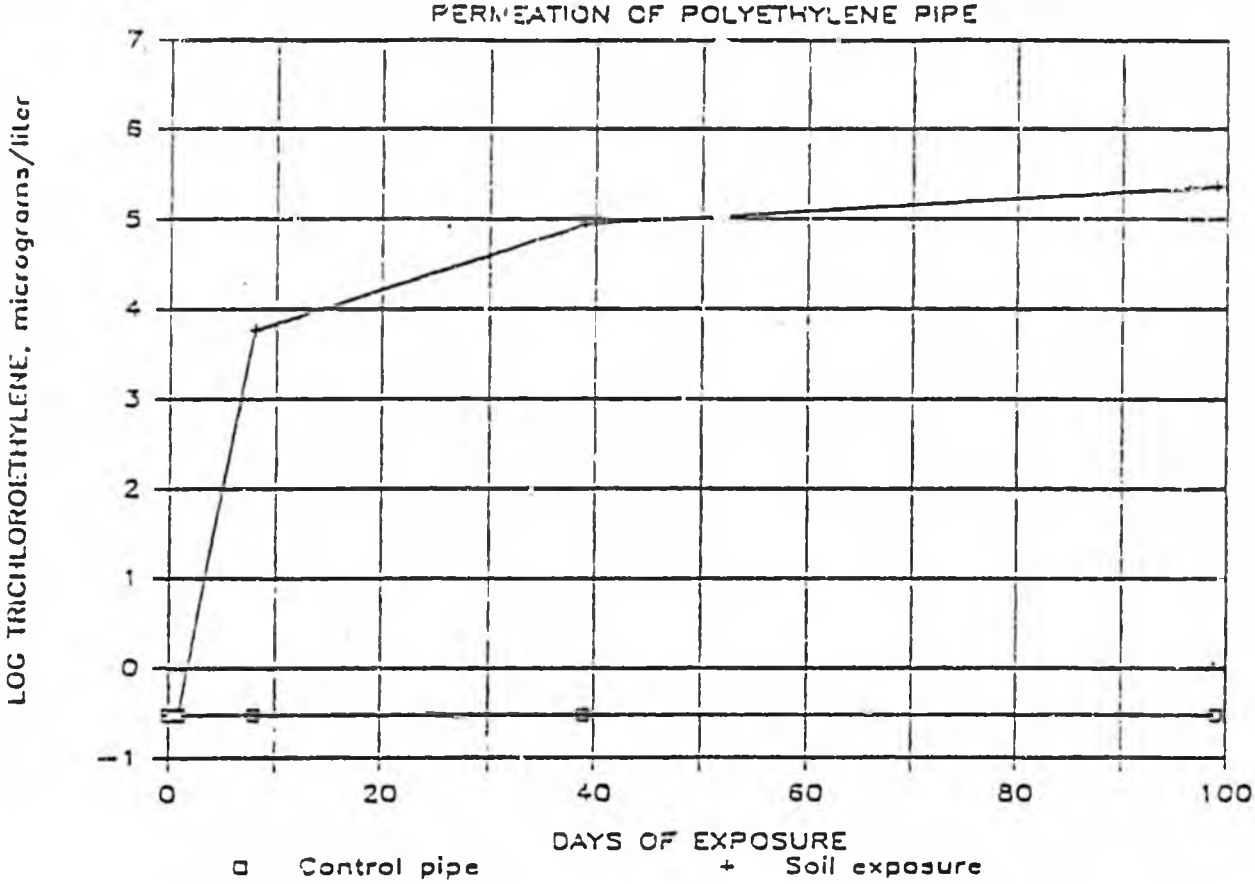


FIGURE IIIB. TRICHLOROETHYLENE

PERMEATION OF POLYETHYLENE PIPE

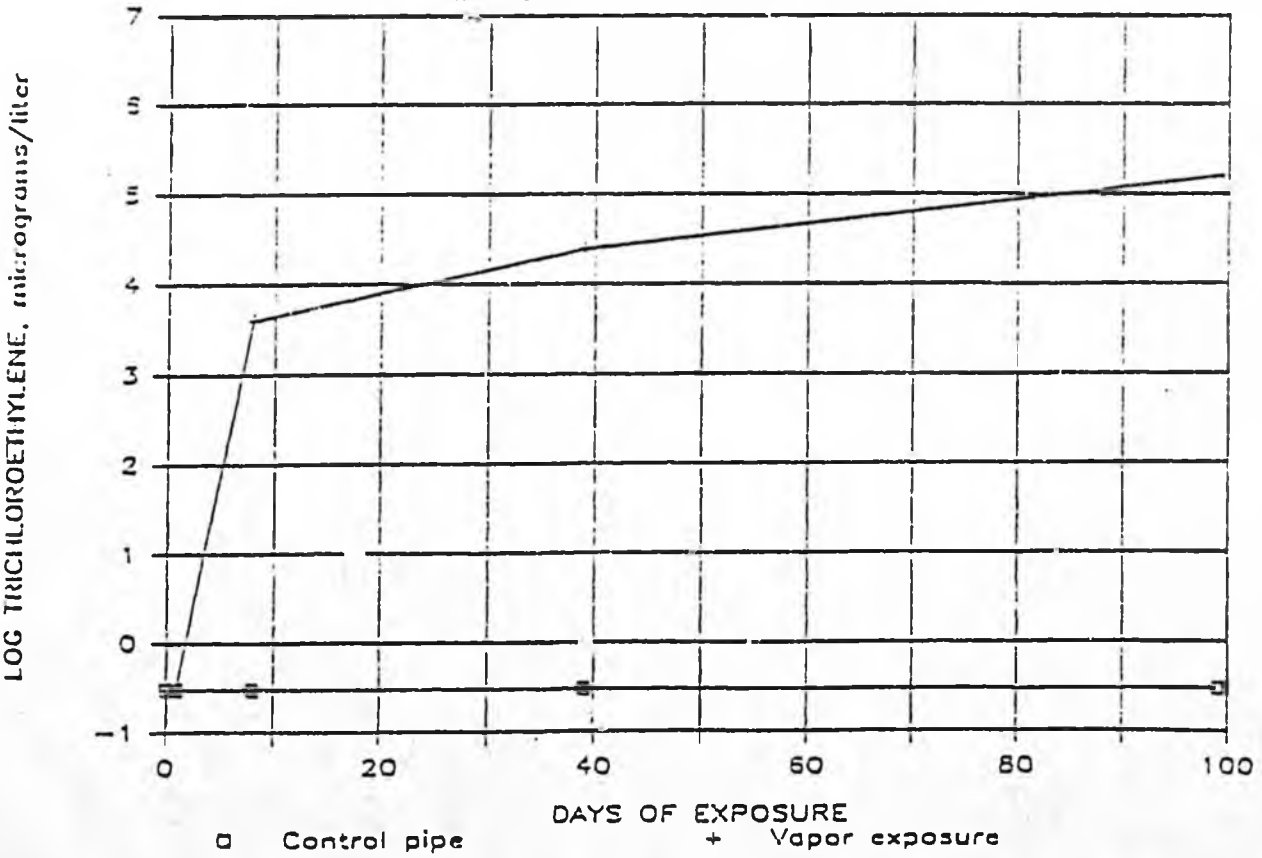


FIGURE IVA. TRICHLOROETHYLENE

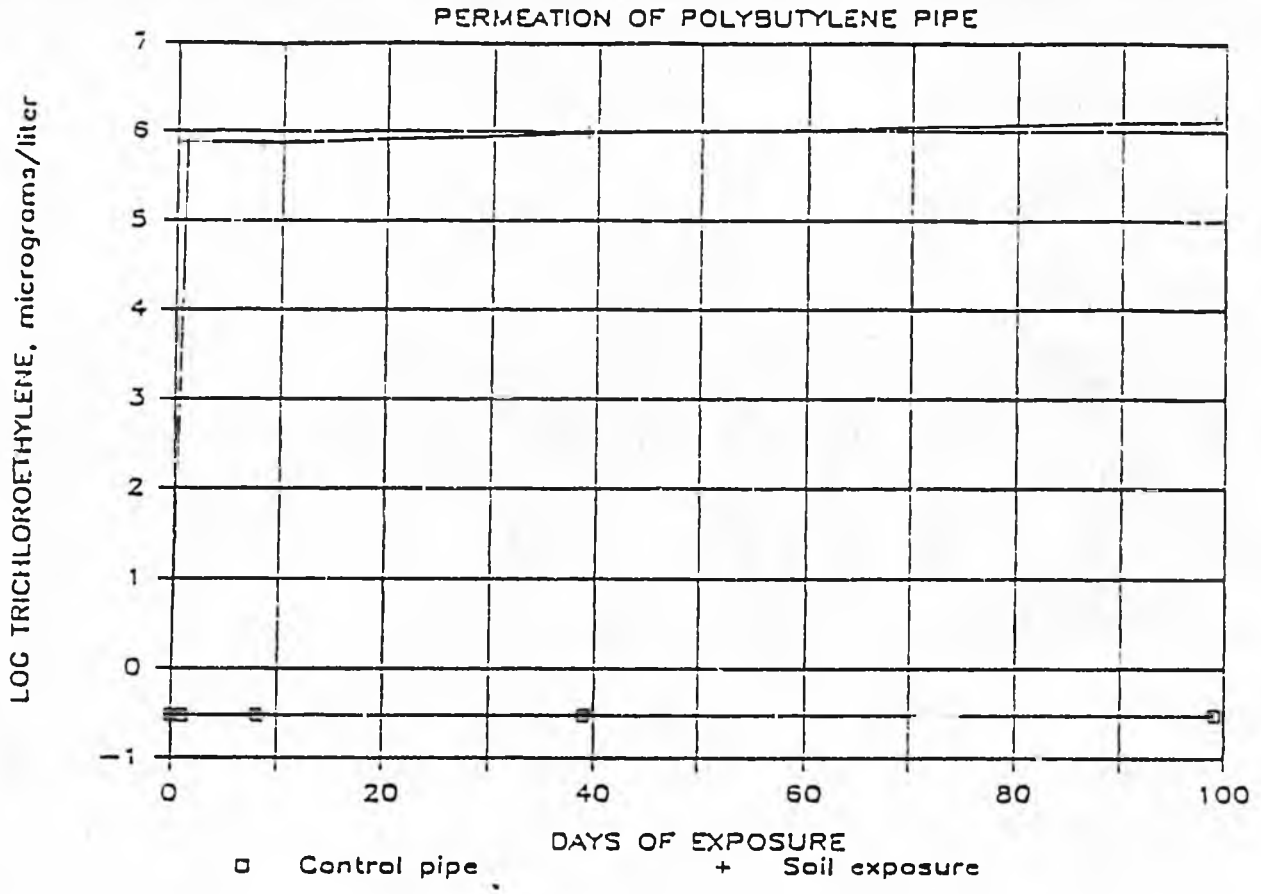


FIGURE IVB. TRICHLOROETHYLENE

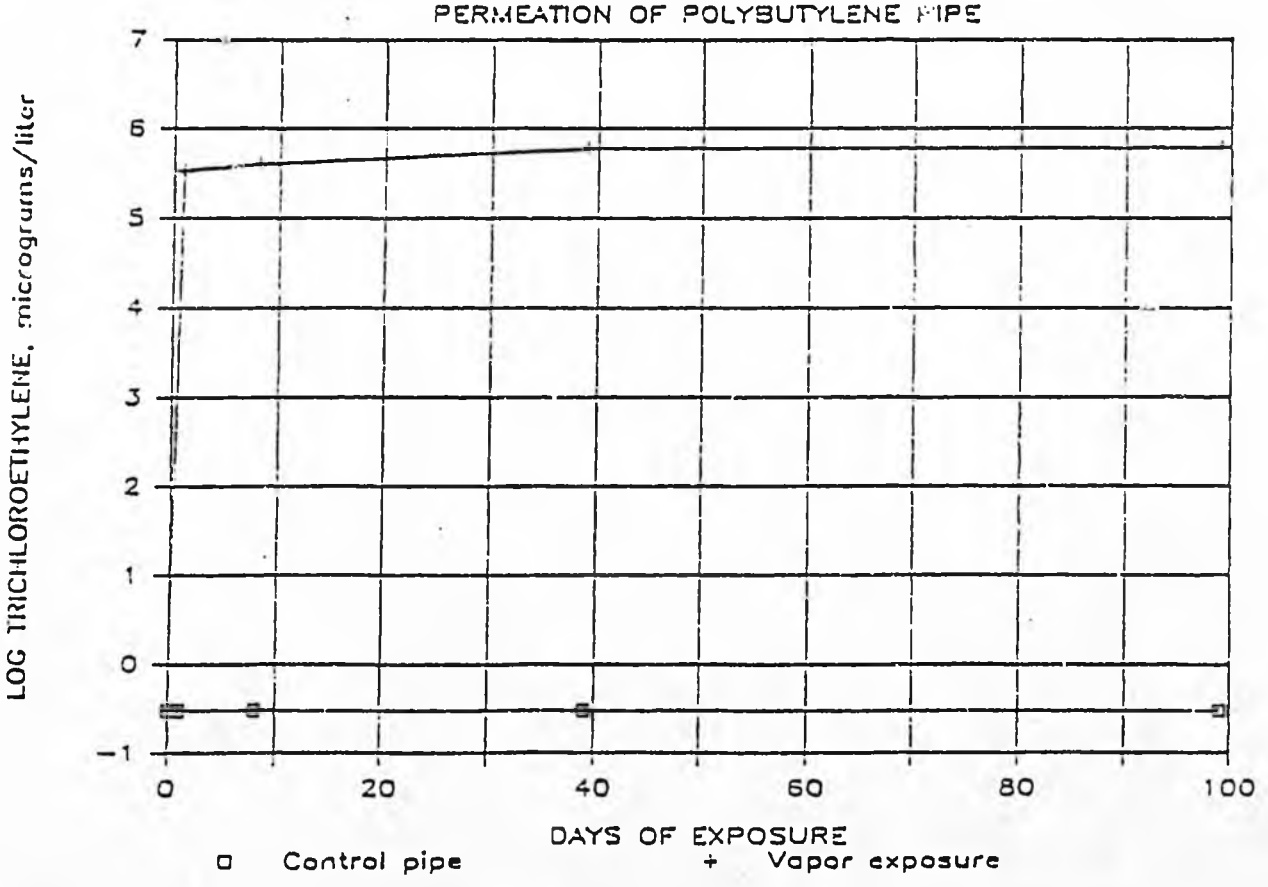


FIGURE VA. TRICHLOROETHYLENE

PERMEATION OF CPVC PIPE

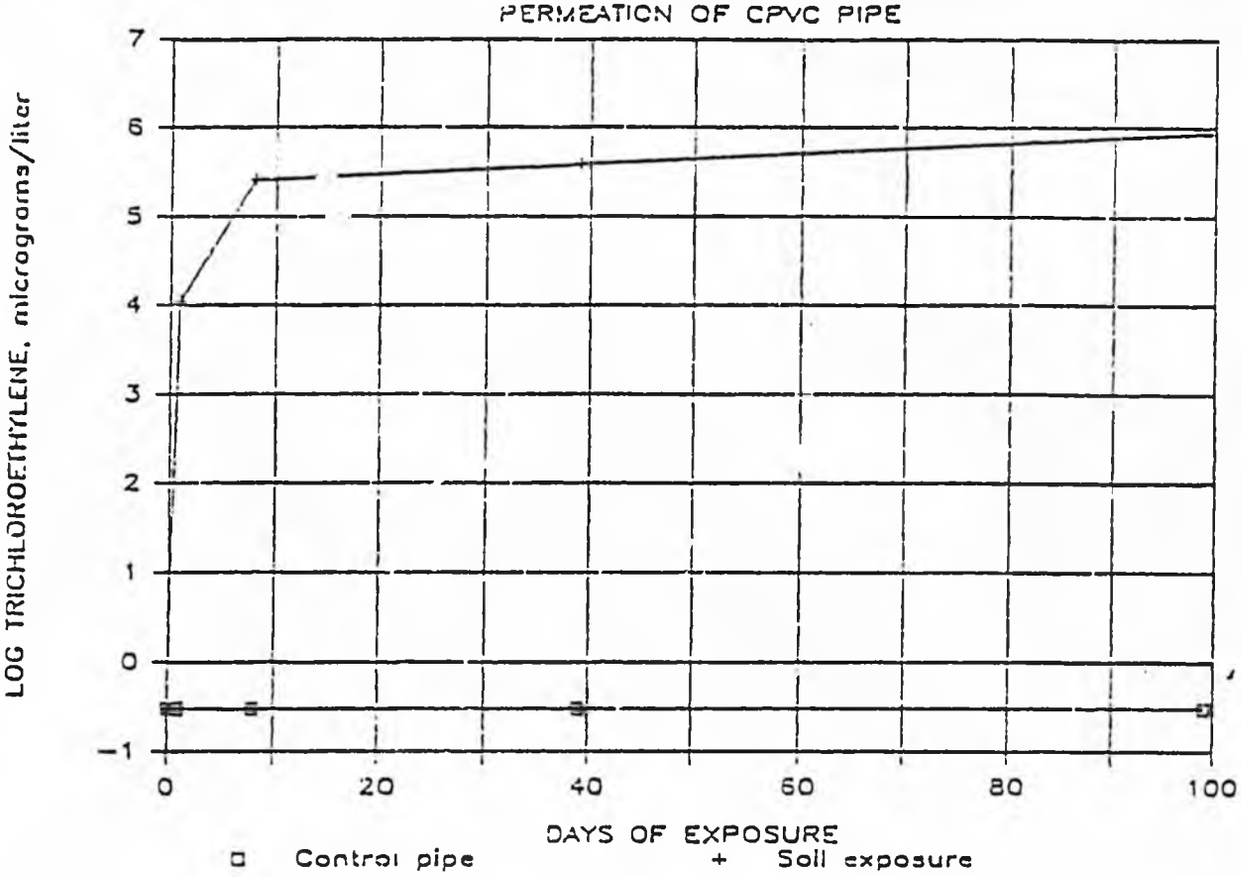
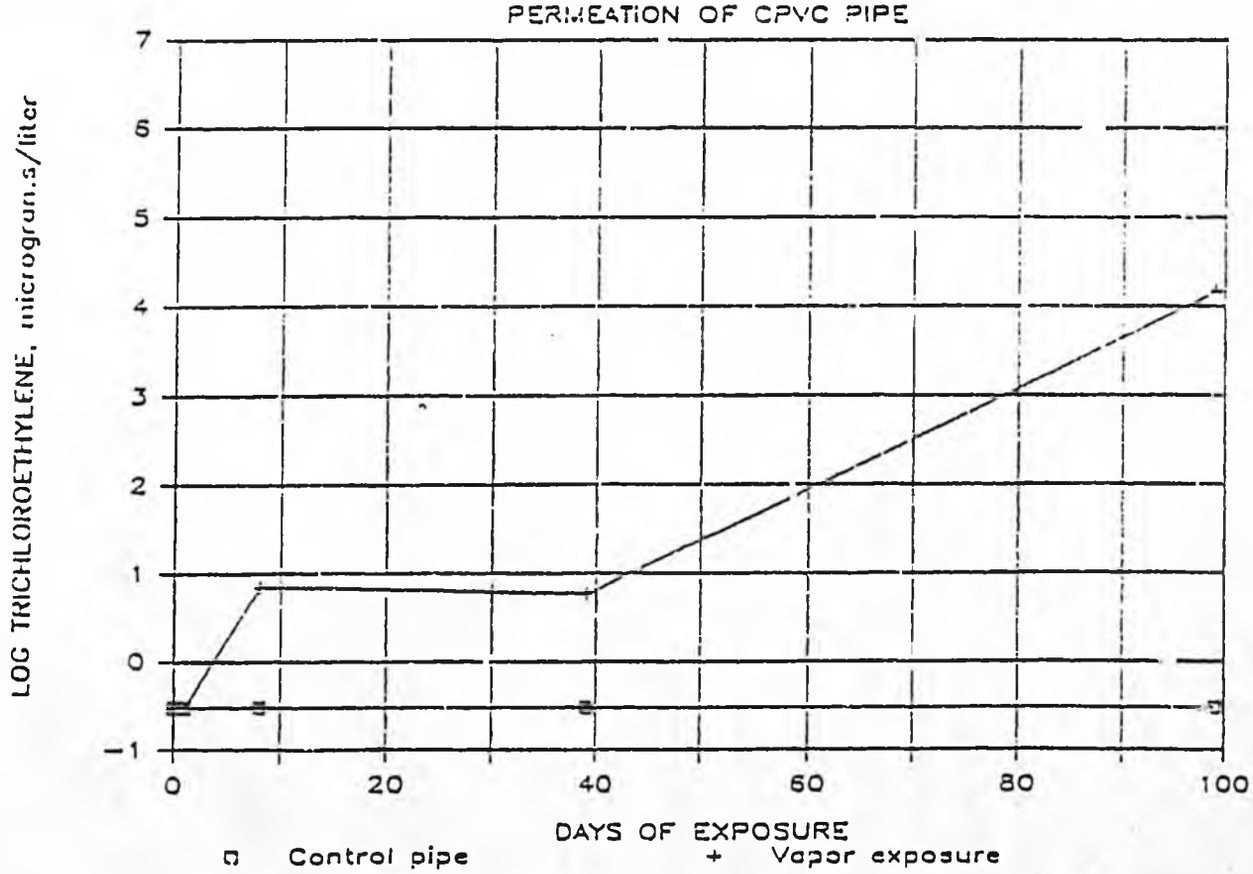


FIGURE VB. TRICHLOROETHYLENE

PERMEATION OF CPVC PIPE



with the iron pipe results. There was no detectable permeation of the copper pipe nor was their any noticeable physical change in the pipe as a result of the exposure to TCE in either the soil or vapor tanks.

Polyethylene Pipe - There were no apparent physical changes in the PE pipes as a result of the TCE exposures. The analytical results of the exposed pipe samples and the control pipe samples are presented in Figure III which shows no detectable TCE found in any control samples during the entire 14 week test. Similarly, there was no detectable TCE found in the 1 day exposure samples. However, there was significant TCE (>1,000 ug/L) found in the 3 day samples from both the soil and vapor exposures, indicating breakthrough had occurred at that point. There was very little difference in the permeation of the PE pipe in the soil and vapor tanks, both exceeding 100,000 ug/L in the samples collected after 14 weeks of pipe exposure.

Polybutylene Pipe - The PB pipe had no apparent physical change from either the soil or the vapor exposures. The analytical results of the exposed and control pipe samples are shown in Figure IV. The permeation through the PB pipe was extremely rapid with levels in the water exceeding 100,000 ug/L in less than 24 hours. The TCE levels in the water samples did not increase significantly during the 14 week exposure, indicating that the system reached equilibrium in a short time. Samples from the control pipe were negative.

Chlorinated Poly(Vinyl Chloride) Pipe - The CPVC pipe was physically impacted by the TCE exposure in the soil tank, but not

in the vapor tank. The pipe in the soil tank softened after 4 days such that the ends of the pipe extending through the tank wall drooped downward. The CPVC pipe in the vapor exposure tank could be flexed but never softened to the point that it drooped either inside the tank or at the pipe ends. At the termination of the exposure when the soil exposure tank was disassembled, the CPVC pipe was soft and pliable. Battelle Laboratories reported a similar softening and ballooning of PVC pipe when exposed to concentrated toluene, but not from exposure to hexane or 1,1,1-trichloroethane. In Battelle's experiment the pressure was maintained at 40 psi and the pipe was buried in sand. This would explain why the pipe ballooned until the soil resisted the pressure. In our study the pressure was not maintained in the pipe so a slight pipe expansion would relieve the pressure on the softened pipe. Under actual field conditions where system pressures could be maintained at high levels, structural failure of the pipe might be expected.

The analytical results of the exposed and control pipe samples are presented in Figure V. The TCE permeated the CPVC pipe in the soil exposure such that the water contained in excess of 10,000 ug/L within 24 hours. The 8, 39 and 99 day samples from the soil exposure were all in excess of 100,000 ug/L. In the vapor exposure the permeation was much slower which is consistent with the lack of physical deterioration in the CPVC pipe in the vapor tank compared to the soil tank. TCE in the vapor exposure samples was not measured above 20 ug/L until the 99 day sample when it measured more than 10,000 ug/L. The CPVC control samples

all contained non-detectable levels. If permeation is defined as occurring when the exposed pipe samples contain levels at least 100 times (2 orders of magnitude) higher than the controls, then permeation occurred sometime between 6 and 14 weeks.

Summary of TCE Exposure - The TCE permeated most readily through the PB pipe, attaining levels in both the soil and vapor exposure samples of over 100,000 ug/L in less than 24 hours. The TCE also permeated the PE pipe in both the soil and vapor exposures although none was detected in the 24 hour samples. However, the 8, 39 and 99 day samples from the PE pipe in both exposures were more than 1,000 ug/L, 10,000 ug/L and 100,000 ug/L respectively, the levels increasing with increasing duration of exposure. The CPVC pipe in the soil exposure was permeated rapidly at a rate between the PE and PB soil exposure rates. However, the vapor exposure was much slower with no significant permeation measured until the 99 day sample. The plastic control pipes (PE, PB and CPVC) and the iron and copper pipes in both exposure tanks never showed any detectable TCE.

TCE is capable of permeating all plastic pipes tested, most easily through PB, followed by PE, and then CPVC. The TCE also physically affected the CPVC pipe, softening and swelling the pipe to the extent that pipe failure might be expected under conditions of continuous high pressure.

B. Chlordane Exposure

The results of the chlordane exposures are presented in Figure VI. There was no permeation of chlordane detected in any of the pipe systems in either the soil or vapor exposures, even

FIGURE VIA. CHLORDANE

PERMEATION OF ALL PIPE TYPES

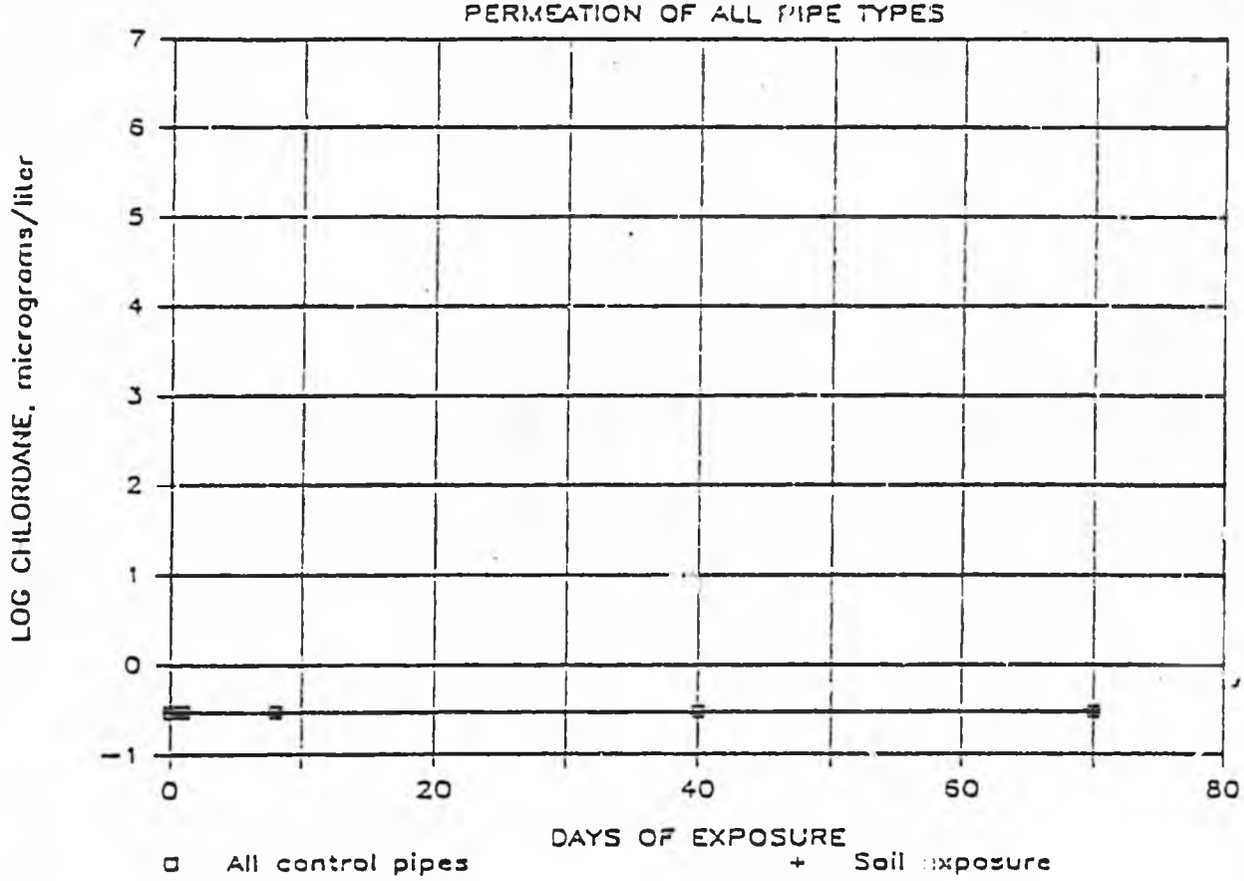
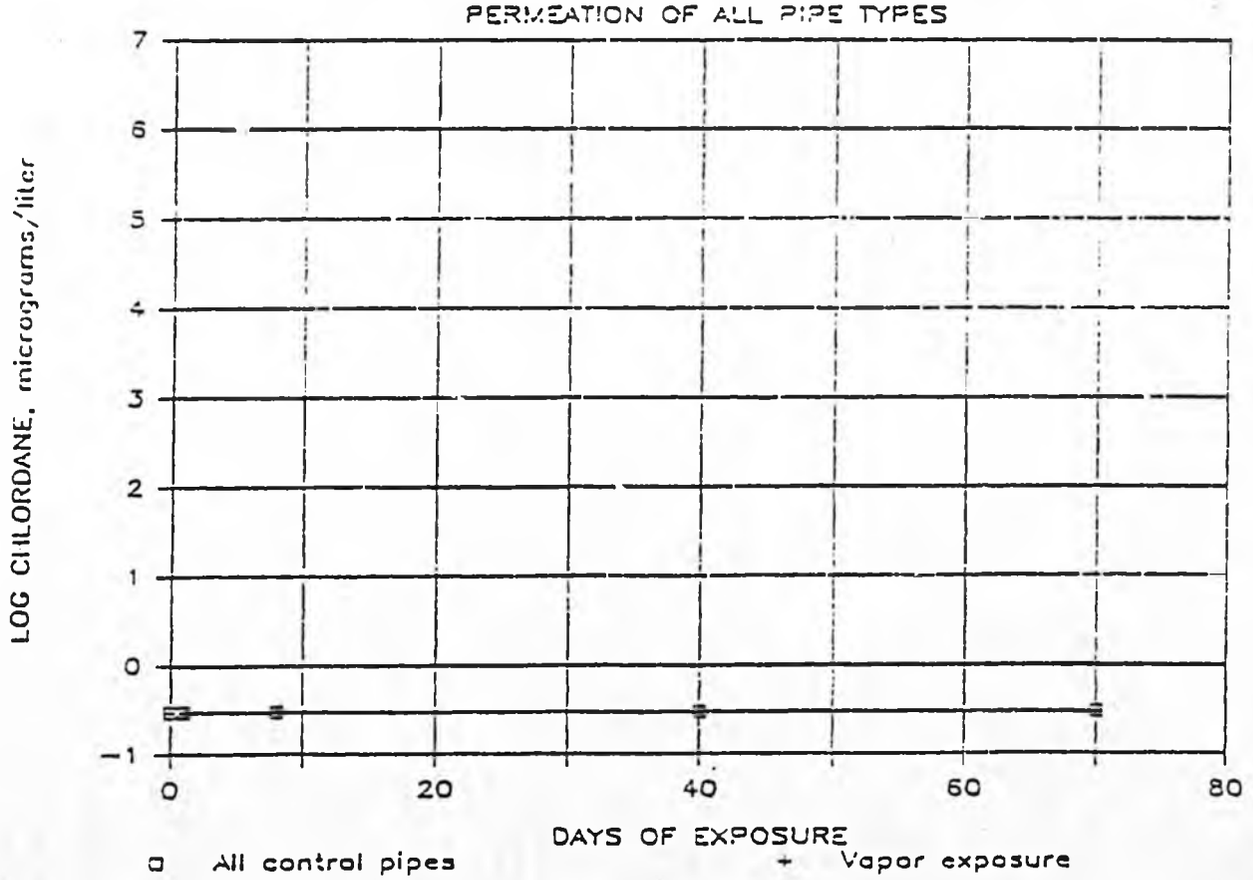


FIGURE VIB. CHLORDANE

PERMEATION OF ALL PIPE TYPES



after 70 days. The control pipes were negative throughout the study. Neither was there any apparent physical damage to the pipe resulting from the chlordane exposures.

When the chlordane was initially applied to the soil as 1500 ml of 72% chlordane, the liquid seemed to be adsorbed into the top and not migrate to the tank bottom. To overcome this, 2 gallons of distilled tap water were added to disperse the chlordane. With a total of 2.4 gallons applied, the pipes were in the saturated zone. This application may more closely simulate actual field conditions since rainfall could raise groundwater levels such that the service lines are in saturated soil. If the chlordane was adsorbed onto the soil particles in the soil exposure this would also be the case in the field. In any case, there is no apparent danger of chlordane permeating plastic pipe based on the results of this study.

C. Gasoline Exposure

When the gasoline was initially placed in the exposure tanks, there was leakage at the tank wall joints and the pipe openings. The gasoline had attacked the silicone rubber sealant causing the leakage. As a result, the tanks were emptied, cleaned and resealed using a pliable "Permatex" which is resistant to gasoline. Additionally, to prevent possible leakage a heavy aluminum foil liner was placed in the soil exposure tank extending 3 inches up on all sides.

Despite the efforts to seal the exposure tanks so that there would be no leakage or contamination of the controls, there was a

detectable level of gasoline components in every control pipe sample and in every iron and copper pipe sample. The levels were low, less than 50 ug/L, in all but two samples where the levels were 125 and 174 ug/L. This low level contamination of the control and metal pipe samples was attributed to leakage of vapors which may have caused contamination during sampling and/or permeated the plastic pipes outside the tank. Because of this background contamination, permeation was operationally defined as an occurrence in which the level of any gasoline component (Benzene, Toluene, Xylene) in the exposed pipe was 2 orders of magnitude (100 times) higher than the plastic pipe controls. The results are presented graphically in Figures VII - XI.

Iron Pipe - The results of the iron pipe exposure are presented in Figure VII. Low levels of benzene, toluene and xylene were found in the iron pipe samples throughout the 99 day exposure. However, because the levels were low (generally less than 10 ug/L), and never approached the levels found in the three plastic pipe controls, the occurrence was attributed to sample contamination rather than permeation of the iron pipe.

Copper Pipe - The results of the copper pipe exposures are presented in Figure VIII. As in the iron pipe exposure, low levels of gasoline components were detected throughout the exposure. With one exception, the levels found were almost identical to the iron and plastic control pipe samples. The exception was the 99 day soil exposure sample where levels exceeding 100 ug/L were found; toluene - 169 ug/L, benzene - 122 ug/L. While the levels are relatively high, they are not two orders of magnitude

FIGURE VIIA. GASOLINE

PERMEATION OF IRON PIPE

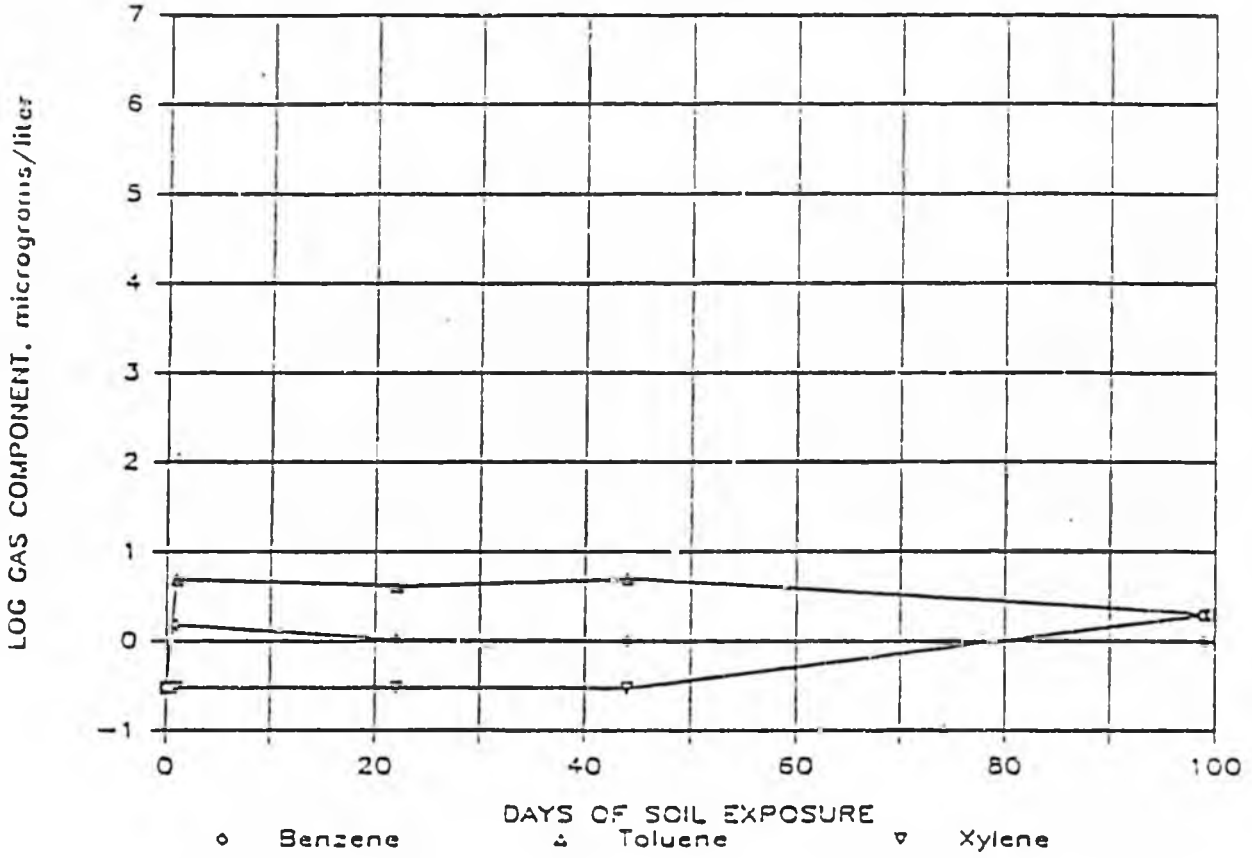


FIGURE VIIB. GASOLINE

PERMEATION OF IRON PIPE

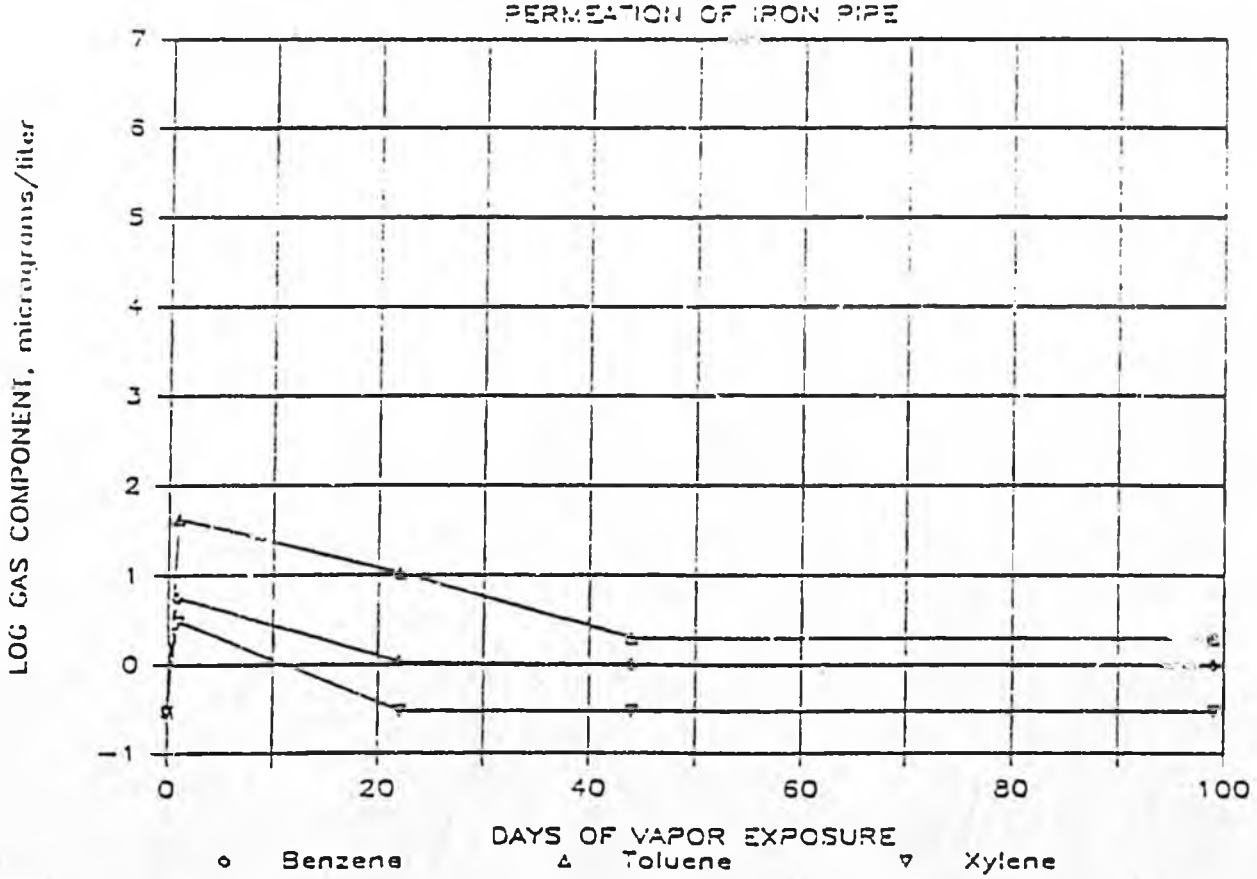


FIGURE VIIIA. GASOLINE

PERMEATION OF COPPER PIPE

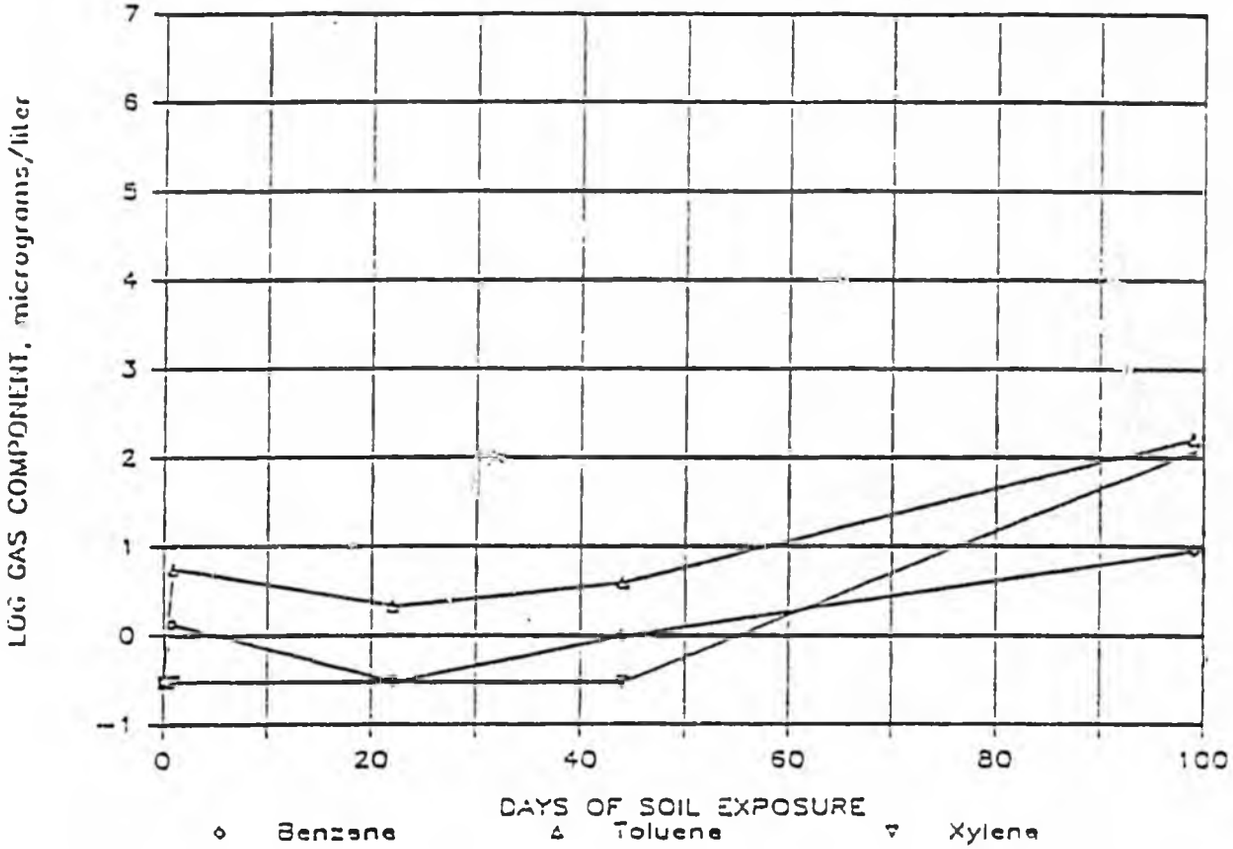


FIGURE VIIIB. GASOLINE

PERMEATION OF COPPER PIPE

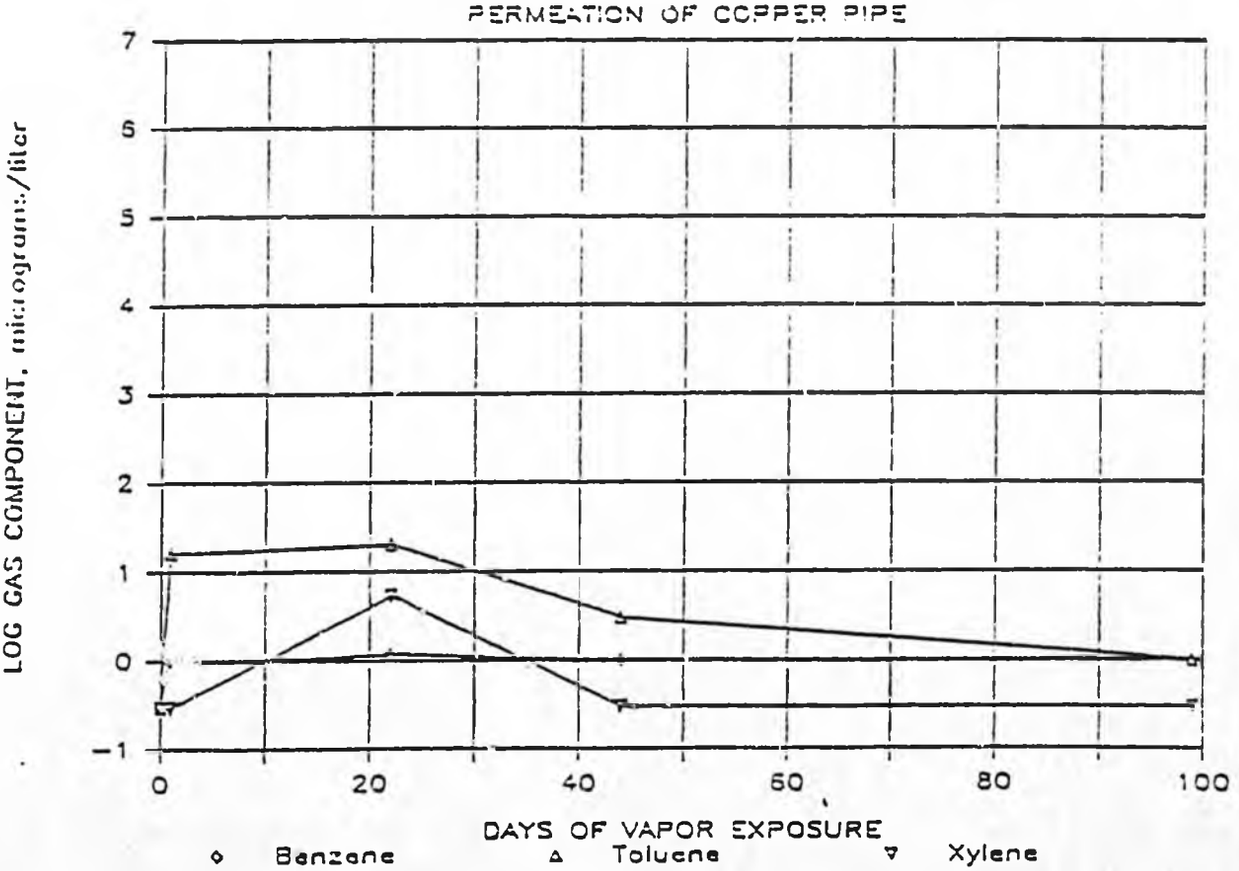


FIGURE IXA. GASOLINE

PERMEATION OF POLYETHYLENE PIPE

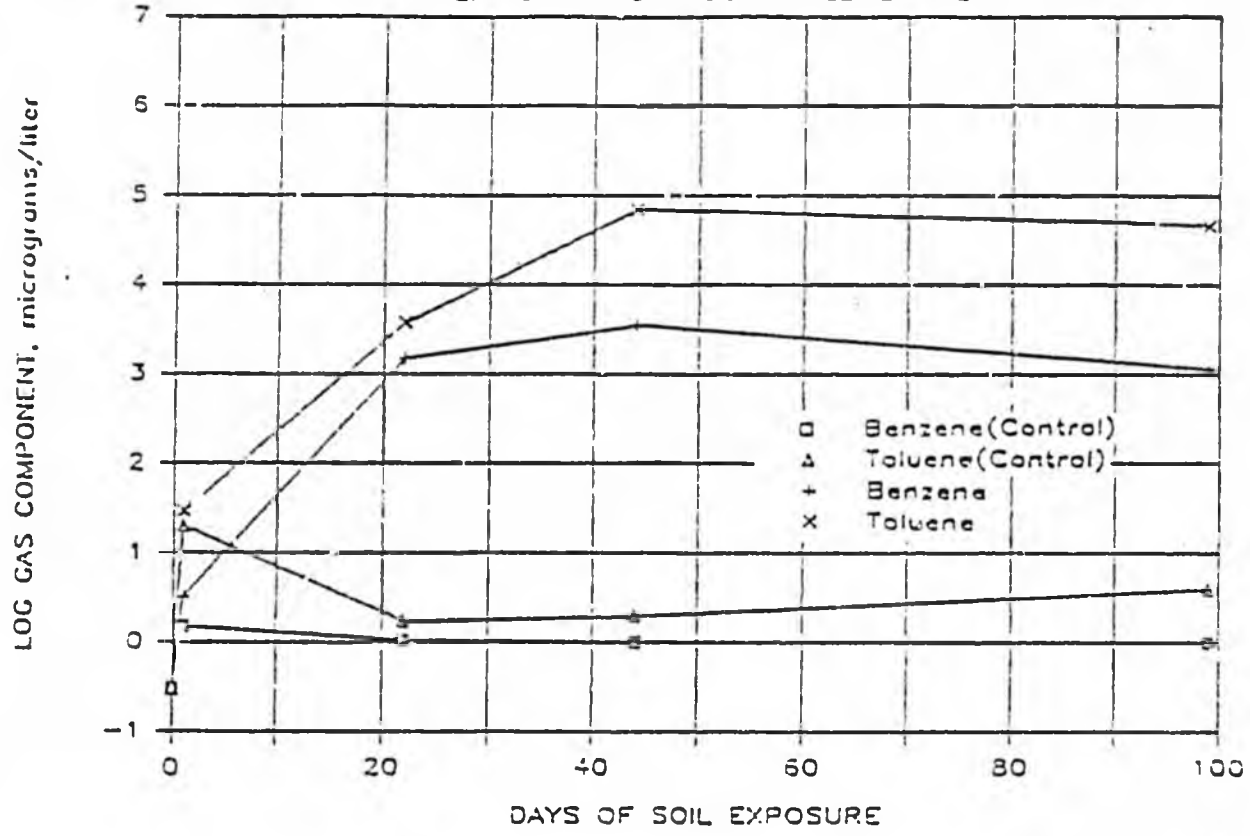


FIGURE IXB. GASOLINE

PERMEATION OF POLYETHLYENE PIPE

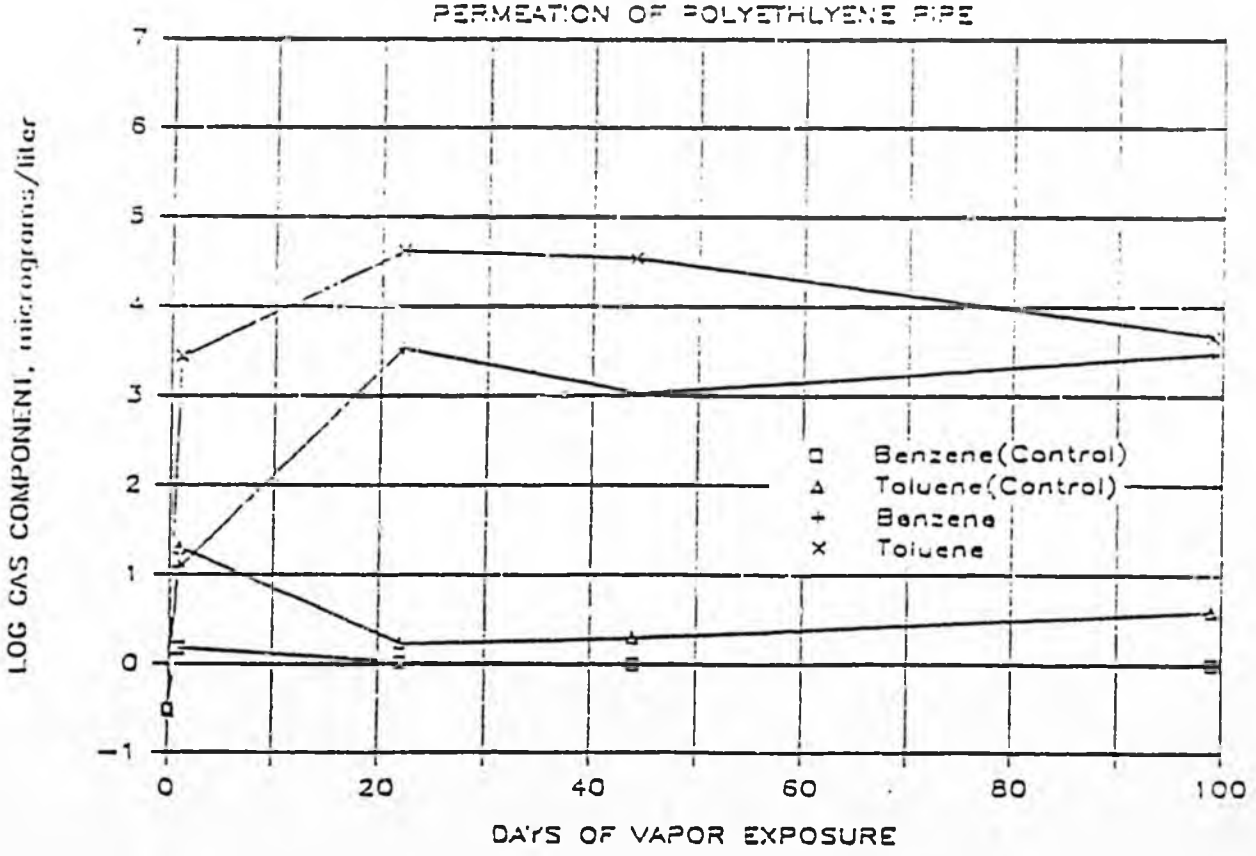


FIGURE XA. GASOLINE

PERMEATION OF POLYBUTYLENE PIPE

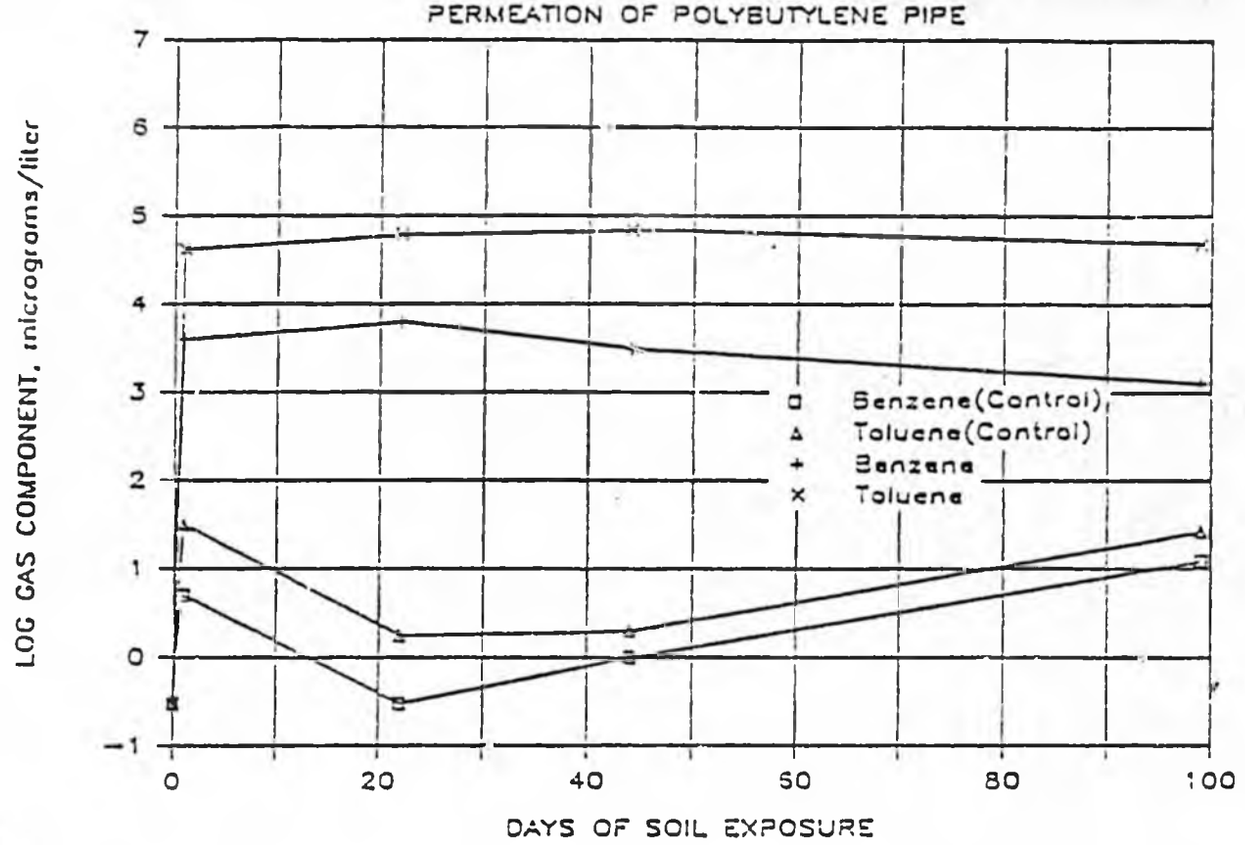


FIGURE XB. GASOLINE

PERMEATION OF POLYBUTYLENE PIPE

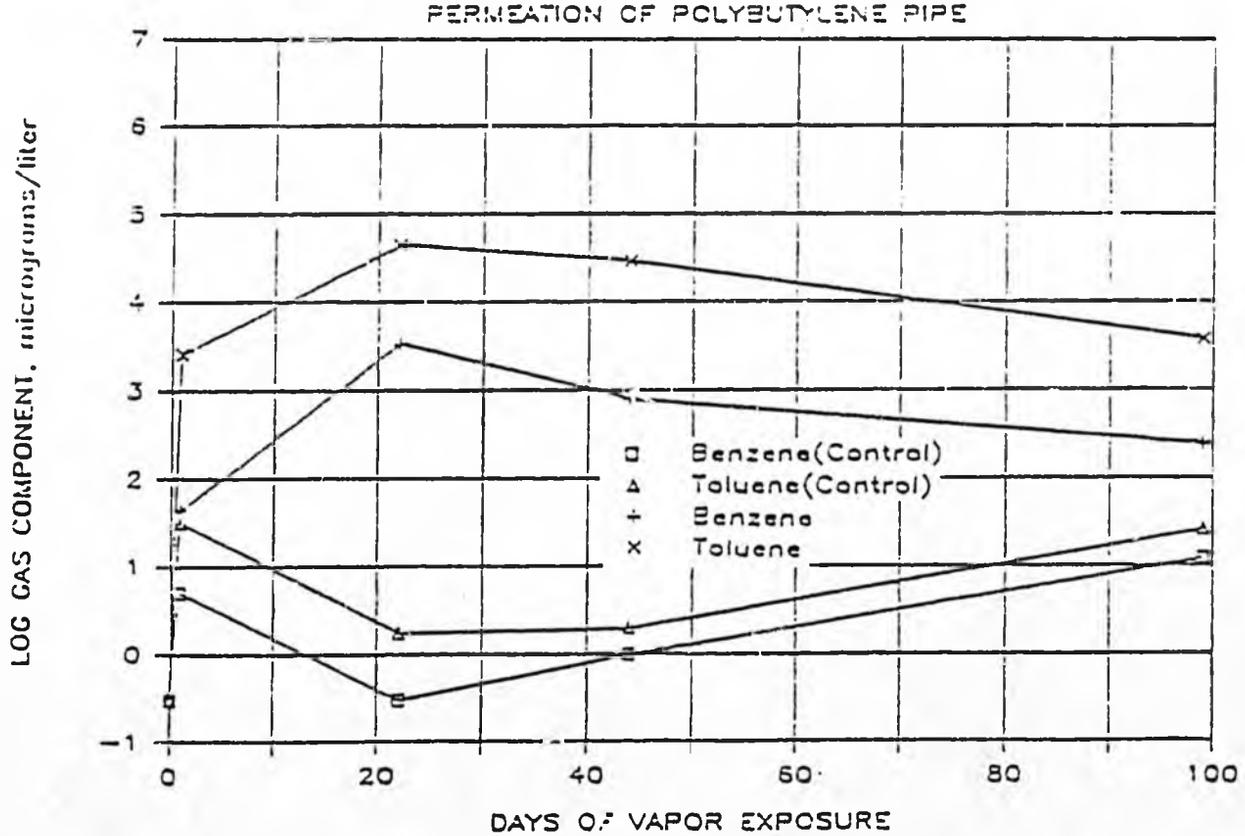


FIGURE XIA. GASOLINE

PERMEATION OF CPVC PIPE

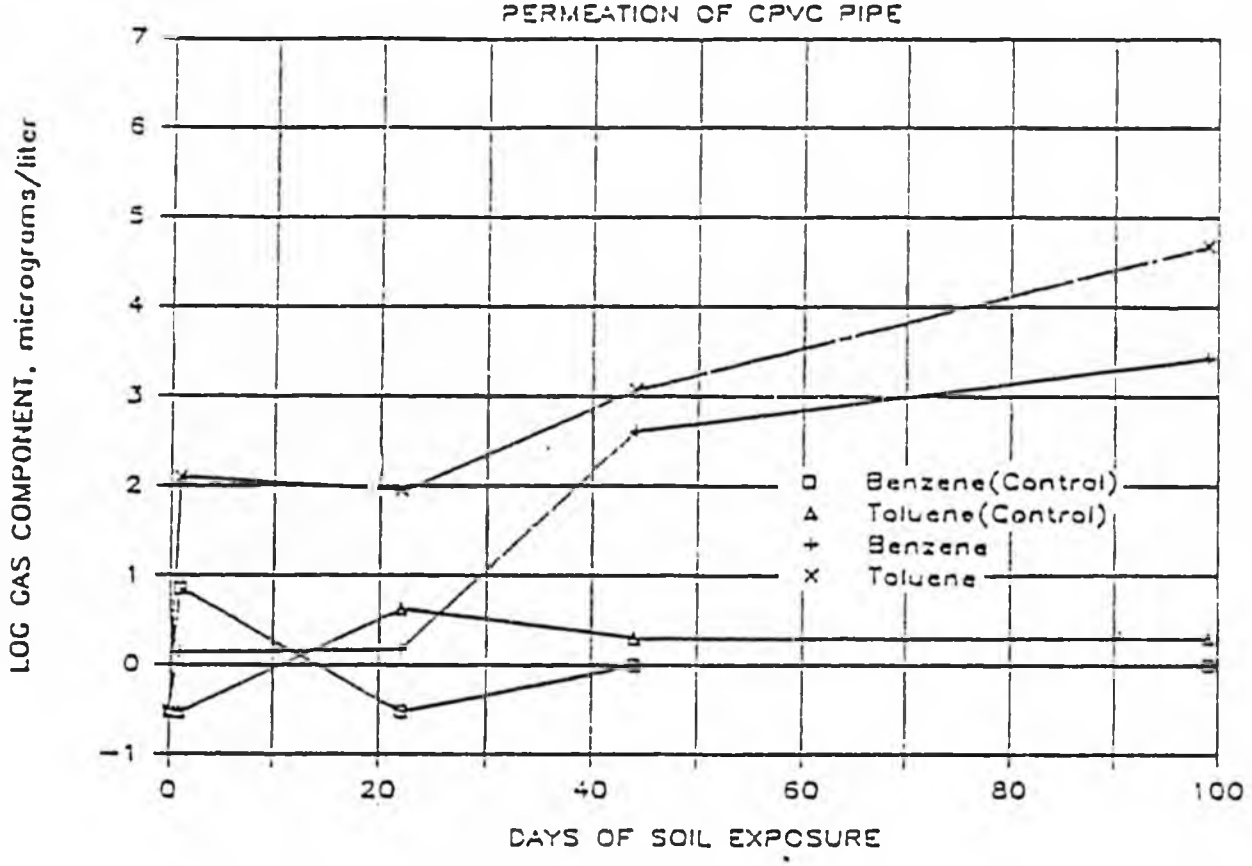
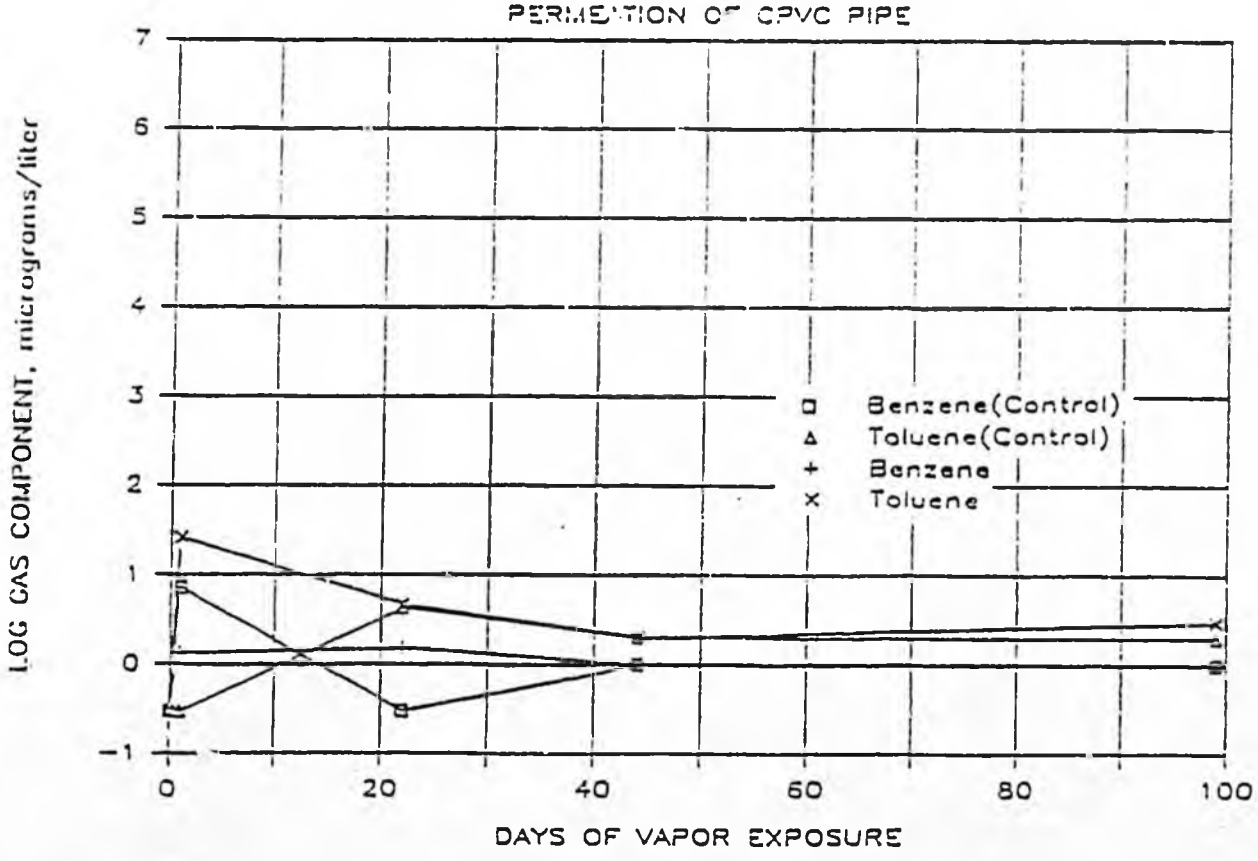


FIGURE XIB. GASOLINE

PERMEATION OF CPVC PIPE



above the iron pipe or plastic control sample results. On this basis, no permeation was believed to have occurred.

Polyethylene Pipe - There was no apparent physical change in the PE pipe as a result of either exposure. There was a noticeable gasoline odor in the soil exposure samples collected on days 22 and 99. Additionally, those samples had a gasoline film on the surface. The results of the PE pipe exposure samples are presented in Figure IX. Permeation occurred in both exposures within 22 days. The permeation was slightly more rapid in the vapor exposure where toluene actually permeated within 24 hours using the 2 orders of magnitude criterion. The levels for all gasoline components were in the 1,000 - 10,000 ug/L range in the 22 day samples where they stayed throughout the remaining samples.

Polybutylene Pipe - There was no apparent physical change in the PB pipe as a result of either exposure. There was a noticeable gasoline odor and film on all samples collected from the soil exposure, and all samples except the 1 day, from the vapor exposure. The analytical results of the PB pipe exposure are presented in Figure X. The control samples had no film or odor present. As seen in Figure X, at least two components in each exposure had levels near or exceeding 1,000 ug/L at day 1. However only the toluene in both exposures, and benzene in the soil exposure met the criterion for permeation within 1 day. This was due to the relatively high levels (5 to 125 ug/L) in the control samples. However, by day 22 the control samples were less than 2 ug/L for all components and the exposed pipe samples were all in the 3,000 - 60,000 ug/L range for all components. The

permeation remained high through day 44 with the concentrations declining slightly. By day 99 the levels in the exposed pipes had again declined slightly, while the control samples contained 17 to 42 ug/L. In the vapor tank the levels had declined such that the criterion defining permeation was no longer met. The only explanation for the declining levels in the exposed pipes is that losses occurred from the exposure tanks through evaporation and leakage causing the differential driving force to be reduced, resulting in the declining levels. In any case, it is clear that gasoline permeation of the PB pipe occurred within a few days.

Chlorinated Poly (Vinyl Chloride) Pipe - There was a physical detericration of the CPVC pipe in the soil exposure. However, the extent of the pipe damage was not as great as in the TCE exposure. The pipe ends extending from the tank did not droop as in the TCE exposure, but when the experiment was terminated and the soil and pipe were removed, the CPVC pipe was soft enough to be tied into a knot. After remaining out of the tank where it dried, it again became rigid in the exact shape in which it was placed to dry. The CPVC pipe in the vapor exposure remained rigid throughout the study. The only CPVC pipe sample having a detectable gasoline odor was the 99 day sample from the soil exposure.

The analytical results presented in Figure XI are consistent with the physical characteristics of the CPVC pipe and the water samples. Only benzene and toluene are shown in Figure XI in order to simplify the presentation. The xylene and ethyl benzene results were similar (See Appendix II). There was some control pipe sample contamination in the 1 and 22 day samples, however the

highest levels found in the CPVC control were below 10 ug/L. In the soil exposure the gasoline had permeated by day 44, with increased permeation by day 99. There was no permeation in the vapor exposure where the 44 and 99 day samples had identical results in the control and the test pipe. It is significant that the CPVC was softened only where permeation also occurred.

Summary of Gasoline Exposure - There was some contamination of the plastic control pipes during the gasoline exposure, most likely due to the presence of vapors which leaked from the tank. However, the level of contamination was minor when compared to the level of gasoline components present in the pipes where permeation occurred. No permeation occurred in the iron pipe exposures where the samples contained levels at or below the plastic control pipe samples. Similarly, no permeation occurred in the copper pipe exposures where gasoline was detected, but not significantly above the plastic controls. Permeation occurred within 22 days in the PB and the PE pipe in both the soil and vapor exposures. Gasoline permeated the CPVC pipe within 44 days in the soil exposure but not at all in the vapor exposure. The CPVC pipe was the only pipe to exhibit physical damage as a result of the gasoline exposure; being softened in the soil exposure test. Most samples in which the levels exceeded 1000 ug/L had a detectable odor and a visual gasoline film on the surface of the sample.

APPENDICES

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APPENDIX I

Permeation Results from Various Studies (1)

Author	Reference	Test Compound	Type of Pipe						
			PE	PB	PVC	CPVC	Asbestos	Iron	Copper
East Bay MUD	1	gasoline	yes/1	yes/1	no/6	--	--	--	--
KIWA	5	methyl bromide	yes/1	--	no/8	--	--	no/8	--
Analab	6	1,1-Dichloroethane and 1,2-Dichloroethane	yes/1	yes/1	(2)	--	--	--	no/3
		Trichloroethylene	yes/1	yes/1	(2)	--	--	--	no/3
		Dinoseb, Dicambia and 2,4-D	no/3	no/3	(2)	--	--	--	no/3
		Chlordane	no/3	no/3	no/3	--	--	--	no/3
		Lindane	(3)	(3)	(3)	--	--	--	(3)
Battelle Lab	7	toluene	--	--	yes/5	--	yes/1	no/6	--
		hexane	--	--	no/6	--	no/6	no/6	--
		1,1,1-trichloro-ethane	--	--	no/6	--	yes/2	no/6	--
AWWSC		TCE	yes/1	yes/1	--	yes/1	--	no/14	no/14
		Chlordane	no/10	no/10	--	no/10	--	no/10	no/10
		Gasoline	yes/3	yes/1	--	yes/6	--	no/14	no/14

(1) Results expressed as yes (permeation did occur) or No, followed by weeks of exposure e.g. yes/5 means permeation occurred after 5 weeks exposure.

(2) Solvent welded joints came apart, negating results.

(3) Low level permeation (12-33 ppb) occurred in all pipes after 3 weeks, test to be repeated.

(4) Additional tests done on jointed pipe sections (not shown).

APPENDIX II

Phase I Results

Trichloroethylene, micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	<1	<1	<1	<1	<1	<1	769000	11000	<1	<1	<1	344000	<1
8	<1	<1	<1	<1	<1	6000	751000	261000	<1	<1	4000	409000	7
39	<1	<1	<1	<1	<1	90000	971000	398000	<1	<1	25000	611000	12
99	<1	<1	<1	<1	<1	233000	1356000	885000	<1	<1	160000	626000	15000

Phase II Results

Chlordane, micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
40	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

APPENDIX II

Phase I Results

Trichloroethylene, micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	<1	<1	<1	<1	<1	<1	769000	11000	<1	<1	<1	344000	<1
8	<1	<1	<1	<1	<1	6000	751000	261000	<1	<1	4000	409000	7
39	<1	<1	<1	<1	<1	90000	971000	398000	<1	<1	25000	611000	12
99	<1	<1	<1	<1	<1	233000	1356000	885000	<1	<1	160000	626000	1500

Phase II Results

Chlordane, micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
8	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
40	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Phase III Results (cont.)

Gasoline (Xylene), micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	<1	125	174	<1	<1	45	11.05	36.56	3.02	<1	177.12	1000	1
22	<1	<1	<1	<1	<1	4549	7309	24.7	<1	5.4	6288	7281	<1
44	<1	<1	<1	<1	<1	7857	7107	565.9	1	1	5838	5361	<1
99	<1	<1	<1	2	122	22530	23276	22590	1	1	7948	7926	4

Gasoline (Ethyl benzene), micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	<1	<1	<1	<1	<1	<1	1248	30	1.57	<1	166	932	1.08
22	<1	<1	<1	<1	<1	3207	3456	10.46	<1	2.59	2924	3363	<1
44	<1	<1	<1	<1	<1	4600	4194	405.7	<1	<1	3309	2808	<1
99	<1	<1	<1	1	46	4297	6612	3407	<1	4	1380	1546	1

Phase III Results

Gasoline (Benzene), micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	1.5	5	7.2	1.5	1.3	3.25	4051	1.4	5.5	1	12.36	44.2	1.36
22	1.05	<1	<1	1.04	0.3	1533	6301	1.52	1.07	1.17	3400	3391	1.52
44	1	1	1	1	1	3561	3124	415.6	1	1	1073	793	1
99	1	12.29	1	1	9	1142	1270	2722	1	1	3046	246	1

Gasoline (Toluene), micrograms per liter

Sample day	Controls			Soil Exposure					Vapor Exposure				
	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC	Iron	Copper	PE	PB	CPVC
0	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1	20	32	<1	4.9	5.6	29.6	41924	126.94	42.68	16.2	2781	2614	25.86
22	1.72	1.76	4.29	4.17	2.14	3809	62100	89.67	10.41	20.3	41892	44435	4.63
44	2	2	2	5	4	70200	69712	1210	2	3	34470	28880	2
99	4	26.4	2	2	169	46474	47965	48912	2	1	4612	3800	3

Polybutylene plumbing pipe saved thousands of home and apartment owners the cost and inconvenience of broken water pipes during the extremely severe cold spell over the 1985 Christmas holidays.

"It was a major disaster in this area," says Jack Smith of Sundance, Inc., a plumbing contractor in Marietta, GA, where temperatures dropped to near zero and high winds pushed the chill factor to -50°F. "We had 500 to 700 service calls. They came in waves. But only one involved a system piped with polybutylene pipe. All the others involved breaks in copper and galvanized pipe. And we've installed hundreds of polybutylene piped water systems in this area."

The experience with polybutylene pipe during the freeze in Cobb County, GA, has fire and building code inspectors smiling. Cobb County, which is part of the rapidly growing Atlanta metropolitan area, has been a leader in changing building codes to allow the use of polybutylene pipe in hot and cold water plumbing and to authorize cost-saving building code modifications to encourage the installation of residential fire sprinkler systems.

"There were leaking pipes all over town -- and one in an unheated area of a new school may have caused a quarter of a million dollars or more in damages by itself -- but virtually no problems with the residential systems based on polybutylene pipe," says Lt. Jerry W. Grier of the Cobb County Fire Department. "We've got about 9,000 water systems and sprinklers based on polybutylene pipe in the county." Because of the dramatic difference in performance, the Cobb County Fire Department is now considering mandating polybutylene pipe for all sprinkler systems installed in the attic.

"We're very pleased with the performance of polybutylene," says Jim Bechtel, Senior Vice President of Post Properties, Inc., which is one of the largest builders and operators of multi-family dwellings in the Atlanta area. "We have 250 domestic water systems and 148 fire sprinkler systems based on polybutylene pipe in operation. There was only one break involving a system based on polybutylene pipe during the freeze."

"This freeze changed a lot of people's minds about plastic pipe," says Danny R. Gosdin, a field supervisor for Carroll & Boyd, Inc., of Jonesboro, GA, a mechanical contractor for Pulte Homes. "We've installed hundreds of water systems based on polybutylene pipe, and during the freeze we had only one fitting push off from freezing, but virtually no water damage resulted. Yet, the first day after the hard freeze, we had 250 calls, all involving water systems made with copper or galvanized pipe. That makes you think this polybutylene pipe is pretty good stuff."

"Knowing what I know now, I'd pay more to have a water system piped with polybutylene than I would for a system made with metal pipe," says W. T. Anderson, who is director of inspections for Cobb County. In actual practice, polybutylene plumbing systems can be installed less expensively than copper systems, even at today's depressed copper prices.

In Houston, the same cold front dropped temperatures to a record low of 11 degrees on Christmas morning and held the area below freezing for more than 100 hours. According to preliminary estimates, freeze damages were expected to match or exceed damages caused by the wind and flooding from Hurricane Alicia

last August. Some 5-10 percent of homes and apartments in the area experienced frozen and broken pipes.

"One apartment complex I repaired had over 180 breaks," says Laurence Klein, a master plumber who specializes in repair and replacement plumbing for large apartment and condominium operators. For several years, Klein has used polybutylene pipe to replace copper and galvanized pipe in water systems and during that time has replaced hundreds of metal water systems in the Houston area with polybutylene pipe.

"I did a good month's work in the week following the freeze, but didn't get a single call involving polybutylene pipe," he said. "The freeze really separated the good from the bad plumbing. Polybutylene isn't giving me very much repair business."

Wood Brothers Homes, one of the larger home builders in the Houston area which switched to polybutylene pipe for its plumbing a little over a year ago, also reported no complaints of breakage or water damage from occupants of some 250 to 300 homes constructed with the high performance plastic pipe.

"Our sales department, because of problems in the past with other plastic pipe, has been uncomfortable about our changing to polybutylene, and felt they were having to sell over it," says Trudy Starkey, who is purchasing agent for Wood Bros. "Since the freeze, that has changed and they now feel that it is a sales point in favor of Wood Bros. Homes."

Shell Chemical Company
A Division of Shell Oil Company

One Shell Plaza
P.O. Box 2463
Houston, Texas 77001

May 16, 1984

EXPRESS MAIL

Chairmen and Members
Senate Labor and Commerce Committee
State of Alaska
Juneau, Alaska

Dear Sir:

REFERENCE: HOUSE BILL NO. 508, AN ACT RELATING TO THE PLUMBING CODE

I appreciate the opportunity to give testimony to the state Senate of Alaska on house bill No. 508. I was disappointed, however, that testimony extended well beyond the scheduled committee meeting time, so that it became necessary for me to leave before I could address the numerous allegations about the performance of polybutyle. piping. This letter is written to address those allegations and show that there are facts that clearly refute the arguments that were made. We would like to see this letter and the substantiating information that is attached entered into the official transcript of the hearing.

In his testimony, Dwight Perkins of the Pipe Trades Council of Alaska raised several general issues in protesting the potential approval of polybutylene pipe. The issues raised by Mr. Perkins and the true facts on those matters are as follows:

Durability of polybutylene pipe - Polybutylene pipe resists virtually all of the actions that destroy metal piping. Polybutylene piping does not rust, rot, or corrode. It resists scale buildup that can plug metal pipes. It is not subject to electrolysis. It resists breakage due to freezing water far better than any metal pipe. It has a wet abrasion resistance superior to metal plumbing pipe (see attached performance report on the use of large diameter polybutylene pipe to replace steel piping in the transport of highly abrasive bottom ash slurries from coal fired power plants). Because of its flexibility, polybutylene pipe should be able to accommodate any movement due to earthquakes much better than metal piping. Indeed, the ability to accommodate movement was one of the primary reasons that polybutylene pipe relaced metal pipe in the mobile home industry. Far from being less durable, the facts clearly show that polybutylene pipe is far superior to metal pipe.

Thawability - There are proven methods that can be used to thaw plastic water lines. Because of its excellent high temperature properties, polybutylene pipe can be thawed by either hot water or low pressure steam, applied from either the outside of the pipe or by a flexible probe inside the pipe. As verification of the pipe's ability to tolerate temperatures in excess of 180°F during thawing, I am enclosing test data that shows that, at close to the condensation temperature of steam (210°F rather than 212°F), polybutylene pipe will carry an internal pressure of 150 psi for well over a year - certainly long enough to thaw the pipe.

I believe that it should be pointed out that, once the polybutylene pipe is thawed, the consumer's problems are over. By comparison, the thawing of a frozen metal pipe frequently presents the consumer with the very serious problem of broken, leaking water lines. I have enclosed an article attesting to the substantial benefit realized this past winter by users of polybutylene plumbing pipe.

Fire hazard - In spite of Mr. Perkin's allegations, SRI International, in an Environmental Review Document prepared for the state of California, concluded on page V-3 of the summary that, "The potable water pipes, kept cooler by the water inside and of much lower mass, are not a significant fire safety issue."

Allegations on smoke toxicity are also not borne out by the facts. A document detailing tests done by Dr. Carlos Hilado using a test method patented by NASA concluded that "dry" polybutylene produced less toxic gases than Douglas fir does. Obviously a pipe wet with water as it will be used constitutes even less of a risk.

Electrical grounding - We were surprised that Mr. Perkins would bring this point up as the National Electrical Code cautions against the use of water pipes as electrical grounds.

Permeability - This allegation only relates to buried piping and as such has no bearing on the installation of hot/cold water plumbing pipe in walls of buildings.

Worker safety - This is another curious point for Mr. Perkins to raise. In their objective study, SRI International concluded on page V-8 of their summary that, "PB is clearly a preferred material from the worker safety and health viewpoint compared with both metal systems and with plastics that require cementing."

Mr. Vernon Akin (sp.?) commented on toxicity/health issues, the installation requirements for polybutylene pipe, his opinion that polybutylene pipe will not be less expensive to install than metal pipe systems and thermal expansion/contraction. Again, addressing the facts as they relate to these issues:

Toxicity/health - Every component of polyoutylene pipe - the resin itself, the pigments, and the stabilizers - are approved for food contact use up to 180°F (the maximum sustained plumbing temperature) under the Food and Drug Administration regulations. None of the piping materials currently approved by the Alaska code can make that statement. In fact, some of the metal systems currently approved by the state of Alaska are coming under increased scrutiny (see enclosed comments on 50/50 time-lead solder). Far from being a heath risk, polybutylene pipe is likely the safest potable water piping material.

Installation requirements - Mr. Akin alleged that the requirements in the code cannot be practiced. The facts are that over 500,000 residences were plumbed with polybutylene piping during this last year to the satisfaction of the local plumbing officials.

Installed costs - We certainly recognize Mr. Akin's right to his own opinion on this matter, but the facts are otherwise. The National Association of Homebuilders Research Foundation documented a 44 percent reduction in plumbing costs. In his report to Congress on February 18, 1982, the Comptroller General of th United States estimated a savings of $300 per house.

Thermal expansion/contraction - Whereas polybutylene does have a higher coefficient of thermal expansion than metal, it is at least 100 times more flexible. As a result, it can flex to accomodate any thermal expansion or contraction, actually generating fewer concerns than metal systems. In almost 5,000,000 plumbing systems installed with polybutylene pipe in the United States, I am unaware of thermal expansion causing a single problem.

Several comments were also raised about the solvent cements thought to be used with polybutylene. The simple fact is that polybutylene pipe is not joined with solvent cements. The 1982 IAPMO code calls for mechanical joining systems. Referring back to my earlier comments on worker health and safety, these joints are actually safer than metal joints.

Judged by the facts as interpreted by objective, credible third parties, polybutylene pipe is not only equal to the metal pipe currently approved in Alaska, it is decidedly superior. It offers the consumers of the state of Alaska a better, safer material at a lower cost. It offers the tradesman a safer material that is easier to use. The facts as differentiated from the opinions and allegations clearly show that the approval of polybutylene pipe as embodied in the 1982 IAPMO code will pay substantial benefits to all of the citizens of Alaska. I urge you to

move expeditiously to move this bill out of committee so that the benefits of the progressive product can be made available throughout Alaska.

Very truly yours,

(Original signed by:)

A. H. Schroer
Manager Sales Development
Polybutylene Business Center

Enclosures

cc: Mr. Clark Gruening
Mr. Gordon E. Evans

Mr. R. W. Baxandall
Alaska State Homebuilders Association
P.O. Box 3-6000, Suite 140
Juneau, AL 99801

VDH PUBLIC HEALTH NEWS
Virginia Department of Health
109 Governor Street
Richmond, Virginia 23219

DATE: December 16, 1983
RELEASE: IMMEDIATELY

CONTACT: Thomas B. Gray, Assistant Technica
Services Chief, Water Supply Engineering
(804) 786-5566

A health advisory is being issued by state Health Department officials to persons whose home plumbing consists of metallic pipe. State Health Commissioner, Dr. James B. Kenley, is advising persons who live in newly constructed homes (less than two years old) or homes where plumbing has been recently replaced to flush the stagnant water from their taps for 3 minutes before using it for human consumption.

Dr. Kenley said, "Whenever a water tap that has not been used for 6 hours or longer is opened, the initial portion of water may contain dissolved metals in excessive amounts. Flushing a tap for several minutes will remove stagnant water from a house's plumbing and should ensure that water obtained after this maneuver is safe for human consumption."

Recent scientific articles have indicated elevated levels of pi[illegible]ng and jointing metals (copper, zinc, lead) in the water after it has been allowed to stand for a period of time. Due to a limited amount of data presently available regarding the extent of this problem in Virginia, Dr. Kenley has established a work group to collaborate with the Department of Housing and Community Development in investigating the occurrence of these corrosion products in stagnant water.

--END--

RECEIVED
APR 2 1984

Solder labeled health threat

By Hugh Robertson
News Leader staff writer

In an investigation with statewide and possibly national implications, an engineering consultant hired by Chesterfield County has concluded that the use of lead-based solder to seal plumbing joints can pose a health threat to owners of new homes.

The investigation was undertaken following complaints this summer by a Brandermill couple, Douglas and Jeanette Corkum, that the water in their new, $158,000 home at 4016 McTyree's Cove Terrace was bad and they had suffered from vomiting, diarrhea and fatigue since moving into the home in January.

Because of the consultant's findings, the solder problem will be laid before the state Board of Housing and Community Development next month with the suggestion that the use of lead-based solder be prohibited in future construction.

The state board administers the Uniform Statewide Building Code to which home and other construction in Virginia must conform.

Additionally, the Virginia Department of Health plans to undertake a statewide study to determine how much of a health danger, if any, may exist in new homes where the lead-based solder was used.

In the meantime, according to Assistant Health Commissioner Robert B. Stroube, owners of homes less than 2 years old who feel they may have a water safety problem should run their water through faucets "a couple of minutes" before drinking it.

Problems with lead and copper in new home plumbing systems usually are resolved, with the metals leached out, in about two years, he added.

However, Dr. Stroube cautioned that just how much of a problem exists from use of lead-based solder is unknown at present.

Dr. Stroube also reported that water quality problems may be created by using water with a high acid content, such as is sometimes found in wells. Corrosion may occur, putting copper into the water system, in these cases, he said.

In Chesterfield, County Administrator Richard L. Hedrick also cautioned that "our data right now is rather uncertain" and how much of a problem exists is unknown.

Laboratory testing of the Corkums' water by the state health department disclosed it was highly contaminated by both lead and copper. In one sample, the metal content was 200 times that allowed under federal and state health standards. The tests also showed the county-supplied water was not at fault.

The Corkums' problem then became involved in suits and countersuits filed by the Corkums and their contractor, Edward J. Buzzell Jr.

On Oct. 27, the county hired the Jordan firm to investigate the situation and recommend what could be done about it.

Last month, the plumbing beneath the Corkums' home was removed and the soldered joints opened and examined.

Additional tests were made by the health department of water which had been allowed to stand for several hours in the joints. Again, high lead and copper content was found.

In a Nov. 10 preliminary report to the county's top building official, Robert S. Hodder, the Jordan firm said, "Several relatively new homes in Chesterfield . . . have been found to have high lead levels in the internal water piping system which are far in excess of the . . . limit." The limit for lead is .05 milligrams per liter.

"Some have levels in the 5 to 6.1 milligrams per liter range," the report said.

"All of the homes involved were relatively new and built by different builders and plumbers" and were in different parts of the county, the Jordan report continued.

The firm also reported that all the houses concerned had copper tubing in which the joints had been sealed by what is called "50-50" solder, which is half tin and half lead. The 50-50 solder is commonly used in home construction, according to building officials.

Additionally, the Jordan firm reported that a "self-cleaning" plumber's flux had been used in each instance. The flux is a liquid which is used in conjunction with solder in sealing pipe joints.

The problem apparently is a far-ranging one, the report continued, because difficulties with water systems where lead solder has been used have been found in Long Island, N.Y.; Carroll County, Md.; Seattle; Portland, Ore.; England; Canada; Scotland and the Netherlands.

"There definitely is a problem associated with the use of 50-50 solder in copper pipe joints which results in lead levels in the water system higher than the federally mandated levels," the report said. "The overwhelming consensus has been in previous problem areas to preclude the further use of lead solder in copper piping."

The report urged that lead-based solder be banned and that solder without lead be required in the future. It also said use of the "self-cleaning" flux should be investigated further.

As did the health department, the report recommended that owners of new homes let their water run for several minutes before drinking it.

"It does appear, however, that the problem dissipates within about (two years) . . ., after all the lead in contact with the water has been corroded and flushed through the water system," the report also noted.

Neal Barber, deputy director of the state's housing and community department, said the agency's staff would lay the problem before the state board at its Jan. 9 meeting and suggest that a solution would be to prohibit use of the 50-50 solder.

Instead, the code should be revised to require use of "95-5" solder, which is 95 percent tin and 5 percent antimony, Barber said. The antimony contains just .03 percent lead, according to the building code.

Barber said the department has learned the use of lead solder recently has been banned in California and New Jersey.

However, the Virginia building code allows the use of 50-50 solder, and, until it is changed, local building officials have no authority to prohibit use of that type solder.

Barber said that, if the board decides to require use of 95-5 solder, the code-amending process would take about seven months, [illegible] procedures, including [illegible] of public hearings on [illegible], would have to be followed.

In a followup Dec. [illegible] report to Hodder, the Jordan firm reiterated, "It is apparent that the lead-tin solder was the source of the contamination in the Corkums' piping system."

Once new piping, using 95-5 solder and a different flux, was installed in the home, the problem disappeared, the report said.

"We feel that the recommendations made in our preliminary report are still valid," the followup continued, adding that the state building code should be changed.

"Consideration should be given to testing the water supplies in recently constructed public buildings," where children are present, such as schools, day-care centers and nurseries, where lead solder and copper piping have been, the report also recommended.

"We hope that our reports will help to solve what has apparently been a longstanding problem which no one was aware of until recently," the report concluded.

— From Richmond News Leader, Wednesday, December 14th Edition —

Tests of Polybutylene Pipe at PT Relief Valve Conditions

Over four years ago, Shell contracted with Springborn Testing Institute, Inc. to evaluate the performance of polybutylene tubing subjected to a constant pressure of 150 psi at a constant temperature of 210°F. Sustained pressure testing was done in accordance with the ASTM D1598 test method. The results accumulated to date (see table below) clearly show that the tubing far surpasses the IAPMO performance requirement of 48 hours at 210°F and 150 psi.

Test Sample	Nominal Size (inches)	Failure Time (hrs.)*
1	1/2 CTS	N31792
2	1/2 CTS	26929
3	1/2 CTS	26653
4	3/4 CTS	N31792
5	3/4 CTS	N31792
6	3/4 CTS	N31792
7	1/2 CTS	N31008
8	1/2 CTS	N31008
9	3/4 CTS	N30072
10	3/4 CTS	25887
11	1/2 CTS	N31008
12	1/2 CTS	N31008
13	3/4 CTS	21792
14	3/4 CTS	14415
15	3/4 CTS	N31008
16	3/4 CTS	N31008

*N denotes a sample which has not yet failed and is still under test.

BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Greater Use Of Innovative Building Materials And Construction Techniques Could Reduce Housing Costs

Problems exist within different levels of government and the homebuilding industry that hinder the development and use of innovations which could check rising costs. For example:

--Builders are reluctant to accept risks associated with using new technology.

--Local building codes are sometimes restrictive and administered inconsistently.

--Builders lack technical information on innovative technology.

GAO makes several recommendations to the Secretary of Housing and Urban Development and the President of the National Institute of Building Sciences to encourage the development and use of cost-saving innovations in homebuilding.



CED-82-35
FEBRUARY 18, 1982

A 1971 study prepared for HUD 1/ regarding builders' use of 12 cost-saving innovations showed that, on the average, 70 percent of the responding builders did not use the innovations. According to building code officials, 73 percent of the time builders in their areas used the innovations occasionally, seldom, or never. Subsequently, a 1973-74 NAHB survey, which included 11 of the 12 items, showed that 8 of the 11 were not used in the great majority of new single-family houses nationally. Our 1978 report, which addressed 8 of the 12 items, showed 3 of the 8 were still widely unused by builders in the 87 communities included in our review. The three still widely unused items and the estimated potential savings per house at the time were: spray painting ($185), 2x4 studs 24" oncenter for exterior bearing walls ($119), and the preassembled plumbing tree ($55).

Examples of available cost-saving innovations currently not widely used by builders, as identified by HUD and NAHB research officials, and estimates of savings they could yield in the medium-price house include:

Engineered 2" by 4" studs, 24" oncenter interior and exterior wall framing (in lieu of 16" oncenter)	$300 - $700
Under floor plenum heating system (in lieu of duct work system)	$400
Polybutylene piping for plumbing (in lieu of metal piping)	$300
One-piece fiber glass bathtub with integral surround (in lieu of tile-work)	$50

Rapid, widespread adoption of cost-saving innovations is hindered in part because the traditional onsite homebuilding industry is extremely fragmented--more than 100,000 builders, the majority of which build less than 25 units annually. However, the 1971 HUD study identified and analyzed a range of other factors impeding builders' use of innovations. While the study has not been updated, its results were substantially corroborated by the widely varied sources we consulted during our review. The study ranked in order of importance a total of 20 constraints, of which it called the following "important":

1/"Constraints to Builders' Use of Cost Saving Innovations," NAHB Research Foundation, Inc., July 1971.

H60128
Cold Bay (Short version)
Feb. 18, 1982

On the Alaskan Peninsula where snow falls 124 days a year, temperatures frequently plunge below zero and earthquakes are common, the choice for a plumbing system for a new home is not a decision made lightly.

"I needed a plumbing system that wouldn't freeze-crack on me or fall apart during our frequent earthquakes and storms," said Magistrate Karl Heiker who completed the first privately built single family dwelling ever constructed in Cold Bay, one of the most seismically active areas in the world.

Other construction complications Heiker had to contend with were hurricane force winds, the high cost of shipping building supplies, plus water with a mineral content that can choke metallic plumbing pipe.

Heiker selected a plumbing system based on a tough, flexible pipe manufactured from Shell Chemical Company's Duraflex™ polybutylene resin. The pipe, fittings and fastenings were supplied by U-Plumb-N-Save in Wasilla, Alaska near Anchorage.

In addition to costing much less than copper, Heiker said shipping charges for Duraflex pipe were less because of its light weight. Fewer fittings, tees and elbows were required because the flexible pipe can be snaked around curves and obstacles.

With skilled labor scarce, Heiker said he wanted a system that would be as trouble free as possible. If water freezes in the pipe, the pipe expands, then retracts when the ice thaws. The pipe neither cracks or corrodes and easily withstands vibrations. Silt doesn't accumulate, reducing water flow.

The construction of Heiker's house of 1,724 square feet is about as solid as a fort. It features 2 x 6 studs throughout, a bolted and cable secured pier foundation, heavy insulation and triple pane windows. Heiker took two years to build his house.

"Part of the careful planning that made it possible to meet a target completion time I had, was my choice of polybutylene plumbing. We hooked up the system and it was secure. We haven't had a minute's trouble and I don't expect any. Our heavily mineralized water won't even scale up," he said. "The system has lived up to my expectations," the magistrate said, adding that "others who are planning to build here are convinced that polybutylene offers exceptional benefits to our corner of the world."

Heiker's home was the first built after the State of Alaska revised its policy to only lease lease lands in Cold Bay, the seat of Heiker's jurisdiction over a district that is 1,600 miles long and only 80 miles wide with a population of about 5,000.

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Shell Chemical Company
A Division of Shell Oil Company

P.O. Box 7637
Stockton, CA 95207

May 27, 1983

Dear Sir:

As one who has been following the progress of DURAFLEX polybutylene I thought you might be interested in the attached comments and report.

On March 28, 1983, S.R.I. International issued their first report on the California Plastic Environmental Impact Report (EIR). While S.R.I. indicates the possibility of some additional testing being necessary, they did make several definitive statements on the subject of polybutylene (PB).

As the plastics controversy continues polybutylene has been in the center of activity. The S.R.I. report clearly refutes those allegations regarding the safety of polybutylene. I have attached for your review a copy of Chapter V of the California Environmental Quality Act (CEQA). The entire 588 page report is available from the Department of Housing and Community Development, 6007 Folsom Boulevard, Suite A, Sacramento, California 95819, at a cost of $62.33.

In addition, I would like to quote a few of the statements by S.R.I. that relate to polybutylene.

--"PB poses little if any worker safety and health concern."

--"PB produce(s) combustion products that are not highly toxic; few if any additional fatalities or serious injuries would be likely from its combustion."

--"At present, the only partial alternative that seems reasonably certain to meet this requirement is to allow PB for hot and cold supply both outside buildings and inside buildings that are not fire-rated or within the fire-resistive construction of fire rated buildings."

--"Parenthetically, there seems little reason to prohibit PB in exposed locations of fire-rated buildings as long as the penetrations of fire-rated construction are designed to maintain the rating of that building."

--"PB is clearly a preferred material from the worker safety and health viewpoint," . . .

--"Although PB will certainly burn and metal will not, the additional risk of fire spread appears minimal, as does that of smoke toxicity."

While it is clear that polybutylene is a safe, cost efficient plumbing material, our opponents will not allow logic and scientific evidence to stand in their way. It is expected that the California Legislature will be presented with a number of bills attempting to ban or restrict the use of polybutylene.

Given the volume of scientific evidence along with the S.R.I. International report, we sincerly hope that you will consider the fact and not allow the use of polybutylene to be restricted any longer.

As always, should you have any questions or would like additional information, please call me. In the meantime thank you for your interest.

Very truly yours,

M. J. O'Brien

M. J. O'Brien
Regional Sales Manager
Polybutylene Department

MJO/ja

Enclosure

LEGISLATIVE PROPOSAL ANALYSIS

Subject of Proposed Bill:

"Adoption of 1982 Uniform Plumbing Code"

Background Information:

Every third year, the International Association of Plumbing and Mechanical Officials adopts a revised plumbing code incorporating advances and improvements in technology. During the Twelfth Legislature, the department did not propose legislation to adopt the 1982 version of the Uniform Plumbing Code because there were conflicts between the Uniform Plumbing Code and the Uniform Building Code. The Department of Public Safety (Fire Marshall's Office) will propose legislation to adopt the most recent edition of the Uniform Building Code which is consistent with the 1982 Uniform Plumbing Code.

Summary:

The most noticeable changes in the plumbing code are as follows:

Section 108 allows for a larger grease interception to serve one or more fixtures. Section 203(d) states that copper tubing used for water service shall have a weight of not less than Type L.

Table 4-3, footnote #4. Evidence indicates that a three-inch horizontal waste will effectively handle discharge from three water closets; thus the code change, so that only four water closets or six unit traps are allowed on any vertical stack, and not to exceed three water closets or six unit traps on any horizontal branch or drain.

Section 601 changes will not allow cold storage rooms, refrigerators, cooling counters, etc. designed to hold food or drink, or sinks for washing or preparation of food, to be directly connected to a waste or vent pipe. All drains shall discharge through an air gap into a open drain or approved receptor.

Section 1004 is one of the major changes, and allows Poly Butylene (PB) water pipes to be used for hot and cold water distribution tubing systems, using inserts for connectors. It also inserts language to assure that when metal pipe is used as a building ground, it will be replaced by metal pipe when repairs are made to these pipes.

Also adopted were insulation standards for cold water service and yard piping. These standards were for Poly Vinyl Chloride (PVC), asbestos cement pressure piping and Poly Butylene (PB).

Those groups most affected by this change will be plumbers, contractors, local governments and state agencies issuing building permits.

Estimated Fiscal Impact: (FY '83 - FY '87)

To the state: -0-

To others: -0-

UTILITY CONTRACTORS OF ALASKA, INC.
Alaska Chapter of the National Utility Contractors Association
P.O. Box 10-1186 • Anchorage, Alaska 99511 • (907) 344-4581

April 4, 1984

Sharon Macklin, Lobbyist
515 5th Ave. #6
Juneau, AK 99801

Re: House Bill Number 65 and Senate Bill Number 256, "An act relating to the plumbing code".

Dear Sharon:

UCA has no objection to adoption of the Uniform Plumbing Code as outlined in the above referenced bills.

However, we very much would like to see an amendment to Alaska Statute 18.62.070, (copy attached). We feel that House Bill No. 65 and Senate Bill No. 256 would be the appropriate vehicle for such an amendment. We propose that the AS 18.62.070 be amended to add the following:

(3) The requirement for Certificate of Fitness does not apply to "sewer/water line installers".

(4) A "Sewer/water line installer" means:

a) A worker who installs the building sewer piping within the property lines, starting at the first joint from the building to the main sewer trunk or disposal field; or

b) A worker who installs water service piping to the first joint in a building above ground, within the property lines from either a public or private water supply.

The purpose for this proposed amendment is to avoid the kind of hassels we had last year with Bill Zubeck. The proposed definition for "sewer/water line installers" conforms with industry wide practice.

Please call me concerning this amendment at your convenience.

Sincerely yours,

William A. McKeever

cc: All UCA members

b.6.1

CERTIFICATE OF FITNESS

AS 18.62.070 PERSONS REQUIRED TO OBTAIN CERTIFICATE. A person engaged in one of the following trades shall first obtain from the department the appropriate certificate of fitness in that trade:

(1) electrical wiring subject to the standards established in AS 18.60.580; and

(2) plumbing subject to the uniform plumbing code, as established in AS 18.60.705 (1ch 12 SLA 1974)

AS 18.62.080. PENALTY: A person, either an employer or employee, who violates a provision of this chapter or of a regulaion issued under this chapter is guilty of a misdemeanor and upon conviction, is punishable by a fine of not more than $500.00 (1ch 12 SLA 1974)

Seattle Post-Intelligencer

Saturday, June 22, 1985

25 Cents

A HEARST NEWSPAPER

Cloudy
High mid-80s
Details/D2

Ueberroth: teams will stay put/B1



NCAA is getting tough/B1



Seahawks e 'taking ...'/B1



City fear: Plastic pipe lets poisons in

by Jane Hadley
P-I Reporter

The first time Alicia Berger, 29, drank a glass of water at the West Seattle house she was renting, she spit it out because it tasted so bad.

Soon, she and her boyfriend, Jeffrey Lewis, 38, found that their water was contaminated by xylene and toluene, two organic solvents commonly found in airplane glue, gasoline, paint solvents, plastics and other products.

As a result of five or six similar cases, the Seattle Water Department may stop using plastic water pipes, an official said.

The city already has tightened its policy within the past year on plastic water pipes, no longer installing them in industrial or commercial areas, said Jim Chapman, supervisor of water quality at the city Water Department.

Organic solvents

But now Water Department executives soon will discuss going even further and discontinuing their use altogether, he said.

The main problem with plastic pipes is that organic solvents can permeate the pipe, polluting the water they carry, said Roy Jones, an environmental scientist for the U.S. Environmental Protection Agency.

Typically, the ground around the pipe becomes saturated with a solvent, such as gas or oil or paint thinner, which passes through the pipe wall to the water.

A second problem is that certain kinds of adhesives used to join some plastic pipes also permeate the pipe and contaminate the water.

Plumbing code

The plumbing code requires that the right combination of adhesive and plastic be used, but Jones says it's hard for plumbing inspectors to know whether an installer has used the correct adhesive.

Chapman said the city began to use plastic pipe in the early 1960s and estimates that maybe half the city water lines serving residences are on plastic pipe today.

In the last two or three years, there have been about six cases in which residents have reported drinking water contaminated with organic solvents such as toluene, xylene and benzene, Chapman said.

Benzene is a known human cancer-causing agent, linked to leukemia. Xylene and toluene are

See TWO, Page A-4



Jeffrey Lewis and Alicia Berger had to leave a rental home because the water there was contaminated with organic solvents. Plastic water pipes may have been part of the problem.

Two leave rented house because city water there is contaminated

From Page A-1

not linked with cancer but can cause kidney, liver and central nervous system damage.

In all but one of the cases, the residents lived in commercial or industrial areas, Chapman said. But in one case, the home was in a residential neighborhood.

Chapman speculated that in that case somebody poured oil or some other petroleum product into the gutter and it leaked through an expansion joint in the concrete to saturate the soil around the water pipe.

In each case, the city replaces the plastic pipe that runs from the street to the property line with copper pipe. It's up to the property owner to replace the pipe from the property line to the house.

Berger and Lewis moved into a rented house last Nov. 28 on a sparsely populated, overgrown ridge in West Seattle just above Marginal Way Southwest. By Jan. 1, they had moved out.

The two were so upset by their experience they didn't even want to talk about it for several months, said Lewis, a teacher of Indian music.

He complained that officials at various agencies were slow to respond initially, never called back when they said they would, were timid and uninformative and tried constantly to limit their responsibility for the problem.

"Everybody was very nice, but nobody would make a commitment," he said. Meanwhile, the couple was driving 40 miles round-trip to shower every day, borrowing water from people across the street and eating elsewhere.

Berger, a graduate student at the University of Washington, and Lewis hired a private lab to test the water, because they felt the Water Department would not do a test.

But the Water Department did do a test. Both tests found the water contaminated and the department decided the plastic service line should be replaced.

When crews dug holes in the ground near the meter box along Marginal Way Southwest to install copper pipe, the soil was clearly contaminated and gave off a strong solvent odor, said Jones of the EPA.

Lewis said, "From 20 feet away you could smell this ground they were digging up. It stunk."

But though the Water Department did replace the pipe, nobody ever did anything about the contaminated soil.

In fact, Water Department crews started to cover over the new pipe with the old contaminated soil until Lewis questioned the wisdom of that move.

"Aren't you just asking for trouble?" Lewis asked. The crews then decided to haul the soil away and put clean dirt down instead.

Jones said he was at the site "strictly as an observer." Jane Lee of the Seattle-King County Department of Public Health said once she saw that the water department replaced the pipe, she considered her responsibility over.

Chapman said the Water Department's responsibility was only to replace the plastic pipe.

He said nobody checked to see whether the contamination is widespread or limited to the meter box area. And nobody checked the source of the contamination.

He said it would be hard to know where it came from, though he added, "Obviously, with the painting contractor next door, that would be suspicious." The meter box is adjacent to the property of Central Painting Inc. on Marginal Way Southwest.

Both Jones and Chapman said any soil contamination would be in the jurisdiction of the state Ecology Department. But the Ecology Department was never called about the case.

And Joan Thomas, director the Ecology Department's regional office in Redmond, said soil contamination isn't that department's responsibility unless either groundwater or surface water is polluted.

She acknowledged that groundwater pollution almost always starts as soil pollution.

When asked whose responsibility the soil contamination would be, Thomas said: "I can't say it was anybody's responsibility. I'm saying I don't know."

Tom Hubbard, a water quality biologist at Metro, which considers it important to follow up such reports of soil contamination, Hubbard has been meticulously testing the shores of Elliott Bay over the past several years trying to figure out where various river pollutants come from.

Jones of EPA said: "The problem is because of different jurisdictions and the delegation of programs back and forth, that we leave some pretty big gaps in the system that are not serving the public right, but they exist."

Chapman said: "It's an area of mixed responsibilities. It's not entirely clear who does have responsibility. I agree it's not a terrific situation."

One person who has taken a stand on the source of the pollution is the owner of the house Berger and Lewis were renting. Landlady Carol Knox, a Cashmere resident, recently filed suit against Central Painting Inc.

Knox's Seattle lawyer, Linda Larson, said the suit alleges that the paint company released chemicals into the soil which ended up in the water line to Knox's house.

Though the new copper pipe put in by the Water Department reduced the levels of contamination, the drinking water is still contaminated, said Chapman.

Knox probably will have to replace at least some of the pipe on her property. To replace all of it up to her house, a long distance up a steep hill, would cost an estimated $3,000, said Knox's lawyer.

John Hamilton, president of Central Painting, denied responsibility for the problem. He said tests performed by a local environmental laboratory show that the pollution in the house drinking water is unrelated to diesel oil found at the meter box and naptha found at a sump on his property.

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D-2 WEATHER
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D-12 FUNERALS

City halts use of plastic pipes for drinking water

By Jane Hadley
P-I Reporter

The Seattle Water Department has placed a moratorium on its use of plastic pipe that delivers drinking water.

"We're not using any until we do come to a final decision" about the safety of the pipe, said Jim Chapman, water quality supervisor for the department.

"We've been contacted by a number of people who claim to have further information."

Water contaminated

The moratorium follows the discovery by a couple renting a home in West Seattle that their water was contaminated with toluene and xylene, two substances commonly found in airplane glue, gasoline, paint solvents and other products.

When the department investigated, it found soil around the meter box contaminated with a strong-smelling solvent. The department then replaced the plastic pipe from the street main to the meter box with copper pipe.

Plastic pipe is a problem because it can be permeated by organic solvents such as gasoline or trichloroethylene, a widely used degreasing solvent. Also, certain glues used to join the pipes are toxic and permeate the pipe to contaminate the drinking water inside.

The city first began to use plastic pipe in the early 1960s for service lines that run from the mains in the street to meters, Chapman said. He estimated that about half the service lines in the city are some type of plastic pipe. The mains are not plastic.

Many lines from the meters to the houses probably also are plastic, Chapman said, but property owners are responsible for installing those.

Forbidding use of plastic for those lines would require a change in the plumbing code, which the City Council would have to do by ordinance.

Chapman said there have been six or seven cases in Seattle within the past two or three years in which drinking water was contaminated when organic solvents penetrated plastic pipe.

All but one were in primarily commercial or industrial areas, where the likelihood of gasoline spills and other soil contamination is greater than in residential areas.

Installations halted

Consequently, the city already has stopped installing plastic water pipes in commercial and industrial areas. The new moratorium applies to residential and all other areas.

Bob Giron, business agent for the United Association of Plumbers and Fitters Local No. 82 in Seattle, said yesterday that plumbers oppose the use of plastic pipe for drinking water.

"It's not delivering as pure an item as it should be," he said. "And from the workers' standpoint, the glues and solvents we have to use we feel are dangerous."



Reeves Journal - July 1985

Southwest Gas Replacing ABS Pipe In Gas Lines

PHOENIX, — Southwest Gas Corp. has been given the central business area top priority in its program to replace an estimated 2,300 miles of possibly defective gas pipe.

The utility acquired the gas distribution system from Arizona Public Service (APS) last November.

The first phase of the project is expected to require between three and four months and will depend on several contractors working simultaneously in various sections of the target area. Some of the work is already underway, according to John Hanenburg, program manager.

Utility officials noted that the program will involve all ABS-type plastic pipe. APS had used the pipe extensively in the Greater Phoenix area and in other parts of Arizona between 1959 and 1971.

Officials said the pipe constitutes about 23 per cent of the entire system. The whole replacement program will cost an estimated $120 million and will last about six years.

The ABS pipe was involved in an explosion in Phoenix last September that killed five persons and prompted an investigation. The probe revealed that the pipe was aging more rapidly than expected initially.

Reeves Journal - July 1985

Oregon City Seeking $3 Million to Replace Broken Plastic Pipe

by Jim Norland

MEDFORD, Ore. — This southern Oregon city of 50,000 is asking seven suppliers of plastic pipe to reimburse more than $3 million in damages the city expects to sustain in replacing the polybutylene water pipe bought between 1971 and 1981.

Attorneys for the Medford Water Commission and the City of Medford told the suppliers by letter, "It would appear . . . that this water pipe does not meet the requirements, warranties or representations made by you at the time of sale."

The city and the water commission have recently discovered defects and consequent breaking of "numerous pipe," says W. V. Deatherage, a member of Frohnmayer, Deatherage, deSchweinitz, Pratt & Jamieson, P.C., Attorneys at Law, in Medford.

Deatherage has asked each of the seven suppliers to notify his firm by June 26 whether they want to reimburse the two government entities "for the damages they have suffered as a result of said defective pipe."

"The Medford Water Commission will be required to replace all of this water pipe, which it has estimated will be at a cost in excess of $2,000,000," Deatherage's letter continues.

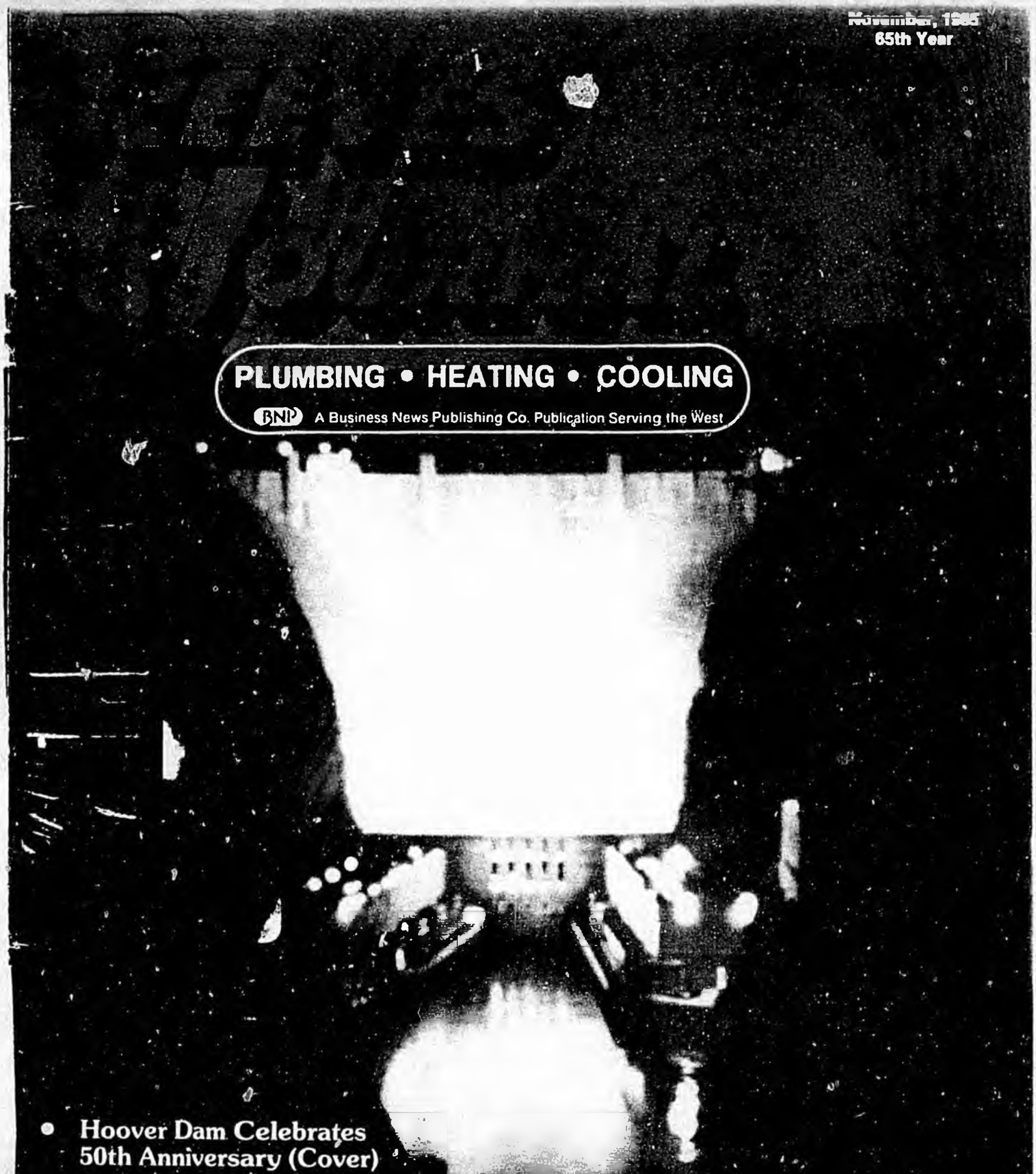
Medford City Attorney Gene Clark told **Reeves Journal** that the total damage is expected to be "in excess of $3 million, but no one supplier is expected to be responsible for more than $2 million."

Letters identical to the one quoted went to The Flintkote Co., Pipe Products Group, Orangeburg, N.Y.; Clow Corp., Plastics Division, P.V.C. Plastic Pipe, Bensenville, Ill.; Western Products Co., Union City, Calif.; Hinds Supply Co., Beaverton, Ore.; Westflex Manufacturing Co., Division of Western Plastic & Rubber Co., Richmond, Calif.; Budge-McHugh Supply Co., Medford; and Consolidated Supply Co., Portland, Ore.

November, 1985
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- Hoover Dam Celebrates 50th Anniversary (Cover)
- NAPHCC, ASA Convention and Exposition Highlights
- Boede Calls for Improved Contractor/Labor Communication
- A-40 Committee Puts Plastic Pipe on Hold

Calif. Attorney General Critical of IAPMO Decision

SACRAMENTO — California's attorney general has written a brief of amicus curiae in support of the anti-plastics factions involved in an appeal of a court decision requesting that an injunction ordered against the International Association of Plumbing and Mechanical Officials (IAPMO) in 1983 be extended to IAPMO's 1985 Uniform Plumbing Code (UPC).

A number of parties, including the State Building Construction Trades Council of California (backed heavily by the United Association), filed suit in 1982 in an attempt to prevent IAPMO from circulating its 1982 edition of the UPC in California because of the addition of several new plumbing code changes which allowed plastic piping materials to be used for potable water within buildings for the first time under UPC guidelines.

The anti-plastics concerns attempted to stop circulation of the 1982 UPC in their lawsuit, which was also filed by the former director of the state's Department of Consumer Affairs, Richard Spohn, and a handful of environmentalist groups and individuals. The original suit alleged that IAPMO did not have the jurisdiction to make such additions to the code and that it was violating the state's Business and Professions Code.

Los Angeles Judge Jack A. Crickard ruled in the county's superior court, however, that IAPMO was not in violation of any laws or alleged unfair business practices and ruled against the anti-plastics factions' efforts to stop the publication of the 1982 UPC.

Crickard based much of his decision in favor of IAPMO on his opinion that there was not sufficient evidence to back up the anti-plastics camp's claims that plastic piping could be hazardous to the public health. Crickard did rule in favor of an environmental impact report to provide further input and agreed to issue an injunction on the code calling for a disclaimer to be distributed with the 1982 UPC in California, stating that an environmental impact report is in progress and advising users of the newly added plastics materials to consult with their local officials as to the status of plastics.

IAPMO had already agreed to voluntarily print the disclaimer before the injunction was ordered.

The injunction was scheduled to be in effect only for the 1982 UPC. Now, as the 1985 UPC is being published (IAPMO issues a new update every three years), the plaintiffs in the case have attempted to continue the injunction through the appeals process.

California District Attorney John Van De Kamp issued his opinion, which has no enforcement powers, on Oct. 15. In his statement, Van De Kamp stated that he felt the appeals case in question falls "within the ambit of Business and Professions Code Section 17500" and that "IAPMO's conduct constitutes a violation of that section."

Van De Kamp called for the extention of the trial court's injunction to apply to the 1985 UPC and the 1985 IAPMO Research Directory (which lists approved products).

One of the primary contentions of the original lawsuit was that IAPMO did not have the authority to list products or grant product approval for products said to be in compliance with the standards of the UPC. Crickard rejected this claim and, in fact, praised IAPMO's efforts and professionalism in making such determinations, citing the input and testimony of the National Sanitation Foundation, which provides testing information for IAPMO and other model code writing bodies.

Van De Kamp's opinion challenges IAPMO's right to make such determinations and contends that the organization's operations should be governed under the Business and Professions Code.

A-40 Committee Puts Plastic on Hold

by Larry Dill

CAMBRIDGE, Mass. — In an effort to avoid becoming bogged down in a never ending materials debate that could slow progress on the American National Standards Institute's A-40 Committee on Safety Requirements for Plumbing, the committee voted during its Oct. 22-25 session here to withhold acceptance of plastic piping materials for use in domestic hot and cold water systems for potable use until it can receive more input on the subject from impartial, outside sources.

The action took place following a follow-up to the controversial discussions about plastic pipe at the committee's last session in July in Universal City, Calif. The July session of the A-40 Committee was highlighted by presentations from plastic pipe advocates and opponents. It was during the July session that both sides of the issue were provided with equal time to discuss the plastics issue.

The anti-plastics camp headed by the United Association presented a well organized and emotional program featuring its two key "expert witnesses," attorney Raymond Leonardini, and Dr. Marc Lappe, PhD., two of the key figures in the union-backed California Pipe Trades council's long running legal battle with the International Association of Plumbing and Mechanical Officials (IAPMO) over the use of plastic pipe in Uniform Plumbing Code (see page 24).

The Plastic Pipe and Fittings Association's participation in the July presentations consisted of a brief six-minute summary of its position on the issue of alleged permeation and leaching of plastic piping materials and the distribution of two documents supporting its position.

After much debate after the July program, PPFA, which had contended that it was not properly notified of the format of the July presentations (which was refuted strongly by A-40 officials), was extended a second invitation to present its case before the A-40 body during the October session. The presentations were established on a similar format with each side given 45 minutes to present its testimony. Following the testimonies equal time was also provided for rebuttals and question answering sessions.

This time it was the plastics advocates who rolled out their team of hired guns in the expert witness derby.

The United Association, which was called upon to make its presentation first, was content to have its legal counsel briefly state that the union felt it had adequately presented its case in July and that it did not feel further input was necessary to express its views on the plastics issue. The United Association then distributed new documents for the committee members' consideration including an opinion (which has no legal binding power) by California attorney general John Van De Kamp on the on-going IAPMO court case over the use of plastics in the Uniform Plumbing Code (see page 24). In his statement, Van De Kamp voiced the opinion that an injunction which called for the inclusion of a disclaimer notifying users of the 1982 UPC in California that an environmental impact report was in progress to study plastic products, be extended for distribution with the 1985 UPC in California.

The United Association also distributed copies of a study being conducted by scientific experts at the University of California, Berkeley. The study, commissioned upon the request of the state's Department of Health Services, is providing a review of recent literature and research on the permeation of plastic pipe. The materials distributed were released Sept. 30 and represent the first half of a study that is scheduled to be concluded by April 1, 1986.

Also distributed were copies of correspondence to Leonardini from a representative of the California Department of Housing and Community Development which included a recent press release explaining the suspension of the environmental impact report assigned to Versar, Inc., a Virginia based research firm. This was accompanied by an audit of the work performed by Versar before suspension of the project.

Plastics Testimony

The plastics proponents were keyed by PPFA representative Jack Lancaster, who repeated PPFA's position following the July presentations. Lancaster continued to state that "PPFA believes, as it has stated other times, that this committee is not the appropriate group to decide complex, scientific and technical issues with regard to plastics or with regard to any other materials."

"None of us has the professional expertise to decide issues like alleged permeation and leaching that have been raised against plastic pipe in this committee," Lancaster continued.

Apparently intent upon stressing its position that the members of the A-40 Committee did not have the technical or scientific background to make decisions on plastics materials, the PPFA representatives innundated the voting committee members with more than 50 documents on the plastics issue. They then presented three witnesses of their own to provide technical testimony on various aspects of the plastics issue.

PPFA's witnesses included Steven C. Packham, PhD, of Salt Lake City, a longtime toxicologist who has worked with a number of governmental and scientific agencies, who announced that he is currently conducting a study of all available data on plastics.

Another witness was Joseph Zicherman, PhD, of Innovative Fire Technology, Berkeley, who discussed his work with studies concerning plastic piping materials in fire stations.

The third PPFA witness was Alan Olson, PE, of B.F. Goodrich's chemical group. Olson addressed the charges of permeation in plastic piping.

Put on Hold

Following the presentations, the committee was still faced with the monumental task of forging ahead with the A-40 document's Table 3.1.3 which provides "standards for materials, equipment, joints and connections."

Realizing that the table, which must be passed before any definative progress can be made toward completing the document, contains hundreds of pro-

Continued on page 44

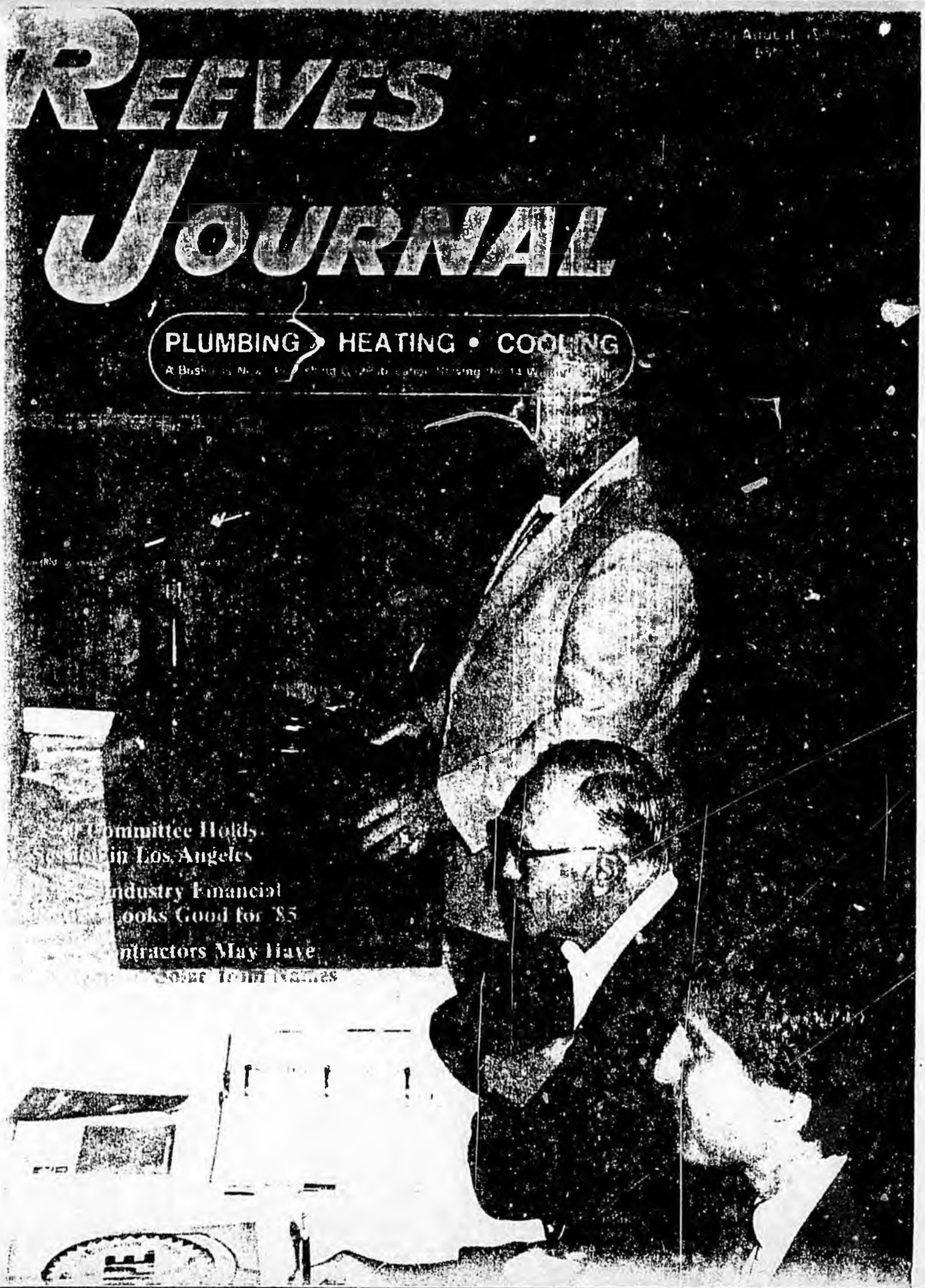


Edward Brabec of the United Association ponders the large stack of technical materials presented to A-40 members for their study on the plastic pipe issue.

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Committee Holds
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A-40

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duct listings and their relating standards, the committee members were faced with the possibility of having progress slowed by debates on every plastics product that appears in the table.

In an effort to avoid such delays, Donald Dickerson, representing the American Society of Plumbing Engineers, suggested a motion which stated:

"Serious concerns regarding the suitability of plastic pipe to convey domestic hot and cold water for potable use have been brought before this committee.

"The committee has heard presentations and received materials regarding data which has been compiled and tests performed, planned and underway which deal with and address the 'complicated chemical, medical and public health questions' involved in such issues.

"It has been stated, and we believe, that much more work must be done in order to provide those data necessary to (make) a sound decision on these important matters.

"With all of the above in mind, the A-40 Committee is withholding acceptance of plastic pipe for use in domestic hot and cold water systems for potable use until such time as clear, definitive and impartial data are available which can substantiate its use for this purpose."

After acceptance of the motion, the committee members agreed that material from an outside source should be submitted and then studied before the committee made any decisions on plastics.

Refuting the charges by PPFA that the A-40 body is not capable of making the proper decisions on plastics, Dickerson noted that the body was qualified to make such determinations provided that it was given sound and impartial study results to evaluate. "I believe we have within this body the ability to analyze pretty technical reports," Dickerson said.

Vincent Doyle, co-chairman, said, "Collectively, we're probably the finest minds in the country in the plumbing industry."

PPFA's Richard Church protested the singling out of plastics materials and asked that all piping materials be studied. His pleas fell upon deaf ears. He continued his contention that the plastics industry would be willing to participate in such studies "if it was done across the board."

The A-40 Committee scheduled its next session for January in Tampa. At that time it will resume work on Table 3.1.3, which is nearly halfway completed with the exception of the plastics materials which have been placed on hold.

Anti-Plastics Forces Bring Out Hired Guns in LA A-40 Session

by Larry Dill

UNIVERSAL CITY, Calif. — It was only fitting that the American National Standards Institute's A-40 Committee on Safety Requirements for Plumbing hold its latest meeting at the Universal Sheraton Hotel here July 23-25.

Overlooking the Universal Studio lots, soundstages and outdoor arenas used for western stunt shows and the like as part of the studio's tours, the hotel was the perfect site for an old fashioned shootout between the advocates and opponents of plastic piping materials. The only trouble with the shootout, however, was that it was as one-sided as Custer's debate with Sitting Bull. If it was a fight, it would have been stopped on cuts in the third round.

While the majority of the three-day exercise was dominated by tedious reviews of the A-40 Committee's Table 3.1.3 (Standards for Materials, Equipment, Joints and Connections) and discussions regarding the chapters pertaining to such products in the developing model code being formulated by the committee, the liveliest session took place on the opening afternoon when it was announced that there would be a 90-minute discussion on permeation of plastic piping materials, providing 45 minutes for both advocates and opponents of plastic pipe to speak, to be followed by a 10-minute question-and-answer session.

The first speaker called to the podium was Jack Lancaster, spokesman for the Plastic Pipe and Fittings Association (PPFA). Lancaster briefly outlined PPFA's position on the issue of pipe permeation and reviewed two documents — a review of the plastics industry's position on permeation (which had the joint letterheads of the Plastic Pipe Institute, the Vinyl Institute, the Uni-Bell PVC Plastic Pipe Association and PPFA) and a copy of PPFA's position that characteristics of water and soil should be considered when making materials selections.

The former document listed the advantages of using plastic piping materials and the latter stressed that proper evaluation of soil and water conditions would lead to responsible selection of materials. The conclusions of the second document stated that "in order to maintain a viable supply of potable water, thought must be given to the installation of affected materials in known or suspect soil and ground water conditions which may cause permeation, corrosion or structural failure of the pipe, tubing or fittings."



Jack Lancaster, Plastic Pipe and Fittings Association, reviews PPFA's position on pipe permeation.

The point of Lancaster's presentation, it appeared, was that all piping materials are subject to failure or permeation and leaching under particular circumstances.

Lancaster's statement was concluded in approximately six minutes and he sat down with nearly 40 minutes still alotted to him. The shortness of Lancaster's presentation was surprising to many of the committee members present at the session, including one who candidly told **Reeves Journal**, "I went to the bathroom and when I got back Jack was sitting down."

Opponents Speak

After Lancaster concluded his remarks and left the podium, chairman Vincent Doyle, representing the Mechanical Contractors Association of America as part of the joint committee with the National Association of Plumbing-Heating-Cooling Contractors as joint secretariats of the committee, called for the other speakers to step forward.

If Lancaster's presentation appeared to be surprisingly short and light to the committee members, what was to follow was a grand performance.

The committee members next witnessed a very organized, polished, professional and dynamic presentation by Raymond J. Leonardini, the attorney who has represented the California Pipe Trades (consisting primarily of United Association interests) in its legal battles with the International Association of Plumbing and Mechanical Officials (IAPMO) during the last three years over the addition of certain plastic pipe products to the Uniform Plumbing Code. He was followed by Marc Lappe, PhD and the chief consultant to the California Pipe Trades on matters concerning its charges that plastic pipe contains toxic materials which are hazardous to the health of the public.

Leonardini, in his best courtroom manner, delivered a moving presentation blasting plastic piping products and their usage in plumbing systems. He also called for the A-40 Committee members to use their own judgment to keep plastics from their model code document. Lappe followed with supporting statements from a health policy consultant's viewpoint, before Leonardini delivered the closing summation.

Toxic Spills

Addressing the subject of permeation, Leonardini cited statistics that estimate 300 toxic waste spills in California every three months. "You don't know where those spills are going to be," he said, "so the idea of analyzing permeation and saying not to put them (plastic pipes) in areas where there are known toxins" is similar to "closing the corral after the horses are out."

"How are you going to know where there is going to be a toxic spill?" Leonardini asked, labeling the committee members "public policy makers and public health officials."

The attorney then pointed out that while efforts are made to determine locations that were once the sites of hazardous wastes, several cases pop up each year where housing tracts have been found to be built on waste sites three or four years after their construction.

One of Leonardini's strongest contentions was that research performed by the American Water Works Company revealed that toxic vapors, particularly from gasoline products, can permeate plastic piping as well as liquids.

"Now where are you going to put pipe to avoid infiltration and permeation by vapors?" he asked.

Leonardini went on to discuss a recent lawsuit filed in the San Jose region concerning polybutylene piping system failures. Submitting a deposition on the issue for the record, Leonardini called the failure rate of PB "time dependent."

"Because of the chemical development of that pipe (PB), if you wait long

enough that particular installation will fail," he claimed.

Leonardini concluded his opening remarks and called upon Lappe, a former official with California's Department of Health and the chief consultant in the lawsuit brought forward by the California Pipe Trades Council and the state's former director of the Department of Consumer Affairs, Richard Spohn, who lent his name to the IAPMO lawsuit under the banner of the Department of Housing.

"I want to thank this group for giving me the opportunity to speak, and the United Association for bringing me here," Lappe said in his opening remarks.

Lappe later explained that the quality of drinking water is generally measured at its source in public treatment facilities. "We assume that nothing happens to it to aid and abet any levels of contaminants in transit," he added, charging that contaminants are being picked up through plastic piping systems.

"We also know of contaminants from metal ions and we are assuming that they are not raising the level of lead, copper or arsenic above the levels that are permissible from the source."

Lappe pointed to three studies conducted by the Pipe Trades Council (under his supervision), the American Water Works Company and the Vinyl Institute.

"What each of these studies found was that there are differences as clear as day and night between plastic and metal," he said. "Plastic permeates certain organic chemicals of health concern. Metal absolutely unequivocally does not."

Leonardini Summarizes

Leonardini followed with a tight, passionate conclusion that hit home with a number of emotional charges and pleas to the committee members.

The attorney challenged IAPMO (which has successfully defended its position on plastics against the Pipe Trades Council, et al in the courts, largely from a judge's ruling that no sufficient evidence has been produced to show any health hazards from plastic piping) and its 1982 UPC additions of plastics. He also questioned the validity of the National Sanitation Foundation which presented key testimony in IAPMO's California lawsuit.

Noting that IAPMO relies upon NSF testing, Leonardini said, "NSF 14 is an inadequate standard for the evaluation and analysis of leaching characteristics in plastic pipe.

"Can you trust EPA? EPA is talking about relying on NSF. EPA has not developed drinking water standards for any of the chemicals that are involved."

Leonardini concluded by stating that all of the data is yet to be received and that it would probably take at least another year and a half to gather all information and comments on the conclusions.

"You have nothing to gain and everything to lose" by acting before governmental studies are completed, he said in closing.



John Woodward, Cast Iron Soil Pipe Institute, expresses his opinion during a discussion of the A-40 Committee's proposed product standards.

Confusion Begins

The polished presentation by Leonardini and Lappe was followed by Doyle's announcement that "in the interest of fairness to both sides and everyone who is on the committee," a 10-minute question-and-answer period would follow.

Lancaster returned to the podium and began to comment on the remarks made by the other two speakers by first acknowledging that he, indeed, represented PPFA and that the other speakers were employed to represent the interest of the United Association.

Lancaster's remarks were quickly met with an objection from Edward Brabec, executive vice president of the United Association. This was followed by Doyle's announcement that the remaining time would be limited to questions from the floor, not rebuttal statements.

Lancaster protested the procedures and then left the podium where Leonardini and Lappe proceeded to answer several questions from the committee members regarding their statements.

Very Convincing

To the members of the audience, it must have appeared as though the anti-plastic speakers clearly presented a very convincing argument for their case, while the plastic concerns failed to prove any of their contentions.

When confronted with the question of why Lancaster had failed to make a more comprehensive and prepared statement, PPFA attorney Robert Creamer and Lancaster both charged that they had no prior knowledge that speakers were going to be given 45 minutes each nor were they informed of the type of presentation Leonardini and Lappe were going to make.

While the plastics representatives claimed that they had not been contacted directly by the committee, but that a message was delivered through a third party, chairman Doyle told **Reeves Journal** that he did speak to Lancaster personally by telephone. William Abernathy, committee secretary, George Kauffman, co-chairman, and at least two A-40 members told **Reeves Journal** they had been told that PPFA was notified of the anti-plastics concerns' plans to appear at the meeting more than a month prior to the sessions.

Creamer told **Reeves Journal** that PPFA did not have any plans of making a similar presentation before the committee because the organization did not feel it was the proper venue to air such testimony.

"This group, regardless of what they call themselves or how they self-anoint themselves, is not competent to make these kinds of decisions, and we are not going to engage in a debate before the A-40 Committee on scientific and technical matters.

"The union can bring in people to talk about whatever they want, but we are not going to do anything that would imply that this committee is competent enough to make those kinds of judgments.

"For us to bring in toxicologists would be, in effect, to submit this issue to this group; and it doesn't belong here. This may be a safety code in terms of traditional concern of plumbers for safety, in terms of what is a safe plumbing system, but I don't believe that makes this group competent to decide whether a particular kind of plastic pipe leaches or is permeable to

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Final Arguments Presented In Calif. Suit Challenging AC Efficiency Rates

by Larry Dill

SACRAMENTO, Calif. — A Sacramento county superior court judge is expected to deliver a final decision in early October on the lawsuit pitting air conditioning manufacturers against the California Energy Commission (CEC) over the CEC's proposed 1988 and 1993 minimum energy efficiency standards.

Judge James I. Morris heard final arguments from attorneys on July 16, and agreed to allow both sides of the litigation to file final closing briefs within 15 days. Upon filing of the briefs, which will be limited to material presented during the July 16 court session, the parties involved in the suit will then have 30 days to file written responses. Upon review of the material submitted, Morris will then deliver his written decision, probably in early October.

The suit was filed by Lennox Industries, Inc., Bard Manufacturing Co., Heil Heating and Cooling Products and Borg-Warner Central Enviromental Systems, Inc.. In a related action, American Standard's Trane Division has petitioned the CEC to reconsider its decision to adopt a minimum seasonal energy efficiency ratio (SEER) of 8.9 — beginning in 1988. The SEER would raise to 9.9 in 1993. California's current minimum SEER is 8.0.

The majority of the July 16 season centered around closing arguments by attorneys Thomas Knox, who represents Lennox Et Al. and Bruce Dodge, legal counsel for Trane.

The plaintiffs' attorneys focused their attention on charges that the CEC staff was selective in its use of reference materials, particularly data from the Department of Energy, and claims that the proposed regulations would drastically increase costs while resulting in products and requirements that would not be cost effective for consumers.

"We're very optimistic about the outcome," David F. Lewis, director of marketing for Lennox Industries, told Reeves Journal. "We think that the regulations will end up costing the consumer a lot more money. The key is that we don't feel it will be cost effective for the consumer."

Lewis also pointed out that the manufacturers contend CEC reached its decision through the selection of data that would only support its position.

Knox outlined a number of points raised in previous testimony which are being challenged by the manufacturers.

While questioning the methodology used to evaluate such factors as feasibility of compliance, [illegible] maintenance costs and [illegible] "design life of units," Knox zeroed in on his clients' contention that the CEC did not have sufficient evidence to develop its regulation. Knox contended that CEC used the wrong "baseline" to determine the cost efficiency of air conditioners that would be subject to the regulations.

"They used the wrong yardstick to measure the cost effectiveness of the 1993 standards," Knox said. "There is no evidence considered that states SEER 9.9 will be cost effective in 1999," he added.

A large portion of the final session was spent arguing the language used in the regulation. The primary question was whether units covered by the regulation should be classified as residential or commercial or single and triple phase air conditioners.

Dodge stated that no data was submitted on a commercial category and that there is no evidence to support the contention the proposed SEERs would be cost effective. He suggested that the regulation be sent back to the CEC staff to either add language specifying commercial air conditioners or that commercial units be exempted from the action.

Exemption would be more favorable, he argued, because of the projected difficulty in enforcing such distinctions, particularly in light of the possibility of units designated for commercial applications being used for residential installations.

In challenging the CEC's selection of data in its regulation formulation process, Knox contended that the CEC staff ignored workshop testimony and input from industry sources and instead selectively referred to data that only tended to back its position on SEER minimums, particularly information from DOE.

Alan B. Lilly, deputy attorney general representing the CEC and the State of California, responded that CEC didn't rely on testimony supplied by industry because it was "just the opinions of their engineers."

CEC has been joined in the defense of the proposed regulation by Carrier Corp. and the Natural Resources Defense Council.

A-40 Committee

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such a point that it should not be used in plumbing systems.

"No one on that committee is competent to make those kinds of decisions, and it's ironic to note that through all of the procedures they have said they are incompetent to decide whether lead should be used. They have decided they aren't competent to decide whether certain kinds of asbestos products should be used in the code. They have said they are not competent to make judgments whether certain kinds of pipe assemblies are fire retardant. They have denied competence to determine all kinds of issues, but yet when it comes to these extremely complex, complicated and controversial issues about plastic pipe, then all of a sudden there is a group of people that is in there who deem themselves highly competent to decide if plastic pipe should be used.

"And that's what we have, but we simply aren't going to submit that issue to this group. So we're not going to come in with our own dog and pony show."

Both Lancaster and Creamer contend that governmental agencies such as EPA and the Department of Health should be involved in the study and evaluation of the issue.

Couldn't Rebut

Lancaster protested the fact that he was not provided the opportunity to answer the charges made by Leonardini and Lappe, stating that they made several misstatements of fact.

As an example, he countered that the lawsuit in San Jose is centered around a mechanical fastening system, not issues concerning cancer. "He was pulling apples and oranges," Creamer added of his legal counterpart.

When it was pointed out to the plastics spokesmen that a member of the audience would surely have to be influenced by the presentation made by their foes, based on PPFA's lack of performance, Creamer concluded, "You got the message that the sponsors and the union people wanted you to get because, again, we were never told what was going to happen and they had a canned, rehearsed, slick presentation. The other thing to remember, and I'll stop saying it eventually, is that this is not the forum for that kind of thing."

Regardless of the contentions of PPFA, they may find that their counterparts on the committee left with a very strong impression from the presentation made by Leonardini and Lappe. If they were keeping score in the grandstands, the committee members may have concluded that it was no contest. The hired guns scored a TKO.

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

DEPARTMENT OF LABOR

OFFICE OF THE COMMISSIONER

P.O. BOX 1149
JUNEAU, ALASKA 99802
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February 13, 1986

FROM THE OFFICE OF
REP. MIKE NAVARRE
FOR YOUR INFORMATION

The Honorable Mike Navarre, Chairman
Labor and Commerce Committee
House of Representatives
Pouch V
Juneau, AK 99811

Dear Representative Navarre:

Thank you for the opportunity to review the ICBO's proposed amendments to our electrical and plumbing statutes.

Basically, the proposal is that the statutes be amended to require that the Department of Labor adopt the latest editions of the national codes. The ICBO's rationale is that Alaska's minimum standards could then be routinely updated through the administrative regulations process without requiring action by the Legislature.

Historically, the courts have invalidated statutes, such as the one ICBO is proposing, that provide for the adoption of future amendments to a code or set of standards from another state or a private organization. In these cases, the courts have held that such statutes constitute an improper delegation of authority. In the instant case, the Legislature would effectively be impowering the American National Standards Institute and the International Association of Mechanical and Plumbing Officials to make whatever future amendments they wished to Alaska's minimum electrical and plumbing standards. Although the ICBO's proposal does provide that the Department of Labor may amend the codes as it deems appropriate, the intent does not appear to be that the Department do a wholesale rewrite of the codes; rather, the intent seems to be that the department would rely largely on the national codes. In sum, it is our belief that this proposed legislation would likely be disapproved of on legal grounds.

Even if this potential legal problem did not exist with respect to the ICBO's proposal, I am not sure I would be comfortable with it. It appears to me, after following the plastic pipe issue, that the matter is being dealt with in the proper forum.

FROM THE OFFICE OF
REP. MIKE NAVARRE
FOR YOUR INFORMATION

07-G9LH

A degree of politics will necessarily play a part in the outcome of the issue; and the Legislature, not the Executive Branch, is the proper place for that negotiation and compromise to occur.

I appreciate the opportunity to comment on this proposal.

Sincerely,

Jim Robison
Commissioner

SOUTHEAST ALASKA ICBO CHAPTER
Task Force on Legislative Affairs
February 10, 1986

RE: **An Act relating to standards for electrical safety and the Uniform Plumbing Code.**

BACKGROUND: The attached Bill causes the State of Alaska, through the Department of Labor, to adopt the most recently published edition of both the Electrical and Plumbing code. This Bill makes future legislation unnecessary for such adoption. Amendment to these codes would be through the processes of regulation governed by the Administrative Procedures Act (APA).

ISSUE STATEMENT: Some communities have adopted recent editions of the National Electrical Code and Uniform Plumbing Code. The State of Alaska operates from older code editions. Design professionals, contractors, banks, and local Building Officials currently must design, build, finance and enforce practices based on conflicting code editions. The result is confusion within the industry, higher cost of construction, conflict between state and local officials, and an inability to use most advanced materials and technologies allowed by current code editions.

BENEFITS: Passage of this bill would result in the following benefits:

1. Minimize conflict between codes and code officials in Alaska and make the system easier for private sector interests to work within thus keeping construction costs lower.
2. Greater predictability about code requirements meaning design professionals, contractors and suppliers can more accurately assess construction (materials and labor) costs.
3. Provides a position of leadership on the part of the State from

IN THE _____ BY _____

BILL NC. ____

IN THE LEGISLATURE OF THE STATE OF ALASKA

FOURTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to standards for electrical safety and the Uniform Plumbing Code."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.580 is amended to read:

Section 18.60.580. MINIMUM ELECTRICAL STANDARDS. The latest [1984] published edition of the National Electrical Code (ANSI/NFPA) approved by the American National Standards Institute [ON AUGUST 5, 1983] and the latest [1984] published edition of the National Electrical Safety Code [ANSI C2-1984] approved by the American National Standards Institute [ON JULY 15, 1983], constitute the minimum electrical safety standards of the state.

* Section 2. AS 18.60.580 is amended by adding a new subsection to read:

(b) The department may by regulation adopt amendments to the minimum electrical safety standards of the state that are set forth in the latest published editions of the National Electrical Code and the National Electrical Safety Code under (a) of this section.

* Section 3. AS 18.60.590 (a) is repealed.

* Section 4. AS 18.60.705 is amended to read:

Section 18.60.705. PLUMBING CODE. The Department of Labor shall adopt, as the official minimum plumbing code for the State, the latest published edition of the code, [UNIFORM PLUMBING CODE, 1979 EDITION, ADOPTED AT THE 49TH ANNUAL CONFERENCE, SEPTEMBER, 1978, INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, CHS. 1-13 AND APPENDICES, BUT EXCLUDING PART I, ADMINISTRATION, PAGES 1a-6a, AND] subject to AS 18.60.710 - 18.60.740.

* Section 5. AS 18.60.705 is amended by adding a new subsection to read:

(b) The department may by regulation adopt amendments to the code.

* Section 6. AS 1860.740(1) is amended to read:

(1) "code" means the latest published edition of the Uniform Plumbing Code [,] approved and issued by [1979 EDITION, ADOPTED AT THE 49TH ANNUAL CONFERENCE, SEPTEMBER 1978,] the International Association of Plumbing and Mechanical Officials.

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RICHARD G. FATHY
ALFONSO M. CERRILLO

HEALTH HAZARDS ASSOCIATED WITH PLASTIC PIPE

A STATUS REPORT

OF

THE CALIFORNIA PIPE TRADES COUNCIL

OF

THE UNITED ASSOCIATION OF JOURNEYMEN AND APPRENTICES OF THE PLUMBING AND PIPE FITTING INDUSTRY OF THE UNITED STATES AND CANADA

PREPARED BY:

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PART TWO: EXHIBITS

EXHIBIT 1. Letter of California State Fire Marshal to State Commission on Housing and Community Development, March 31, 1981, requesting study of fire issues involving plastic pipe because of MGM Las Vegas fire.

EXHIBIT 2. Summary of Major Findings, "Health Hazards Associated With the Use of Plastic Pipe" Interim Report. California State Department of Health Services. April 29, 1980.

EXHIBIT 3. Letter of Deputy Chief for Health, Division of Occupational Safety and Health Administration, California Department of Industrial Relations to California Commission on Housing and Community Development, March 5, 1981, correcting misleading statements of the Plastic Pipe and Fitting Association (PPFA).

EXHIBIT 4. Letter of Alexandra Levine, M.D., Lymphoma-Leukemia Program, University of Southern California Medical Center, October 3, 1981, describing research on lymphoma and plumbers.

EXHIBIT 5. "Impurities Detected in ABS, PVC and CPVC Plastic Pipe." California Analytical Laboratories, Inc. November 12, 1980.

EXHIBIT 6. (a) Resolution of the California Consumer Advisory Council, February, 1980.

(b) Letter of the Sierra Club to Commission on Housing and Community Development, November, 1980.

(c) Letter of the Center for Law in the Public Interest to California Commission on Housing and Community Development, November, 1980.

(d) Letter of Women For to Commission on Housing and Community Development, October, 1980.

EXHIBIT 7. "Discussion and Conclusions," Final Report on Potential Health Hazards Associated With the Use of Plastic Pipe in Potable Water Systems. California Department of Health Services, October 17, 1980.

EXHIBIT 8. Letter of California State Department of Health Services to the National Association of Plumbing, Heating, Cooling Contractors, (PHCC) February 2, 1981.

EXHIBIT 9. Letter of Director, California State Department of Consumer Affairs to Commission on Housing and Community Development, November 21, 1980, on risks of cancer for consumers who drink water from plastic pipe.

EXHIBIT 10. California Analytical Laboratories report on chemicals in polybutylene pipe, December 31, 1980.

EXHIBIT 11. Addendum document published by the United States Environmental Protection Agency (EPA) entitled "Priority Review Level 1 - Di- (2-ethylhexyl) Phthalate (DEHP)," December 1980.

EXHIBIT 12. California Analytical Laboratories report on chemicals in polybutylene pipe as flexible fixture connectors, March 18, 1981.

EXHIBIT 13. Letter of California State Department of Health Services to Commission on Housing and Community Development, January 28, 1981, regarding polybutylene posing a potential health hazard to consumers.

EXHIBIT 14. "Analysis of Polybutene Pipe Leachate For Selected Organic Species" by Radian Corporation presented to: Shell Development Company. March 1981.

EXHIBIT 15. "Review and Evaluation of Radian Corporation's 'Analysis of Polybutene Pipe Leachate For Selected Organic Species." California Analytical Laboratories. April, 1981.

EXHIBIT 16. Letter of Staff Toxicologist to attorney for Shell Chemical regarding the possible presence of BHT and alkylbenzene sulphonate in PB pipe, June 15, 1981.

EXHIBIT 17. Letter of Director, California State Department of Housing and Community Development to Commission on Housing and Community Development, April, 1981.

EXHIBIT 18. Letter of Director, California State Department of Consumer Affairs to Commission on Housing and Community Development, April, 1981.

EXHIBIT 19. News Accounts, San Francisco Chronicle, Sacramento Bee, April 21, 1981.

EXHIBIT 20. Letter of general counsel for the California Building Standards Commission regarding the relationship between the California Building Standards Law and the California Environmental Quality Act (CEQA). July 21, 1981.

(NOTE: Additional information on these Exhibits may be obtained by contacting the law offices of LEONARDINI & FATHY, 400 Capitol Mall, Suite 221, Sacramento, California, 95814-4480, (916) 441-4405.)

PART ONE: SUMMARY OF HEALTH ISSUES

INTRODUCTION

Thousands of pages have been written on the advantages and disadvantages associated with plastic pipe. The debate normally concerns its effectiveness and usefulness as a new product. Most recently, issues have focused on human health hazards and potential long-range environmental dangers. With this type of dispute the problems surrounding plastic pipe involve a staggering level of scientific abstraction. Public officials and policy makers (usually not scientists by training) oftentimes are faced with a morass of scientific jargon, chemical formulae and mathematical probabilities. Such scientific disputes, if taken out of context, can be an obstacle to the appropriate protection of the health and safety of the general public.

The following paper is a short summary of the main health and environmental issues in the plastic pipe dispute. It includes documents of policy makers, environmental scientists and health officials that comment upon the proper health and safety approach to the issue, all of which documents are part of the Public Record of the California Housing Commission. These documents illustrate that scientific assertions of the petrochemical industry, when analyzed by independent testing agencies, do not overcome the threat of severe safety risks, health risks and environ-

mental contamination that may arise from the use of plastic pipe.

Lastly, thi paper documents the extreme peril of relying upon media presentations and press packages of the Plastic Pipe and Fitting Association (PPFA).

The reader should carefully note the serious need for policy decisions with regard to plastic pipe that reflect truly unbiased research and independent analysis.

I

FIRE SAFETY

In early 1980, the California State Fire Marshal, at the specific request of the California Legislature, (ACR 98), analyzed and evaluated every major scientific document on "the potential flammability of plastic pipe and the fire hazards associated with its use." It concluded:

> "In multi- (3 or more) story fire-rated construction, additional in-depth fire testing is necessary to (a) ensure that plastic pipe will not contribute to unusual fire spread; (b) that the toxicity generated by the combustion of plastic pipe will not extend beyond the area of initial exposure in quantities sufficient to prove hazardous." ("Fire Hazards of Plastic Pipe" State Fire Marshal. May 1980.)

The State Fire Marshal was particularly concerned at the time with "through-penetrations" of fire-rated walls by a combustible material and by the loading of plastic pipe, i.e.,"stacking", in high-rise construction.

His concern proved to be prophetic after the tragic fire at the MGM Las Vegas in November 1980. News accounts

and independent investigations on the Nevada fire led the State Fire Marshal to conclude: "... plastic pipe may have played a contributing role in...(the) tragic fire...in Las Vegas, and many news accounts describe the precise problems I alluded to in my reports to the (State Housing) Commission." (See Exhibit 1.) The Fire Marshal went on to "strongly recommend" specific research and standards evaluation prior to any approval of plastic pipe for high-rise construction.

II

HEALTH HAZARDS FOR WORKERS

In May 1980, the California Department of Health Services did the first compilation of medical literature and research data on the potential hazards to workers when exposed to the wide variety of toxic chemicals found in plastic pipe and glues. As with the State Fire Marshal, the Health Department's effort was the first major push by an independent governmental agency to fully evaluate heretofore disparate and complex chemical data. Their conclusions (see Exhibit 2) are wide-sweeping and "suggest the possibility of serious and previously unrecognized health effects among workers who install plastic pipe....Consequently, it is not clear that such pipe can be used safely under present conditions."

Unfortunately, but not unexpectedly, the petrochemical industry deliberately misrepresented the major findings of the Health Department, specifically Cal/OSHA. The Plastic Pipe and Fitting Association (PPFA) went to such an extreme in twisting and contorting the facts on plastic pipe that on March 5, 1981, the Deputy Chief for Health of the California State Occupational Safety and Health Administration wrote to the California Housing Commission to correct

the false information. "...The PPFA has inappropriately extracted parts of our overall study, developed misleading statements and made these available to the press." (Exhibit 3.) Dr. Wade continued, "...we carefully identified what is known of the real and potential toxicity of these materials as well as the areas where we have inadequate information." He re-emphasized the importance for "all interested parties" to look at the evidence collected "in total" as presented the May 1980 report.

The California Health Department in November 1980, publicly testified on the relevance of its May 1980 "Interim Report":

> "We think further study is urgently needed about the possibility that some events in and around the construction of pipes, particularly, and the pipes that we have been studying may be associated with increases of cancer in workers, particularly lymphomas.... We also have a long list of adverse effects." (Reporter s Transcript, Commission on Housing and Community Development Hearing, November 24, 1980, p. 70.)

The health survey of plumbers in California reported, among other things, 54 lymphomas out of approximately 10,000 respondents. This staggeringly high rate of lymphoma drew the specific attention of the USC Medical School where the country's foremost research in lymphoma is being conducted.

In late 1980, Alexandra Levine, M.D., after an analysis of the biological slides and medical records of the first five cases submitted to the medical school, commented: "It is noteworthy to me that all five of these patients with documented diagnosis of lymphoma have had quite extensive exposure to plastic materials which were used during the course of their work." (Exhibit 4.)

In sum, the medical research conducted by the California Health Department, the Occupational Safety and Health Administration, USC Medical School and others, clearly documents the potential for serious, long-range health problems from worker exposure to plastic pipe and its glues.

III

ENVIRONMENTAL CONTAMINATION

Perhaps the most frightening aspect of the multi-faceted issues with plastic pipe concerns general environmental contamination. The toxic chemicals in plastic pipe and its cement solvents appear to be capable of leaching into the environment and thereby causing unalterable damage to our plants, our aquatic life, and our food chain.

For example, a study done by the California Analytical Laboratories and reviewed by the State Department of Health Services, documents the previously unknown presence of "impurities" in plastic pipe. The impurities include known carcinogens such as chloroform, benzene, DEHP, acrylonitrile, and styrene, as well as other toxic chemicals on the EPA list of priority pollutants. (Exhibit 5.) This poses not simply a human health risk to workers who install plastic pipe, but as discussed in more detail below, to consumers who drink water from plastic pipe. Furthermore, it points to a definite risk to the environment generally from the waste discharge of water flowing through plastic pipes. The subject chemicals will add to the existing load of pollutants known to have serious environmental effects because they display all of the characteristics of such chemicals: they can be accumulated in living organisms

and food chains, and may be widely dispersed in the environment.

Policy makers may find it helpful to reflect on the numerous requests from public interest groups -- consumer groups, environmental coalitions, womens groups, public interest lawyers -- who have called for comprehensive analysis and evaluation of these potential long-range contamination factors before plastic pipe use is allowed to expand. (Exhibit 6.)

IV

PLASTIC PIPE FOR POTABLE WATER

(Poly Vinyl Chloride [PVC]
and Chlorinated Poly Vinyl Chloride [CPVC])

In the course of its exhaustive research of the scientific literature on plastic pipe, the California Department of Health Services found a previously unheralded article indicating that plastic pipe leaches its solvents into the drinking water. To confirm the potentially incalculable health consequences of this article, the Department of Health Services commissioned the Montgomery Testing Laboratory to conduct the first government sanctioned study to measure the amount of solvents that leached into drinking water from plastic pipe.

The landmark Montgomery test is highly controversial because it simply provides raw test data. Moreover, because the simulated pipe configuration test incorporated an arguably improperly designed pipe "fitting density," experts in the State Department of Health Services estimate the possibility of a 50 percent sampling error. That is, the results of the Montgomery tests may be understated by as much as 50 percent ("Final Report on Potential Health Hazards Associated with the Use of Plastic Pipe in Potable Water System," Department of Health Services, p. 16).

Yet, even with a conservative evaluation of the data, alarming interpretations result. The Department of Health Services stated in their final report:

"With the possible exception of the leaching of the phthalates (DEHP), the principal public health finding of this study is the possibility of excessive amounts of solvents and carbon tetrachloride, chloroform and tetrachlorethere accumulating during the stagnant period between initial installation of plastic pipe and occupation of the dwelling." (Exhibit 7.)

The other conclusions in the final report of the Department of Health Services are tremendously complex and must be viewed in their proper context. For example, extensive "flushing" of the system "may" decrease the risk of abuse from the solvents leaching into the water. However, some of the so-called "volatile organic" chemicals in plastic pipe itself "can accumulate in chlorinated water" notwithstanding the flushing requirement. (See Exhibit 7, p. 35.) One of these chemicals (carbon tetrachloride) was present in the water at 10 times the EPA action level. Other equally dangerous chemicals (chloroform, tetrachloroethylene, DEHP) found at equally high and dramatic levels may not be reduced by flushing. For example, the Department stated:

"Because the possibility exists that some of these elements (carbon tetrachloride, chloroform, and tetrachloroethylene, DEHP) may be coming from the pipes themselves, particularly plasticizers, there is every possibility that they could build up on a longer interim after the initial flushing." (Reporter's Transcript, Commission on Housing and Community Development Public Hearing, November 24, 1980, p. 76.)

So damaging were the findings of the Montgomery tests and the Department of Health Services' evaluation, that the Plastic Pipe and Fitting Association (PPFA) proceeded to initiate a nationwide media strategy to "explain" the results.

In a January 19, 1981, letter from the National Association of Plumbing, Heating, Cooling Contractors (PHCC) to Dr. Marc Lappe', California Department of Health Services, the PHCC Technical Director complained to the California Health Department as to the reliability of the PPFA's explanation that the Health-commissioned tests showed plastic pipe and its glues were safe. The Contractors had received a number of inquiries from their members concerning the trustworthiness of the Plastic Pipe and Fitting Association's news accounts. The Technical Director of the Contractors requested back-up support information from the Plastic Pipe and Fitting Association. The information provided by the plastic pipe industry apparently

was so poorly drafted, with unsigned reports, and missing data, that the Contractors decided to request review from the California Department of Health Services. In asking for Health Department reviews, the Contractors commented: "It is interesting to note how your report is reworded (by PPFA) or interpreted to mean something rather different from what was generated by your organization."

The California Health Department response (Exhibit 8) to the Contractors' request was directly to the point. According to Health, the Plastic Pipe Association's reports were "flawed," "incomplete" and "do not reflect accurately our own interpretation of the findings." The California Health Department reached "totally different conclusions regarding potential risks than did this (unidentified industry group of toxicologists) review committee." The PPFA press release was "factually in error and seriously misleading regarding our findings."

In particular,

1. "PPFA did <u>not</u> submit Table 19 of the Montgomery Study to PHCC which "contained the highest readings on chemicals of concern to us, and substantially changed our analysis of the final results. (Table 19 attached for comparison.)"
2. PPFA's characterization that "solvent levels did not exceed safety values "severely distort(s)

the actual findings of the (Montgomery) Report." Specifically, the Health Department found that "solvent levels did exceed recommended (safety) values..."

3. Contrary to PPFA assertions that some chemicals found in the Montgomery tests were not found in the pipe but were induced from sloppy laboratory procedures, the Health Department stated "we resolved (that) issue...by repeat testing and concluded that the evidence pointed to the pipes or a combination of pipes and solvents as the source of DEHP and not laboratory artifact."

In a nutshell, the California Health Department found that the Plastic Pipe and Fitting Association had seriously misrepresented the real health and safety dangers with drinking water coming from plastic pipe.

As with the worker safety question, the plastic pipe industry again distorted, misrepresented, and inaccurately quoted California governmental reports on health and safety to the extent that each of these governmental agencies had to specifically correct the record. It is no wonder that the Director of the California Department of Consumer Affairs recommended:

> "It would be unwise to decide now to expose Californians in their homes to what may be an extremely serious health hazard." (Exhibit 9.)

V

POLYBUTYLENE PIPE FOR POTABLE WATER

Since the Montgomery test for plastic pipe drinking water safety was based on the hypothesis that solvents used to cement these plastic pipes leached toxic chemicals into the drinking water, the Department of Health Services did not request a study of polybutylene (PB) as this pipe does not require solvents for installation.

Yet because polybutylene is part of the generic plastic pipe grouping, it may have many of the same additives, stabilizers and plasticizers as PVC, CPVC and ABS.

In early 1981, the California Department of Consumer Affairs petitioned the State Housing Commission requesting the same stringent testing for PB as the Commission mandated for CPVC and PVC. In this context, the California Health Services Department analyzed the first research conducted on PB pipe itself. The results were alarming. (See Exhibit 10.)

In particular, the tests conducted by the California Analytical Laboratories found 50-50[illegible] ppm (parts per million) of DEHP (a known animal carcinogen) in the pipe itself. The United States Environmental Protection Agency (EPA), in a document published at the end of 1980 entitled "Priority Review Level 1 - Di-(2-ethylhexyl) Phthalate (DEHP)," recommends "appropriate action(s) under the Toxic Substance

Control Act, section 6 to prevent or reduce the carcinogenic risks from exposures to DEHP." (page 129).* Subsequent tests on other polybutylene pipe used for flexible connections to plumbing fixtures also found DEHP. (Exhibit 12.)

The results were all the more disturbing because the representative of Shell Chemical Company had testified on the public record that polybutylene pipe did not contain DEHP. The combination of Shell's apparent discrepancy in testimony and the data developed by California Analytical Laboratories finding DEHP, led the Department of Health Services to state:

> "It is disturbing that the (State Housing) Commission was given such apparently misleading testimony (by Shell), since the potential leaching of this compound (DEHP) if present in the type of polybutylene used for potable water poses a potential health hazard to consumers." (Exhibit 13.)

The Department of Health Services went on to conclude that "obviously this situation deserves immediate at-

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* The same EPA document reviewed the DEHP data from the Montgomery Tests on PVC and CPVC. (The test on PB had not been completed.) This document commented: "these data represent the most reliable data on levels or potential levels in drinking water from DEHP containing plastic pipe." (Exhibit 11.)

tention because of the health risks at stake."

To counter this substantive finding, Shell Chemical Company commissioned a first test to be conducted by Radian Labs of Austin, Texas. (Exhibit 14.) While purporting to show the absence of DEHP or any other toxic chemicals, the company's first test was so flawed as to be of little value. (Exhibit 15.)

At the April 20, 1981 public hearing before the California Housing Commission, the representative from the State Department of Health Services stated unequivocably that the chemical found by the California Analytical Labs was "without question" DEHP. Furthermore, the Health Department spokesperson specifically identified a three-member panel within the Health Department which had reviewed the California Analytical Laboratories Test. This impartial panel found the test to comply with strict EPA testing protocols and to be scientifically valid. The Health Department went on to assert that DEHP was also found, in smaller amounts, in Shell's own tests of the PB pipe conducted by Radian Labs.

Presumably embarrassed by the results of its first test, Shell Chemical Company conducted a second test on its product through the Radian Lab. Unfortunately for the industry, the second test revealed "unknown" chemicals that "have to be evaluated," according to the April 20, 1981

testimony of the Department of Health Services.

In a June 15, 1981 letter, the Department of Health Services expressed "cause for concern" to Shell with the chemicals BHT and alkylbenzene sulphonate, both of which were found in the Radian Lab tests.

> "Recent studies have shown that chronic, relatively low level ingestion of BHT can lead to reduced weight gain, increased liver size and raised serum cholesterol in a number of separate animal tests. Other studies have shown reduced litter size following exposure during embryonic development." (Exhibit 16.)

As of this writing, no additional information has been supplied on these chemicals for the Housing Commission's public record

In conclusion, the Housing Commission agreed with the Department of Health Services, their own Director of the State Department of Housing and Community Development (Exhibit 17), and the Director of the State Department of Consumer Affairs (Exhibit 18) that polybutylene should not be authorized for use until the plastic pipe is thoroughly and impartially studied. (Exhibit 19.)

VI

CONCLUSION

It is now clear that every major California state governmental agency that has an interest in construction, including the State Department of Consumer Affairs, the State Department of Health Services, the State Department of Housing, the State Occupational Safety and Health Administration and the State Commission on Housing and Community Development, all advocate comprehensive analysis and evaluation of plastic pipe through the rigorously scientific and public procedures of the California Environmental Quality Act (CEQA) before any expansion of use is permitted. To do otherwise violates California law:

> "An adopting agency cannot avoid compliance with CEQA by adopting a 'model' code by reference where the code contains material that was previously found to be subject to CEQA. To do otherwise would violate both the State Building Standards Law and the California Environmental Quality Act." (Exhibit 20.)

Furthermore, major health, consumer and environmental interest groups, specifically the Sierra Club, the

Consumer Advisory Council, Women For, the Center for Law in the Public Interest, have unanimously called for plastic pipe to be scrutinized for long-range health and environmental contamination before plastic pipe is permitted for widespread use.

PART TWO: EXHIBITS

STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY EDMUND G. BROWN JR., Governor

STATE FIRE MARSHAL
7171 BOWLING DRIVE, SUITE 800
SACRAMENTO, CALIFORNIA 95823

(916) 322 2370
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March 31, 1981

Myron Moskovitz, Chairman
Commission on Housing and
Community Development
921 Tenth Street
Sacramento, California 95814

Dear Mr. Moskovitz:

I have been informed that the Commission on Housing and Community Development has decided to conduct an Environmental Impact Report (EIR) for ABS and PVC when used for drain and waste piping. I believe that the EIR presents our best opportunity to study many of the fire-related issues I spoke of in my May 1980 paper, "Fire Hazards of Plastic Pipe", and I would strongly recommend that the Commission address fire safety as part of its report. I would further recommend that a study of vent piping be included as well.

As the enclosed articles suggest, plastic pipe may have played a contributing role in last November's tragic fire at the MGM Grand Hotel in Las Vegas, and many news accounts describe the precise problems I alluded to in my reports to the Commission. Further, my office is presently reviewing all available documentation of the fire, and I am reconvening a Task Force to evaluate the whole question of fire safety in high rise buildings. The findings of the EIR would be of great help in that review.

In short, I think we have an excellent opportunity, through the EIR, to look objectively at the fire safety issues raised by the proposed increased use of plastic pipe. I hope you agree.

Sincerely,

PHILIP C. FAVRO
State Fire Marshal

PCF:cog

Enclosure

DECEMBER 25, 1980 THE DALLAS MORNING NEWS

Hundreds of code violations found at MGM Grand

LAS VEGAS, Nev. (UPI) — Hundreds of building code violations that contributed to the intensity of the MGM Grand Hotel fire have been found by investigators, the Clark County Building Department reported Wednesday.

Eighty-four people were killed in the blaze, which sent deadly smoke and gases through the 26-story tower on the Las Vegas strip Nov. 21, forcing about 4,500 guests to flee.

Most of the victims died from smoke inhalation, and the building department report blamed hotel construction, which did not meet county codes, for the rapid spread of smoke and fire.

"Code violations exist throughout the complex and hundreds contributed adversely to the life safety of the occupants," Building Department Director Robert Weber said in the preliminary report.

The 4-page document represented 600 hours of inspections of the hotel and reviews of building plans, Weber said.

The document described structural irregularities that drew smoke up elevator shafts, stairwells, and through every floor of the resort.

Holes in air shafts and air ducts that lacked fire dampers provided smoke and flames an avenue of escape, it said.

The report pinpointed other violations, including improperly ventilated air shafts, holes in corridor firewalls, plastic pipes, and large holes cut into interior stairways.

The building department report also said the design of some hotel safety systems, including exits, emergency lighting and signs, were in violation of county codes.

"Sign visibility, illumination and mounting for proper viewing and shortage of directional signs were extensively inadequate," the report said.

Stairways, exits, and corridors were improperly constructed and were not protected by adequate fire-resistant materials, and the resort lacked smokeproof stairways required for buildings more than 75 feet tall, the report said.

MGM Grand spokesman Bill Bray said management would have no comment until it examined the report.

Another report, released by the Clark County Fire Department, said the blaze was caused by a short circuit behind the wall of a serving station near the delicatessen, not in the ceiling of the restaurant as originally believed.

The report said the fire probably burned for two to three hours before it was discovered.

The first employee to notice the flames immediately turned to leave the room and report the blaze, but was knocked to the floor by a backdraft, the fire department report said.

The employee grabbed a fire hose and tried to extinguish the blaze, but he was knocked to the floor by a second backdraft, and remained unconscious for two or three minutes, the report said.

Report: Hundreds Of Violations Fueled Tragedy At MGM

LAS VEGAS, Nev. (UPI) — Hundreds of building code violations that contributed to the intensity of the MGM Grand Hotel fire have been found by investigators, the Clark County Building Department reported Wednesday.

Eighty-four people died in the blaze that sent killing smoke and gases through the 26-story tower on the Las Vegas strip Nov. 21, forcing about 4,500 guests to flee.

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LOS ANGELES TIMES DECEMBER 21, 1980

A Fire Dissected: What Caused MGM Grand Blaze

When fire raced through the MGM Grand Hotel in Las Vegas a month ago today, it left behind piles of ashes, rubble and questions. In this special report, Times Staff Writers Bob Secter, Gaylord Shaw and Ronald L. Soble examine how the second-worst hotel fire in U.S. history occurred in a building that had been certified as safe.

LAS VEGAS—It was a splashy production, worthy of its movie-maker parent, Metro-Goldwyn-Mayer—literally dripping in glitter and glamor and sparkle.

No expense was spared to offer the finest decorations, the richest appointments, the ultimate in opulence in the 26-story hotel-casino—the largest in the world when it opened in 1973.

But like a Hollywood movie set, everything at the MGM Grand Hotel was not what it seemed to be. The ornate polished wood trim was not all wood, the gleaming marble not all marble, the imported crystal chandeliers not all crystal. Many items, in fact, were flammable plastic.

The casino was so loaded with synthetics and structural quirks that it produced the most intense fire many investigators said they had ever encountered. It was, one fire official said, "a torch waiting to go off."

On the morning of Nov. 21, it did.

What began as a minor fire near the kitchen area became a 1,500-degree inferno. Within minutes, virtually everything in the 50,000-square-foot casino was consumed. Smoke and toxic fumes surged into the adjoining high-rise hotel, turning rooms, corridors, elevators and stairwells into gas chambers.

Eighty-four persons died. It was the second deadliest hotel fire in U.S. history. And, along with a rapidly spreading blaze that killed 26 persons in a New York hotel conference center two weeks later, the Las Vegas fire raised disturbing questions about a patchwork regulatory system intended to ensure fire safety.

Owners of the MGM Grand said the hotel was designed and built to comply with all building codes and fire regulations in force in 1973. On-site building inspectors said construction work met the codes, and fire inspectors said they discovered no major problems before the disaster.

How, then, did fire and smoke spread so rapidly through a structure certified as safe?

Since the fire one month ago today, Times reporters have examined thousands of pages of documents and interviewed scores of witnesses, fire experts, public officials and hotel employees. The inquiry found that:

—Half to three-fourths of the casino's furnishings and decorative trim was made of plastic or other synthetics, one investigator estimated. These petroleum-based substances burned so intensely that temperatures within the casino were roughly three times greater than the volcanic heat that scorched the slopes of Mt. St. Helens last spring.

—Although such high-occupancy buildings are supposed to be designed to retard the spread of fire and smoke, the design of the MGM Grand appears to have aided the spread of flames and allowed smoke to billow uncontrollably throughout the hotel.

—Sprinklers protected some restaurants, show rooms and the hotel's shopping arcade—and halted the fire there—but did not extend a few extra feet into the delicatessen, where the fire started, or into the casino, where it expanded.

—No fire-resistant barriers to contain the flames were installed in the casino's cavernous attic, which was crisscrossed by flammable plastic plumbing and wiring. The barriers would have made it harder to use the attic as an "eye in the sky" to spy on casino cheaters and would have dammed up part of the hotel's heating and air-conditioning system.

—Several investigators said that (1) the air-conditioning system did not have a sensor, which they interpreted the building code as requiring, to shut it down automatically and thus avoid the spread of smoke; (2) vents atop elevator shafts and stairwells appeared to be inadequate, (3) a vertical ventilation shaft in the core of the hotel helped carry smoke into corridors, and (4) louvers above guest room doors allowed smoke from the

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corridors to enter the rooms.

—Construction of the building was rushed. It opened 18 months after groundbreaking, a remarkable feat for a structure containing 2¼ million square feet. In the "fast-track" construction process, some corners were cut as dozens of subcontractors drew their own designs and selected their own construction methods. The reason for the hurry, said the president of the supervising construction firm, was "so you can make money sooner."

—On-site inspectors for the county building department did not report design or construction problems that figured in the disaster. The department's director—who resigned in 1978 during a grand jury investigation of irregularities in construction of other hotel-casinos—took no action on a fire official's suggestion that sprinklers be required throughout the MGM Grand. The director repeatedly sparred with fire officials over trying to pressure other hotel-casinos into upgrading their fire safety equipment.

—County fire marshals found a host of safety discrepancies in the MGM's kitchens this year, but failed to follow through fully on their investigation. Only three inspectors are assigned to police 29 hotel-casinos on the Strip. At MGM Grand they missed what fire officials characterized as serious code violations.

—Some hotel employees said they never received training on what to do in case of fire, and investigators said no printed fire instructions were given to guests or posted in rooms. The hotel's fire alarm never sounded before it was destroyed by the fire. To screen out false alarms, one investigator said, the system was set up so that it would not ring immediately.

Possible Code Violations

Since the fire, dozens of lawsuits seeking hundreds of millions of dollars in damages have been filed against MGM, and local prosecutors have been studying whether charges should be filed. Clark County Dist. Atty. Robert J. Miller said his office would decide within a few weeks whether to pursue criminal or civil actions. "We're looking into possible code violations," he said, specifically mentioning "holes in walls" in stairwells.

The prosecutor was referring to the post-fire discovery, reported by Clark County Fire Chief Roy L. Parrish and other investigators, of five openings that had been cut in stairwell walls. Under the building codes, such openings are prohibited because these walls are supposed to be built to resist fire for at least two hours.

"There were many, many code violations," said a high-ranking investigator after touring the building. "Some were serious and some were not so serious."

Among other potential violations cited by investigators were a lack of roof hatches for interior stairwells, inadequate firewalls between kitchen and casino areas, use of the wrong type of gypsum board to line an entway near the casino, improper attachment of a sprinkler in one stairwell and too few exits for the huge casino.

Investigators said it is difficult to trace responsibility for the possible code violations or for the design features and construction problems that have been identified as contributing to the disaster. This is because of numerous building changes that have taken place in the seven years since the hotel opened and because the "fast-track" construction method meant scores of subcontractors shared major responsibility for construction details.

The hotel's chief executive officer, Fred Benninger, declined a request for an interview. The chief architect, Martin Stern Jr. of Beverly Hills, and the project architect, Joel Bergman, also declined to discuss their work. Because official investigations are continuing, fire officials also are guarded in what they say about the MGM blaze. But Chief Parrish told The Times:

"It was a textbook fire that, given the right circumstances and conditions—which existed in this particular building—caused the rapid spread. . . .

"What I mean is, a textbook fire could be set up under laboratory conditions to do that, or it could mean it does not necessarily have to be a laboratory situation. It's something that we know that under the right conditions could happen. And it did."

Same Building Code Involved

Parrish said the same circumstances exist in other buildings "in other cities—it's a fact."

Indeed, experts say the same basic building code in effect in Clark County at the time the MGM Grand was constructed also was in effect in hundreds of other local jurisdictions across the country.

While there are no uniform federal standards for construction—it is a process which, like licensing automobiles, is left to state and local authorities—an estimated 18,000 jurisdictions have adopted much of the language in one of the four model building codes written by regional or national organizations.

In some cases, local officials set tougher standards than those outlined in the model codes. This has happened in Los Angeles where, for example, sprinklers are required in all new buildings over three stories and where many existing high-rise buildings have had to install basic fire safety features.

But, the sponsors of the model codes acknowledge, the most serious problems come in the enforcement of the standards. "No code is worth a plugged nickel if it isn't enforced, and that's what's happening in too many places," one official said.

The two recent major hotel fires brought orders from the governors of both New York and Nevada for a re-examination of the adequacy of their states' codes. Clark County is moving to require all existing hotel casinos to install sprinklers—as is now required in new construction—but many experts doubt there will be significant changes elsewhere.

Gordon Vickery, head of the U.S.

Fire Administration, said a federally imposed system of building standards is unlikely. "I don't think with the current political climate that it's in the cards," he said.

Vickery said there are more than 12,000 hotel and motel fires a year, causing $90 million damage and claiming an average of 160 lives. "We usually lose people by ones and twos," he said, "and the public doesn't pay much attention until disasters like these come along."

The Las Vegas tragedy apparently began in one short stretch of the 1,895 miles of wiring—equal to the distance from Las Vegas to Detroit—which was installed throughout the complex. Investigators theorize that the wiring in the delicatessen, which was closed at the time, overheated and began arcing, and that for some reason circuit breakers did not shut off the current. Unnoticed, heat began building up from the small, smoldering fire in the wall and ceiling cavity.

Looked for Fire Extinguishers

Shortly after 7 a.m., Jack Kenigson, a retired Redwood City, Calif., car dealer, entered the coffee shop and ordered breakfast. Before his food arrived, several waitresses rushed from the kitchen yelling: "Get the hell out!" Kenigson said he fled just in front of a "tremendous cloud of black smoke . . . (and) a big ball of flame."

Dave Beshoar and Kurt Schleuter also fled the coffee shop. But the two members of the Western Springs, Ill., firefighting force did not just run for the exits. They scurried up and down a nearby hallway looking for fire extinguishers. Finally, as the fire got too intense, they ran toward an open emergency door.

"I was looking back toward the casino floor," recalled Beshoar later. "There were employees still out there and other guards carrying drop (cash) boxes were running out the door. Suddenly there was a loud click, like a circuit breaker cutting out, and the lights went out in the casino. All of a sudden the heat started pouring out like a blast furnace. You could see the flames rolling out of the deli at the ceiling level toward the casino. That's when we left."

Preliminary Findings Discussed

The casino's ruins still were smoldering when the first of what would become an army of investigators arrived. Vickery's U.S. Fire Administration recruited a 12-man team of experts to supplement local and state probers. Then several dozen other investigators—many considered among the nation's top authorities in reconstructing the cause and spread of fires—spent days inspecting the hotel and casino after being retained by lawyers in behalf of fire victims.

The experts are awaiting the results of chemical and other sophisticated tests on materials they collected at the scene, but a number of them discussed their preliminary findings on a not-for-attribution basis.

They all agreed that the fire started in the deli area and smoldered for hours before breaking into the casino. Once that happened, according to one expert's reconstruction, the flames quickly reached a 40-foot-long plastic awning stretching above the Parisian Bar. That awning, he said, "burned like gasoline."

The casino's red-painted ceiling tiles, witnesses reported, also seemed to burn vigorously. One investigator said the tiles were a combustible type of fiberboard, and another said they were "unrated"—meaning they had not been classified for fire resistance.

Also spurring the fire spread was the ceiling's decorative trim. The trim looked like ornately carved, highly polished wood, but several investigators said it actually was rigid polyurethane, a cellular plastic commonly known as urethane.

Urethane Used Widely

(Urethane has come into widespread use in the last two decades—not only in construction as trim and insulation but, in its flexible form, as a soft padding used in furniture and mattresses. The substance is a major concern of fire officials because some formulations burn hotter than wood and twice as fast, melting and flowing as a flaming liquid and generating dense smoke and toxic gases. Although its flammability problems were becoming well known to architects and builders in the early 1970s, building codes placed no restrictions on its use as decorative trim when the MGM Grand was constructed.)

At the same time flames were beginning to sweep along the casino's ceiling, investigators said, fire also was spreading in the attic-like area between the casino ceiling and the roof. There, catwalks, television cameras and two-way mirrors had been installed so security personnel could monitor the gamblers below. And there also, according to several sources, a network of pipes had been suspended from metal hangers to drain rain water from the casino's nearly flat roof. Two 12-inch pipes apparently extended almost the full length of the casino attic, intersected by a series of 4-inch pipes. Like the trim on the other side of the ceiling, these pipes were plastic.

Pipes Released Smoke, Gas

More precisely, investigators said the pipes were of a formulation known as ABS, an abbreviation for acrylonitrile-butadiene-styrene. When such pipe burns, according to a National Science Foundation report published last year, "it releases relatively large quantities of smoke and gases . . . it provides heat for increasing the intensity of the fire . . . it may provide a path for flame spread along its surfaces and . . . it may leave open holes at wall or ceiling penetrations . . . (which) could provide a route for passage of hot flame and gases between rooms."

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One nationally recognized fire expert said such plastic pipe above a ceiling could "spread the flames like a rain of fire."

Every official and private investigator interviewed by The Times said there was no evidence that any "fire stops" had been built in the attic space, which covered an area nearly 500 feet long, more than 100 feet wide and at least 12 feet high. Fire stops are partitions of fire-resistant materials, such as gypsum wallboard, which are designed to slow the spread of fire.

Fire Stops Not Required

But they apparently were not required by building codes at the time the MGM Grand was built, and court documents indicate that—rather than install sheet-metal ducts—the designers decided to rely on the cavity between the ceiling and the roof as a huge "plenum" to recirculate air for heating and air conditioning.

If fire stops had been erected, the attic could not have been used to convey air. And it would have been more difficult to use the space for the security catwalks, the plumbing pipes and the extensive network of electrical and communications cables—most believed to have been insulated with polyvinyl chloride (PVC), another plastic that in some formulations emits toxic fumes when exposed to fire.

Thus, flammable plastics lined both sides of the casino ceiling. Missing from the ceiling, though, were the small, inconspicuous sprinkler heads that could have doused the fire before it became a major conflagration.

Parts of Complex Had Sprinklers

Parts of the MGM Grand complex did have sprinklers—the small membership-only casino set aside for high rollers on the 26th floor; the stage areas of the show rooms where big name entertainers performed, the arcade where expensive shops beckoned conventioneers and tourists; even the Barrymore Room, a restaurant that adjoined the deli area where the fire started.

One veteran fire investigator was appalled when he discovered that sprinklers stopped a few feet from the fire's origin. "If they had spent a few hundred dollars to extend the piping for sprinklers, they would have put it out in the first five minutes," he said.

Hotel officials said at a news conference two days after the fire that they had met or exceeded sprinkler requirements in the building code when the hotel-casino was constructed.

In early 1980, when the corporation began work on renovation of parts of the first floor of the existing building and construction of an addition, the architect made clear that he had no intention of adding sprinklers to the casino.

In a letter last Feb. 25 to the county building department, Fred D. Anderson of Stern architectural firm said construction would be sprinklered but that "remodeled areas on the first floor . . . will remain as they are. . . ."

"By copy of this letter to Chief (Fire Marshal) Jim Barrett, I am requesting that he acknowledge that there is no legal requirement to separate or add fire sprinklers to the existing facilities," Anderson concluded, underlining the word "legal."

But at least one expert instrumental in drafting the building code adopted by Clark County three years before the MGM Grand opened said it was his intention that fire sprinklers be required for casinos.

John G. Degenkolb of Glendale, a retired Los Angeles fire official who now is a fire protection engineer and

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MGM: More Died of Smoke Inhalation Than of Burns

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consultant, in 1969 drafted an amendment to the uniform building code requiring sprinklers in exhibition halls and similar areas with more than 12,000 square feet of floor space. The revised code was adopted by the International Conference of Building Officials that year—and by Clark County in 1970.

Casino Not Referred to in Code

The word "casino" was not specifically used in the revised code, and the district attorney's office recently ruled that the 1970 code did not mandate casino sprinklers. Nonetheless, Degenkolb said "I know what I meant when I wrote it. My firm recollection is that we intended it to apply to casinos. As far as I'm concerned it was completely understood that a casino over 12,000 square feet should be sprinklered."

Whatever the understanding of national building code authors, the MGM Grand casino was not sprinklered at breakfast time Nov. 21 when flames broke out of the restaurant area and spread unchecked through the gambling palace.

The blaze reached the "flashover" stage—the point where a fire begins to feed on its own gases and expands explosively—just as the first firefighters arrived from a station directly across the street from the hotel. One firefighter said he was confronted by "a huge fireball" and another said flames were spreading "like a blowtorch." By several accounts, it took from one to three minutes for the entire casino—an area half again as large as a football field—to become totally involved in the fire.

Urethane foam padding in furniture, felt table tops and expanses of flocked wallpaper all "contributed to the intense fire," one official's report said. Another investigator estimated that 50% to 75% of the furniture, fixtures and other materials in the casino were synthetic, many of which burn readily.

But of the 84 persons who perished, only eight died of burns in the casino or the hotel's first floor. One woman jumped to her death, and all the others died of smoke inhalation, most of them in rooms, corridors or stair wells on the upper floors of the hotel.

It is the rapid spread of lethal smoke that most disturbs some investigators, who since the fire have sought clues to why and how it happened.

Shaft Supplied Air to Corridors

Two investigators said they found that at least one of the 12-inch plastic drain pipes in the ceiling was routed near a ventilation shaft located behind the elevator bank adjoining the casino. They said this led them to believe that as the pipe burned and melted, it spread toxic fumes into the shaft, which extended vertically to the top floor.

The shaft, they said, apparently was designed to supply air to corridors in the three wings of the T-shaped high-rise. From the corridor, air was drawn into guest rooms through louvers above each door, they added. While these louvers were equipped with devices intended to snap them shut in the presence of fire, they were not activated by smoke alone—meaning that they remained open and provided a ready conduit for smoke to move from the hallways to the guest rooms.

The high-rise elevator shafts themselves also were cited as conduits for smoke by Emmet D. Condon, deputy chief of the San Francisco Fire Department, in a report he made Dec. 8 after inspecting the hotel.

Some Pipe Chases Improperly Sealed

The shafts, he wrote in the document obtained by The Times, acted "as conduits from the casino area charging the upper floors with smoke . . . . The eight high-rise elevators serving the upper floors had a three-eighths inch gap around the doors which amount to an area over four square feet on each floor through which toxic smoke and gases penetrated. . . ."

In addition, Condon reported, "some vertical pipe chases (for plumbing and electrical conduits) had not been properly sealed where they penetrated floors" and thus allowed smoke to rise in the building.

Two of the six stairways "had holes cut through the walls in five places that permitted the passage of smoke and toxic gases to upper floors," he wrote, and the bottom five floors of one stairwell were lined with a wallboard that was not rated as adequate for fire protection.

The three stairways in the interior of the building also had no access to the roof and "extremely limited" ventilation at the top, Condon's report said.

"The recirculating air-conditioning system was also carrying smoke into guest rooms" because it was not turned off when the fire began, he said.

Although the fire itself was confined to the casino and the second floor of one of the hotel's three 26-story wings, "the heat of the smoke and gases that traveled from the casino area up through the hotel was of such intensity that sprinklers in a small casino on the top floor" turned on automatically, Condon wrote.

A Building in a Hurry

From its conception, the MGM Grand was a building in a hurry. Even though it was, at the time, the largest hotel ever constructed, the 2,100-room facility threw its doors open to the public less than 18 months after the first piece of structural steel was laid in place.

So fast and furious was the pace of construction that the work started long before the plans were complete. There was no firm budget for the project until three months before opening day, according to court testimony of Benninger, the MGM chairman.

In a 1979 trial of a lawsuit filed by MGM against one of the project's subcontractors, Benninger testified that the Dec. 5, 1973, MGM Grand opening was nearly seven months ahead of the original premiere date.

At times 1,000 persons were working for the project's nearly 100 subcontractors. Such a massive work force was designed to speed the building to completion, but it also appeared to create confusion.

Court testimony indicated that workers were tripping

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over each other. One subcontractor complained that he had to keep six to eight men working full time just moving his construction materials around so they would not be in the way of other workers. The same subcontractor also contended that pressure to finish the building was so great that his crews assigned to erect the outside shell of the building often were hampered by work already done on the interior—the reverse of the normal construction process.

The reason behind the hurried pace was simple—money.

As Benninger acknowledged in a 1977 deposition, all the "subs" were pressured to finish quickly. "Why?" he was asked. "Well," he replied, ". . . the carrying costs of construction are horrendous, so therefore, you want to finish as soon as possible."

Stuart J. Mason, president of the construction firm that supervised the entire project, put it even more succinctly in his deposition in the same case. Asked why it was important for the MGM to open on schedule, Mason replied: "So you can make money sooner."

Profit 1st Full Year

And make money the hotel did. In 1974, the first full year of operation for the MGM Grand, it turned a net, after-tax profit of $6.5 million. For the year that ended last Aug. 31, the Las Vegas MGM Grand and its sister, the MGM Grand in Reno, tallied an after-tax profit of $33.9 million.

Everything about the MGM project implied speed—even the name of the construction process, "fast-tracking."

In fast-tracking, the building starts going up before the plans have been made final. In fact, the definitive building plans are drawn not by the architect or builder, but by many of the subcontractors.

As Mason explained in court testimony, the architect in a fast-track project draws up a set of general plans and specifications for what he wants accomplished and then leaves it up to subcontractors to decide exactly how to do it.

Subcontractors Get End Result

"What we basically give them is the end result of the criteria that we want," explained Mason, president of the Las Vegas-based Taylor Construction Co. "We don't tell them how to get there necessarily. Like on air conditioning we would say: 'We want this room to maintain 75 degrees and the room next to it 72 degrees.' We list all the rooms . . . and it is up to them to design the type of system that is going to achieve what we want."

While the subcontractors' plans were required to be submitted to the chief architect for approval, fast-tracking in a project such as the MGM Grand means that there would be, in effect, dozens of architects designing different parts of the building.

Although Mason declined to discuss the MGM project with The Times "on the advice of my attorney," a source close to the Taylor firm said fast-tracking could help cut six to nine months off the normal construction time for a project of the MGM's magnitude.

Fast-tracking was not unique to the MGM Grand. In court, Mason testified that his company had used it in building several Nevada hotel-casinos, including King's Castle in Lake Tahoe (now called The Hyatt Lake Tahoe), MGM's Reno hotel and the Las Vegas Hilton, originally named the International when it was built in the late 1960s by elusive financier Kirk Kerkorian and Benninger, his right-hand man. Kerkorian, who owns nearly half of all MGM stock, sold the huge International before effectively taking control of MGM.

Mason said his firm was linked up with the same architect, Martin Stern Jr. AIA Architect and Associates of Beverly Hills, in designing the four facilities.

Bergman, 44, Stern's chief deputy on the Las Vegas MGM Grand, no longer works for Stern. He was reached in Atlantic City, N.J., where he is an architect for the Golden Nugget casino that opened Dec. 9. "It's a sensitive issue and I think you know that," he said, referring all questions to Stern.

"I do not want to seem uncooperative," Stern said in a prepared statement read over the telephone by his secretary. "But I believe that it is inappropriate to comment at this time."

MGM Tried to Cut Costs

Appearing opulent, almost extravagant, on the outside, MGM attempted to cut costs and construction time in several ways. For example, it was cheaper to use the huge attic above the casino as a passageway for heated and cooled air rather than to install sheet-metal ducts through the attic to conduct the air. The lack of fire barriers, which could not have been installed in the attic if it was to be used as an air path, helped spread the fire, investigators have said.

Other cost-cutting attempts boomeranged years before the fire. In one instance, MGM hired a California firm called Imperial Glass Co. to build a curtain wall, the glass and metal outer shell of the hotel. The architect's specifications called for structural tests to be conducted on a small mock-up of the wall before the entire structure was erected.

But in an effort to cut costs and speed construction time, MGM and Imperial agreed to eliminate the mock-up, according to records from a lawsuit involving the two firms. After much of the curtain wall was built, it was discovered that it was leaky and not structurally sound, problems that might have been caught early if the originally specified mock-up had been built and tested, testimony in the case indicated.

MGM Fired Company

MGM eventually fired Imperial and hired another firm to repair and complete the work, but it cost the hotel more than twice the original price to get the curtain wall up.

Another attempted cost-cutting move involved the decision to substitute a relatively new exterior wallboard system called Rescon to cover the outside walls of the structure instead of the plaster coating called for in the original design.

In testimony in a lawsuit involving Rescon, MGM Chairman Benninger said he agreed to the switch because he was told the new product was cheaper. However, other testimony indicated that neither Taylor Construction Co., the managing contractor for the entire

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hotel project, nor the subcontractor who was to install the Rescon, ever checked to see whether the material had been used on a high-rise building before. It had not.

Not long after the hotel opened, the Rescon coating started to crack and fell off the building in several places. Again, repairs to the Rescon alone more than doubled the original cost of the job.

Other evidence presented at the Rescon trial showed that MGM managed to chip a few thousand dollars off here and a few thousand there by deleting other construction materials originally called for in the architect's specifications. In one instance, one work-change order called for a savings of $3,000 by eliminating one layer of gypsum board from walls on three building stair towers. In case of a fire in a stairwell, extra layers of gypsum board could serve to help delay its spread.

Gypsum board also was deleted from the plenum, or attic, area above the casino, testimony showed. George Morris, who served as project supervisor for Taylor on the MGM, testified that the hotel later suffered from draft problems near some attic areas where the insulating gypsum board would have been.

There were other headaches for MGM management and construction personnel. For example, many of the furnishings were weeks late in arriving or were damaged when they were received. According to one affidavit filed in a lawsuit by an electrical subcontractor against MGM, some of the light fixtures ordered by the hotel were difficult to install because "manufacturers' installation and assembly data were sometimes not available and sometimes not printed in English, being either in Portugese or Italian."

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MGM: 'Fast-Track' Construction Used

Continued from 23rd Page

Still, despite all the delays and problems with erecting the outer shell of the building, it managed to open before the big Christmas and New Year's holiday seasons in December—months before the original target date. No matter that the hotel was only partly completed on opening day, with the honored guests finding chunks of plaster adorning the halls and rooms. The pool, theaters, many guest floors and other hotel features were not finished for several months.

During and after construction of major buildings in Las Vegas, problems have plagued the inspection processes. In fact, in a town where everyone gives odds, the odds are currently stacked against any sort of thorough, periodic inspection of the dozens of large hotels that line the Strip, according to one high-level Clark County fire official who asked that his name not be used.

Giving one of those "little cities" the weeks or months a thorough going-over would take is "impossible" for one man, but—given current staffing levels in the department—it is something for which a single inspector is responsible, the official said.

Fire Chief Parrish plans to ask the county commission to let him hire five additional inspectors. But for now, the department will have to make do with its current force of 11 inspectors—including three rookies and only two men who have ever attended a fire-training seminar.

Only three of the 11 inspectors are specifically assigned to do the thorough, floor-by-floor, inspections of the 29 major Strip area hotels and their maze of shops, restaurants, casinos and guest rooms.

Armed with briefcases bulging with code books, tape

Please see MGM, Page 25

Los Angeles Times

MGM: 29 Hotels Have 3 Inspectors

Continued from 24th Page

measures, flashlights and other tools of the trade—but no formal safety check lists—it takes three weeks, on the average, to walk through a major Strip hotel. It takes another week to compile the report. More follow-up time may be necessary to make certain violations are corrected.

Because the inspection force was stretched so thin, Fire Department officials last year decided to emphasize the inspection of newly built hotels rather than spend the bulk of their time checking existing ones.

"It's easier to make recommendations on new buildings being constructed," one fire official explained. "But once a building is built what can you do (to upgrade it)?"

As a result, in 1980, only 10 of the Strip's 29 major hotels will have received full Fire Department inspections, The Times learned. In those hotels thoroughly checked, 90% of the fire safety code discrepancies were corrected, a department source said.

Only partial checks were done on the other 19 hotels —including the MGM. Kitchens were inspected and guest rooms randomly checked. Show room inspections were just beginning. But the wide-open casinos had not been checked for fire safety violations.

Inspector's Power Limited

Even when uncovering a condition he believes to be unsafe, a fire inspector here has only limited power to force the hotel to fix the problem. Though the inspector works for the Fire Department, it is the Building Department that has the power to crack down on a hotel—either by levying a fine or by hauling its management into court. High-ranking Fire Department sources said that, until two years ago when former Building Director John Pisciotta resigned under the cloud of a grand jury investigation into his conduct in office, the two agencies were locked in frequent battles over how stringently to interpret building and fire code requirements. Pisciotta routinely argued in favor of less stringent code interpretations, the source said.

Even today, in an era of more amicable relations between the two departments, the process of correcting problems can be painfully slow. To get around the bureaucratic roadblock, inspectors sometimes try to bluff hotels into upgrading equipment.

Complaints Outlined

Such was the case last April 28 when David Lovelace, a 34-year-old fire inspector with two years experience, wrote an eight-page letter to Paul Ross, the MGM Grand's general manager, citing dozens of fire safety "discrepancies" in the hotel's kitchens. The problems included out-of-position sprinkler nozzles in the hotel's main kitchen, a large hole in the wall in another kitchen, and, no maximum occupancy signs in several restaurants, including the coffee shop near where the fire is believed to have started. Lovelace also slapped the hotel with a myriad of citations intended to require a significant upgrading of fire protection for cooking equipment.

In a follow-up letter to Ross on June 11, Lovelace declared that only minor violations had been corrected and that only "20% of the original discrepancies have been corrected." The remaining violations, however, "are life safety hazards and must be corrected as soon as possible," he said.

Interviewed recently about the violations, Lovelace said technicalities in the building code would have made it difficult to go to the mat with MGM and force the hotel to make corrections. Because the equipment was certified as proper when it was installed, Lovelace would have had to prove that it had been altered or modified subsequently. To prove that, he would have needed the original installation manuals for the equipment. But he could not obtain them from either the hotel or the manufacturers.

MGM did not buy his bluff. The equipment had not been upgraded by the time the fire broke out, although investigators have not linked faulty kitchen facilities with the blaze.



JOE KENNEDY / Los Angeles Times

Bradford M. Bowker, now retired, was chief on-site inspector during MGM Grand's construction.

Fire officials lament that, more often than not, citations recommending major safety revisions in existing facilities are brushed aside by managers who argue that their hotels fully complied with all code requirements when they were granted occupancy permits by the Building Department and allowed to open for business. Therefore, they should not be made to comply with new, tougher restrictions put into effect after the hotels opened, the managers argue.

The Fire Department has only minimal involvement in inspecting a building as it goes up. The brunt of that job falls to the Department of Building and Zoning, which was under the control of Pisciotta when the MGM Grand was built.

Most building inspectors in Clark County are hired on an ad hoc basis to work on a specific construction job. Though their paychecks come from the Building Department, the department is reimbursed by either the contractor or owner of the building being erected.

8 Inspectors Worked on Hotel

Such was the case on the MGM project, where eight inspectors worked at various times. The chief of the crew was Bradford M. Bowker, a retired Navy rear admiral. At 75 and retired two years from the inspecting business, he is still proud of the work he and the other inspectors did on the MGM Grand.

One of Bowker's subordinates, Jerry F. Hansen, an electrical inspector, said that as far as he could remember everything he checked during construction was up to code.

In fact, said Hansen, who left the department shortly after Pisciotta, the MGM Grand was "on a par" with other hotels built in that period.

Pisciotta, a native New Yorker, resigned in January.

1978, after eight years as building director. He left in the midst of a county grand jury investigation into alleged misconduct in the building and electrical inspections on two new hotels called the El Inca and the Mardi Gras. The grand jury probe was dropped not long after Pisciotta's resignation. That came only days after Clark County Manager Richard Bunker wrote the county counsel that Pisciotta's handling of the two hotel inspections was in itself "sufficient for his discharge."

Financial Role a Target

Documents obtained by The Times indicated that a key target of the grand jury probe was Pisciotta's financial interest and partnership role in companies developing the two casinos.

As Building Department chief, Pisciotta had overall responsibility for approving most phases of the construction process, including making certain all plans and revisions were up to code.

Pisciotta, 44, now a private contractor, refused to answer the questions of Times reporters, but he told the Las Vegas Sun shortly after the Nov. 21 fire that he believed the hotel was "one of the best (construction) jobs I've seen."

"I've got nothing to be ashamed of," he told the Sun. "I have nothing to hide. There was no problem at the MGM."

When he resigned his county post, he declared he had been hounded out of office "for nothing other than political reasons." Two weeks later, he invoked his Fifth Amendment protection against self-incrimination and refused to answer the grand jury's questions.

In the month since the MGM Grand fire, the hotel owner and others—contractors, subcontractors, county officials—have been named in a rash of suits filed on behalf of victims by some of the nation's best-known plaintiff lawyers. These include James L. Fetterly of Minneapolis, who has won several major fire catastrophe cases; Stanley Chesley of Cincinnati, who was a lead attorney in suits stemming from the Beverly Hills, Ky., supper club fire disaster, and Wendell H. Gauthier, a Louisiana lawyer who pressed cases stemming from a rash of grain elevator explosions.

Faced with the litigation, MGM officials told stockholders at the company's annual meeting last week that they would not discuss the "cause and spread of the fire."

But president Alvin Benedict said management "will leave no stone unturned" to reopen the hotel by midsummer. All subcontractors will be required to work on an "expedited schedule," including two 10-hour daily shifts, he said.

Every guest room will be equipped with sprinklers and fire and smoke detection systems. Benedict said in assuring stockholders that the reopened hotel "will be regarded as the safest, as well as the most beautiful resort hotel casino in the world. . . ."

A partial floor plan of the hotel traces spread of the fire from where it started (1) in the Deli, (2) initial path of flame upward toward Parisian Bar (3) where it caught a plastic awning on fire, (4) The fire then spread rapidly along ceiling of the casino, through ducts and pipes in attic area. Smoke moved into elevators and ventilation shafts (5), and into hotel above. Striping indicates areas with sprinklers.

BOB ALLEN / Los Angeles Times

9

9

HEALTH HAZARDS ASSOCIATED WITH THE USE OF PLASTIC PIPE

Interim Report

Prepared by the

Hazard Alert System

Epidemiologic Studies Laboratory

Department of Health Services

April 29, 19[illegible]

1. Summary of Major Findings

The Hazard Alert System of the Department of Health Services has conducted four related studies of possible hazards associated with plastic pipe work:

1) an evaluation of the available literature on the toxicity of the major solvents used by workers in joining plastic pipe;

2) an assessment of the risk posed by plastic pipe work on job sites;

3) a review of the existing epidemiolgical studies of pipefitters; and

4) an analysis of the acceptability and significance of a current UCLA health survey of pipefitters.

Solvents

The available literature indicates that the solvents used in fitting plastic pipe fall into three general categories:

I. those with relatively low human risk, that can be used safely in open or well-ventilated areas with minimal personal (eg. skin) protection;

II. those with moderate risk that may pose potential health problems; and

III. those with high risk that can cause skin damage, organ injury, and may may be associated with cancer or birth defects.

Methyl ethyl ketone (MEK) falls into the first category; tetrahydrofuran (THF) and cyclohexanone in the second; and dimethylformamide (DMF) the third.

Work Sites

Cal/OSHA investigations revealed excessive and near-limit inhalation exposures to MEK in some finishing operations with ABS pipe. Extensive dermal exposure to MEK-containing solvents was also observed, and considered a potentially serious problem since rapid skin absorption of MEK occurs.

Absorption through unprotected hands of THF, cyclohexanone and DMF is also clearly possible since manufacturers' brochures show PVC glues being handled without glove protection. Dermal exposure to these last two solvents in particular is considered a health risk since skin-absorbed cyclohexanone causes cataracts in susceptible animals, and DMF can cause liver damage to workers and birth defects in animals at relatively high doses. Finally, in the case of these studies, several samples of solvent cement were found to be inadequately labelled as to their actual contents.

Epidemiological Studies

A NIOSH-sponsored study measuring cancer mortality among a large number of plumbers and pipefitters has found a significant excess of cancer of the esophagus, lymphatic system, larynx and lung. Confirmation of a trend for excess diagnoses of cancer of the larynx was obtained in an independent study conducted among contemporary California pipefitters by the Department of Health Services' Resource for Cancer Epidemiology. However, adequate tests have not been performed to establish a link between these excessive cancer rates and occupational exposure to a specific causative agent or agents.

Health Survey

Preliminary data from a UCLA pipefitters' health survey indicates that workers report signs of pathology--particularly red or reddish-brown urine--in direct proportion to the number of years that they have worked with plastic pipe. Occurrence of a cluster of kidney disorders that may be related to these signs also appear to be associated with the length of plastic pipe exposure, although these self-reported findings require medical verification and a more appropriately designed study before the results can be considered definitive. Other reported symptoms, notably sinus, skin and

respiratory problems as well as possible excess rates of cataract formation and skin cancer have not yet been adequately evaluated.

In spite of methodological inadequacies, such data suggest the possibility of serious and previously unrecognized health effects among workers who install plastic pipe. Consequently, it is not clear that such pipe can be used safely under present conditions. Until the full extent of health risks posed by solvent or other plastic pipe-related exposure is resolved, HALTS proposes the following interim steps to minimize undue worker exposure:

1) the Commission should recommend limitations on the use of solvent-cemented pipe that must be installed under conditions of inadequate ventilation;

2) the Commission should consider issuing regulations that limit the use of cyclohexanone and DMF containing glues, so that single-solvent glues, particularly these that use MEK, are used preferentially to combination types; and

3) the Commission should take steps necessary to require manufacturer labeling so that products are accurately identified with regard to contents and the possible health hazards associated with their use.

Because of the risk of increasing exposures to products that may be responsible for adverse health effects among workers, HALTS recommends that no decision be made at the present time that would lead to the expanded use of plastic pipe.

STATE OF CALIFORNIA — EDMUND G. BROWN JR., Governor
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
525 GOLDEN GATE AVENUE
SAN FRANCISCO

ADDRESS REPLY TO
P.O. BOX 603
SAN FRANCISCO, CALIF. 94101

192-177-A

March 5, 1981

Date: 3/16/81

CC: Commissioners
Kerin
Reynaga
Smart
King
Johnson
Dryer
Nichols
Sung
File

Myron Moskovitz, Chairman
Commission on Housing and
Community Development
921 - 10th Street
Sacramento, CA 95814

Dear Mr. Moskovitz:

It has come to our attention through press clippings and announcements (attached), subsets of the DIR/DHS joint study on plastic pipe solvents are being taken out of context. It appears that the PPFA has inappropriately extracted parts of our overall study, developed misleading statements and made these available to the press.

The Department would like to re-emphasize the importance of the Commission and all interested parties to look at the evidence collected in total, as presented by the Cal/OSHA-DHS interim report presented to your Commission on May 1, 1980 and as presented at hearings by Dr. Marc Lappe. In that report we carefully identified what is known of the real and potential toxicity of these materials as well as the areas where we have inadequate information. One of the areas of greatest uncertainty is related to dermal absorption rates and resulting toxicity. As a follow-up to these issues, we are continuing our research in collaboration with the University of California Medical School at San Francisco. Results of these tests should add new evidence in these matters.

This Department will carefully monitor the utilization of information presented by all parties and will be prepared to make public comments as to the appropriate interpretation of our findings.

Sincerely,

RICHARD L. WADE, PH.D., M.P.H.
DEPUTY CHIEF FOR HEALTH

cc: Art Carter, Chief
Don Vial, Director

S 677

Plastic Pipemen Hail Results Of Cal Fume Tests

SAN FRANCISCO — Workplace exposure to the possibly harmful cements used in conjunction with plastic pipe — even under "worst case" conditions — has been found to be well within California's "permissible exposure" levels, declares the Plastic Pipe & Fittings Assn.

PPFA says that a special study was conducted by the Cal OSHA Health Targeting Unit and the California Dept. of Health Services. That study, declares PPFA, found that the exposure of plumbers to both fumes and contact with the cement itself appeared to be minimal.

State technicians conducted their measurements in Los Angeles on July 28 and 29, days chosen because of unusually "poor" weather condi-

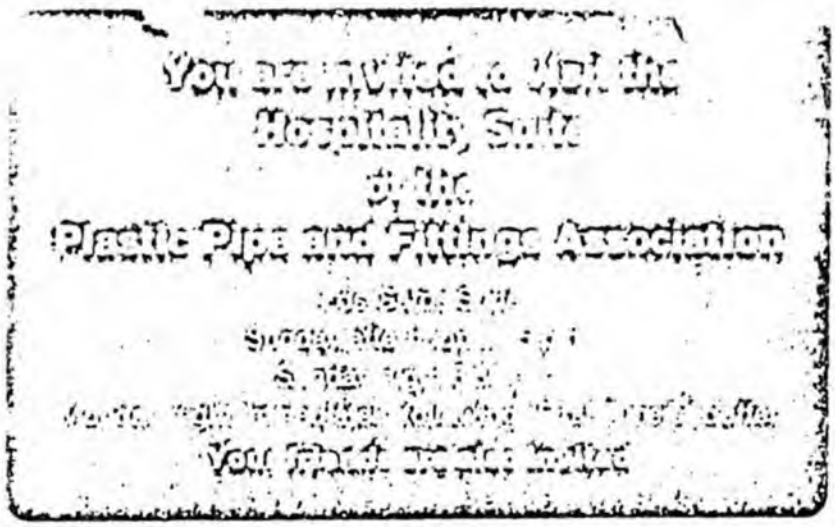
(Cont. Page 4, Col. 5)

tions.

On those days a high pressure system centered itself over Los Angeles giving rise to an average high temperature of 102 degrees accompanied by air quality poor enough to qualify for issuance of a Stage-Two smog alert.

Three different work sites were monitored, each involving workmen pent in, to some degree, with cement fumes. In all cases, according to the report, "inhalation exposure measured was not in excess of Cal/OSHA standards." Dermal exposure was said to be present but difficult to measure while ingestion was found to be "remote."

The "worst case" measurements, argues PPFA, support its contention that solvent cements used to join plastic plumbing elements pose little hazard when properly used. And, in fact, they may constitute less of a threat to plumber health than the smoke and fumes that attend the older methods of joining metal plumbing, adds PPFA.



Some of the many benefits of using plastic pipe and fittings:

Corrosion Resistant: Plastic piping is prescribed in many areas of the country because of its high resistance to aggressive water and soils.

Energy Savings: In 1977, 56 million barrels of oil were saved because of the use of plastic pipe instead of other materials. Additionally, in hot water distribution systems, plastic piping serves as an insulator to reduce heat loss.

Cost Savings: $200 to $1500 can be saved per dwelling, according to the California Housing and Community Development Commission staff, by using plastic pipe and fittings in residential and apartment construction. Comparable savings can be realized for commercial and institutional construction.

Proven Performance: Plastic DWV has been used for 25 years with excellent field performance. Plastic water piping has been used for over 15 years with similar results. Both systems are covered by ASTM specifications and are tested against those standards by a certification program.

What About Solvent Leaching?

Data in a draft report prepared by James M. Montgomery Consulting Engineers for the Department of Health Services show that plastic pipe provides safe transport of potable water. Plastic potable water piping can aid communities in meeting stringent EPA regulations for drinking water.

Fire Problems?

"Use of plastic pipe in non-fire-rated construction, whether in residential, commercial, or industrial occupancies, does *not* present an unusual fire risk," according to the California State Fire Marshall's Office.

Workplace Exposure?

Current "worst-case" studies show no excessive exposure to workers.

Want to Know the Facts?

Stop by the Los Gatos Suite, (600 Building, 3rd floor) Sunday afternoon (3-5 p.m.) or Sunday or Monday night. We look forward to seeing you there.

PPFA

999 N. Main Street
Glen Ellyn, IL 60137
Area Code 312/858-6540

Department of Health Services
Los Angeles County - University of Southern California
Medical Center

BERNARD M. ARIEVALO
Executive Director

SOL BERNSTEIN, M.D.
Medical Director

JOYCE D. O'CONNOR, R.N.
Director, Nursing Services
and Education

Affiliated with
UNIVERSITY OF
SOUTHERN CALIFORNIA

SCHOOL OF MEDICINE
SCHOOL OF DENTISTRY
SCHOOL OF PHARMACY

October 3, 1980

To Whom It May Concern:

I am currently an Assistant Professor of Medicine at Los Angeles County-University of Southern California Medical Center, and am in charge of the Adult Clinical Lymphoma-Leukemia Program at this Institution. In that capacity, I was contacted by Dr. Brian Dolan regarding several cases of lymphoma occurring in patients who have been employed as plumbers in the past.

I have had the opportunity to review the material on five of the patients with whom Dr. Dolan is working. Interestingly, all five patients are confirmed as having malignant lymphoma. Moreover, all patients at this time have the same pathologic type, which is termed small cleaved follicular center cell lymphoma (Lukes-Collins), or poorly differentiated lymphocytic lymphoma (Rappaport). It is noteworthy to me that all five of these patients with documented diagnoses of lymphoma have had quite extensive exposure to plastic materials which were used during the course of their work.

We are currently involved in a large study during which we will obtain all of the pathologic material from all of the patients involved. This material will be reviewed closely by myself, as well as Dr. Lukes and the Hematopathology section at Los Angeles County-USC Medical Center. Our clinical information will also be collected and collated. It is my opinion at this time, that a further study into this problem is warranted, since lymphoma in general is quite infrequent in the population, and since rather significant numbers of patients in this very preliminary study have already been confirmed as truly having malignant lymphoma.

If you have further questions, or require further information, please do not hesitate to call upon me.

Sincerely,

Alexandra Levine

Alexandra M. Levine, M.D.
Assistant Professor of Medicine
Director, Adult Hematologic Neoplasia Service
Lymphoma-Leukemia Program

AML:ras

IMPURITIES DETECTED IN ABS, PVC, AND CPVC PLASTIC PIPE

SAMPLE IDENTIFICATION	COMPOUNDS FOUND
Acrylonitrile-butadiene-styrene (ABS)	
Gable Plastics Spartan Plastics	dichloromethane acrilonitrile methyl cyclopropane benzene tetrachloroethene toluene 4-ethenyl cyclohexene ethyl benzene methylethyl benzene hexane styrene propyl benzene 1-methylethenyl benzene unsaturated alkanes 2,6-bis(1,1-dimethylethyl) -4-methyl phenol heptyl phenol unknown (several)
Polyvinyl Chloride (PVC)	
Pacific Western Extruded Plastics Co.	dichloromethane bromochloromethane trichloroethene toluene bis 2-ethylhexyl phthalate DEHP unknown (many)
Chlorinated Polyvinyl Chloride (CPVC)	
GSR	dichloromethane chloroform hexane tetrachloroethene toluene pentachloroethane hexachloroethane bis 2-ethylhexyl phthalate DEHP alkanes (several) unknown (several)

Source: California Analytical Laboratories, Inc. 11/12/80.

DEPARTMENT OF Consumer Affairs

CONSUMER ADVISORY COUNCIL
1020 N STREET, SACRAMENTO, CALIFORNIA 95814
PHONE: (916) 322-0548

February 11, 1980

Mr. Myron Moskovitz, Chairman
Commission on Housing and
Community Development
921 Tenth Street
Sacramento, CA 95814

Dear Chairman Moskovitz:

The attached resolution by the Consumer Advisory Council is an expression of our concern associated with unlimited use of PVC pipes and the potential threat this brings to the health and safety of California Consumers.

The Council is a 7-member body appointed by the Governor mandated to make recommendations in the consumer interest. It is the Council's contention that further testing of PVC pipes and the solvents used to join them is warranted. It is in the consumers interest that all feasible avenues of investigation be explored into potential health hazards associated with these products carrying drinking water before regulations for their use are promulgated.

We ask that the attached resolution be formally entered into the record and that all haste be taken on the part of the Commission on Housing and Community Development to join the Consumer Advisory Council in holding hearings to solicit input from consumers as to their views in this issue. Thank you for your attention in this matter.

Sincerely,

Lynn Morris

LYNN MORRIS
Executive Secretary

cc: Donald Turner, Director, Commission on Housing and Community Development
Assemblyman Louis Papan
Alice Lytle, Secretary, State & Consumer Services Agency
Alan Stein, Secretary, Business & Professions Agency
Richard B. Spohn, Director, Department of Consumer Affairs
Ron Gordon, Chief, Division of Consumer Services, DCA
Joanne McNabb, Consumer Liaison Officer, DCA

SIERRA CLUB

530 Bush Street San Francisco, California 94108 (415) 981-8634

November 21, 1980

Myron Moskovitz, Chairman
Commission on Housing and Community Development
921 Tenth Street
Sacramento, CA 95814

Dear Chairman Moskovitz:

The Sierra Club has had an opportunity to review the recent report from the California Department of Health Services on the use of plastic pipe in potable water systems.

According to the underlying data in that report, toxic chemicals on the Environmental Protection Agency list of priority pollutants appear in water contained in plastic pipe. I am referring in particular to chloroform, carbon tetrachloride and tetrachloroethene. Additionally, a common plasticizer, DEHP, which is now thought to be carcinogenic, appears in water transmitted by plastic pipe. For the protection of human health, it is critically important to remove these substances from drinking water. Undertaking an activity which apparently would add these toxic pollutants to drinking water requires careful and complete environmental justification.

The Sierra Club believes that the material presented to the Commission in the report from the Department of Health Services more than adequately discloses the existence of potential human health hazards and adverse environmental impacts so that an environmental impact report must be prepared.

According to the water quality criteria promulgated by the Environmental Protection Agency under Section 304(a) of the Clean Water Act, extremely minute quantities of these substances can have serious toxic effects on a chronic basis. Given the toxicity of these substances and the difficulty of removing plastic pipe once installed, the Commission is contemplating action which could have a significant and virtually irreversible effect on the environment. Even if the law did not require it, wisdom surely dictates that a full and complete environmental evaluation be made in advance of such a decision.

Very truly yours,

Carl Pope

Carl Pope
Director of California Affairs

cc: Members of the Commission
Tom Johnson

DEPARTMENT OF Consumer Affairs

CONSUMER ADVISORY COUNCIL
1020 N STREET, SACRAMENTO, CALIFORNIA 95814

WHEREAS the Consumer Advisory Council is mandated by law to study, promote and protect the interests of consumers,

WHEREAS the Consumer Advisory Council is sensitive to the possibility that some products may represent a serious health threat to consumers,

WHEREAS at least one of the principal elements of plastic water pipe and its glues is identified as a human carcinogen by the Occupational Carcinogens Control Act of 1976, Health and Safety Code Section 24200, et seq.

WHEREAS the Department of Health Services has adopted the position that it cannot support the use of PVC pipe until it is shown that solvents used to join PVC pipes do not enter drinking water in amounts significant to health, and

WHEREAS the Commission on Housing and Community Development has pending before it a proposal permitting the unlimited use of plastic pipe in California construction,

BE IT HEREBY RESOLVED that the Consumer Advisory Council :

(1) endorses the passage of ACR 98 (Papan) in order to permit knowledgeable health experts to study potential health risks arising from plastic pipe before its unrestricted use in consumer water systems is approved.

(2) urges the Commission of Housing and Community Development to forego acting on the plastic pipe proposal before it has exhausted all reasonable avenues of medical investigation into potential health threats arising from the unrestricted use of plastic pipe, and

(3) requests the Commission on Housing and Community Development to join with the Consumer Advisory Council in the holding of public hearing to actively solicit the input of consumers as to ther views concerning the wisdom of now permitting the unrestricted use of plastic pipe.

ADOPTED: February 8, 1980
San Diego, CA

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JOEL R REYNOLDS

November 21, 1980

California Commission on
Housing and Community
Development
921 Tenth Street
Sacramento, CA 95814

Dear Chairman Moscovitz and Members of the Commission:

The Center for Law in the Public Interest urges this Commission not to adopt regulations approving the use of plastic pipe in potable water systems in residential, commercial, and business structures in California without prior preparation of a full environmental impact report ("EIR") as required by the California Environmental Quality Act. (Cal. Pub. Res. Code §§ 21000 et seq., "CEQA.")

CEQA requires that a public agency, before undertaking any discretionary project which is not categorically exempt from CEQA, must conduct an "initial study" to determine whether the proposed project "may have a significant effect on the environment." (Pub. Res. Code § 21083; 14 Cal. Admin. Code § 15080.) In carrying out the "initial study," the public agency must exercise "careful judgment . . . based to the extent possible on scientific and factual data." (14 Cal. Admin. Code § 15081(a).) The agency must consider "both primary or direct and secondary or indirect consequences" of the project. (14 Cal. Admin. Code § 15081.)

Only if, as a result of the "initial study," the agency determines that a project clearly "will not have a significant effect on the environment," that "no significant environmental effects would occur" as a result of the project, should the agency prepare a "negative declaration" instead of an EIR. (14 Cal. Admin. Code §§ 15080, 15083.) "[W]henever it can be fairly argued on the basis of substantial evidence that the

project may have a significant effect on the environment," or "there is serious public controversy concerning the environmental effects of a project," an EIR must be prepared. (14 Cal. Admin. Code § 15084.) Examples of effects which would be considered "significant effects on the environment" include where a project would (a) substantially degrade water quality; (b) contaminate a public water supply; (c) create a public health hazard or a potential public health hazard. (14 Cal. Admin. Code §§ 15000 et seq., Appendix G.)

The EIR is the "heart" of CEQA because it ensures that relevant environmental data are considered by the agency prior to its decision to approve the project, before the environmental changes have reached "ecological points of no return." (County of Inyo v. Yorty, 32 Cal.App.3d 795, 810 (1973); No Oil, Inc. v. City of Los Angeles, 13 Cal.3d 68, 84 (1975).) In light of CEQA's legislative intent "to afford the fullest possible protection to the environment" (Friends of Mammoth v. Bd. of Supervisors, 8 Cal.3d 247, 259 (1972)), the California Supreme Court has interpreted Pub. Res. Code § 21151 as imposing a "low threshold requirement for preparation of an EIR." (No Oil, Inc. v. City of Los Angeles, supra at 84.)

A substantial body of scientific evidence has been developed since the Commission first prepared a negative declaration in February, 1978, on the use of plastic pipes. Studies have been done both on the health effects of installation of plastic pipe on the workers who install it, as well as on the health effects on the public caused by the leaching of plastics and solvents into the water system. 1/

1/ See, e.g., three reports prepared on the potential health hazards of use of polyvinyl chloride plastic pipe systems (CPVC and PVC pipe) by the State's Hazard Evaluation System (Feb. 14, 1980; Apr. 29, 1980; and Oct. 17, 1980); May 1980 Fire Marshal report on potential flammability of plastic pipe and fire hazards associated with its use; Preliminary Survey of Chemical Composition, Contamination and Associated Health Hazard of Plastic Pipe for Potable Water Supply, Thomas Reid Associates (Nov. 14, 1980); Plastic Pipes Study, James Montgomery Consulting Engineers, Inc. (Aug. 1980).

Together, the findings of these reports far exceed the "low threshold" for preparation of an EIR. These reports show, at the very least, that there exists "serious public controversy" concerning the health effects of the use of plastic pipe, and, at most, that very serious harmful effects to human health and the environment will result from the unrestricted use of plastic pipe in California. Therefore, the Commission must prepare an EIR on the potential health and environmental effects of unrestricted use of PVC, CPVC, ABS and polybutylene pipe in California before approving such use of plastic pipe.

Respectfully,

Alletta d'A. Belin

Ad'AB:pmk

women for:

continuing volunteer support and action for issues, candidates and legislation of our choice on local, state and national levels

October 20, 1980

Mr. Myron Moskovitz, Chairman
Commission on Housing and Community Development
921 Tenth Street
Sacramento, California 95814

Dear Mr. Moskovitz:

WOMEN FOR:, an organization of over 2,000 people, opposes the unrestricted use of plastic pipe in residential dwellings in California until their use is scientifically proven to be safe.

We are concerned by the results of research at UCLA School of Public Health and by Montgomery testing laboratories which indicate that solvents and glues used to connect pipe do pose a possible health hazard.

At this time in history when cancer incidence is increasing, when we know that a mojority of cancers are caused by exposure to toxins, when the public is already exposed to toxins in food additives, pesticide residue on food, and in our air and water, we can ill afford another possible source of such exposure to be sanctioned by government.

We are an organization of women, most of whom are mothers and so have a special concern for children. Children, especially infants, are more susceptible to the effects of carcinogens than are adults. When you analyze the date on the amounts of solvent that leach into water, please note if the effects on infants and children have been considered.

Please give this entire matter your most thoughtful and cautious consideration. The health and welfare of the citizens of California are at stake.

Sincerely,

Georgia Mercer

Georgia Mercer
Coordinator

8913 West Olympic Boulevard • Beverly Hills • California 90211 • 213 / 657 7411

COORDINATOR Georgia Mercer • ASSISTANT COORDINATORS Marilyn Kizziar • Collette North • TREASURER Edith Schwartz • ASSISTANT TREASURER Ann Kotin • RECORDING SECRETARY Gita Hamm • SPECIAL ADVISOR Sylvia Braverman • SPECIAL PROJECTS MEMBERSHIP Rosalind Anderson • FINANCIAL CONSULTANT Betty Lessing • STEERING COMMITTEE Mary Anton • Vibeke Aineer • Betty Andersen • Jill Balan • Nettie Bann • Edythe Berman • Muriel Blandford • Geri Brandon • Pauline Bro... • Cooperman • Norma Cranston • Fran Diamond • Nora Ehrlich • Rose Marie Epstein • Katie Fine • Magelyn Gerberich • Laura Lee Gould • Nadie Gordon • Dorothy Green • Faye Haley • Billie Heller • Marian Heller • Marcia Herman • Rose Hirsch • Terry Hoffman • Grace Jacobs • Phyllis Kahan • Irene Kleinberg • Lucy Lasher • Charlotte Lesan • Edith Longbrake • Sheila Mann • Ida Mathes • Dodo Meyer • Sarah Moskowitz • Rose Mary Nastasia • Adele Oldfort • Nancy Pomerantz • Jo Robinson • Rose Rosenberg • May Rosenblum • Peggy Saferstein • Carole Schaffer • Beatrice Shaeffer • Jean Siegel • Gloria Starr • Jean Stratton • Jean Troxell • Winkie • Miriam West • Joan Zuckert • SUPPORTING COUNCIL Rose Wolfe Gilbert • Toni Haas • Marilyn Hoffman • Judy Kahn • Beulah Kotin • Bessie Seligman • Ann Shaw

Cc: 10/23 Myron, JACK. (CA) 1/45

(FINAL REPORT ON POTENTIAL HEALTH HAZARDS ASSOCIATED WITH THE USE OF PLASTIC PIPE IN POTABLE WATER SYSTEMS. CALIFORNIA DEPARTMENT OF HEALTH SERVICES, OCTOBER 17, 1980.)

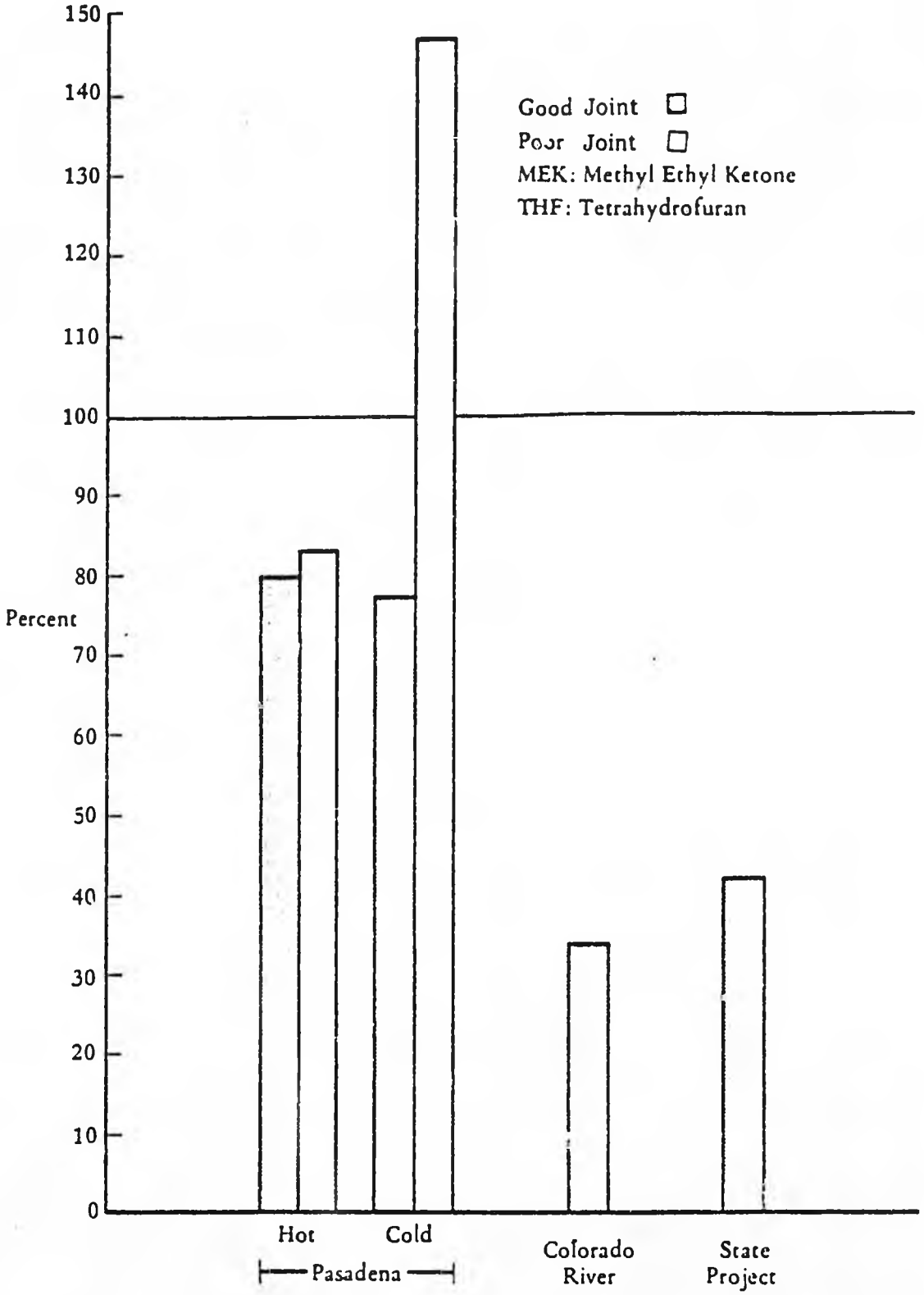
V. DISCUSSION AND CONCLUSIONS

With the possible exception of the leaching of the phthalates, the principal public health finding of this study is the possibility of excessive amounts of solvents and carbon tetracholoride, chloroform and tetrachlorethene accumulating during the stagnant period between initial installation of plastic pipe and occupation of the dwelling. On two occasions, solvents were found in excess of the proscribed amount for short-term

* Data from the National Toxicology Center released on 10-15-80 (after this report was written) establish that the Bis compound (DEHP) is carcinogenic in rats and mice (see Appendix XI for calculations relative to human health consequences).

Chart 3

SOLVENT CONCENTRATIONS IN WATER FROM STATIC TEST SYSTEMS
MEF, THF, and Cyclohexanone Combined for Additive Toxicity,
Expressed as Percent of Proposed Combined STMAC



maximum exposures. As shown on Graph 1, both THF and DMF exceeded the short-term maximum acceptable concentrations suggested by the Hazard Evaluation System. While this finding was present only for poorly jointed pipes (THF) and one outdoor system using Colorado water (DMF), the likelihood exists that the combined toxicity of the potentially neurotoxic solvents could exceed the limits suggested by HES. As shown on Chart 3, (p. 31) the combined concentrations of the major solvents come to within 75 and 80 percent of the suggested STMAC. Assuming a combined fitting density and sampling error of ±50, percent these values might actually be above the suggested STMAC.

The extent of the hazard posed by solvent contaminants may acutally be underestimated by these figures. Calculations for a "worst case" scenario (see Appendix IV) demonstrate the highest likely doses of solvent that might be ingested from stagnant water in newly-plumbed houses. In the "worst case" (ingestion of powdered infant formula prepared with tap water) the suggested STMACs are greatly exceeded by measured values—as much as 20-foid in the case of THF from CPVC pipe with poor joints using cold Pasadena water (see Table 3-2, p. 93). The highest level of DMF (PVC pipe, good joints, Colorado River water), 4.3 mg/L, also exceeds the "worst case" suggested STMAC of 0.2 mg/L by 21-fold, suggesting a substantial potential hazard for infants in newly-plumbed unflushed homes.*

We have reached the following conclusions about solvent toxicity:

1) Within 1-2 days of installation of PVC or CPVC and for up to at least 2 weeks following, a high probability exists for one or more solvents (depending on the primer/solvent cement used) to reach levels in water that might result in adverse health effects when ingested;

* Unpublished data furnished to HES by the Pipe Trades Council regarding freshly installed CPVC pipe at a new hospital in Sacramento (Comm. from California Analytical Laboratory to Ray Leonardini, June 10, 1980) provides further confirmation that stagnant water in freshly installed pipe can exceed the suggested STMACs. These data are presented in Appendix VIII, Table 1 to demonstrate the real-world possibility of the solvent build-up and depletion we have described in laboratory simulations. Since they were not gatnered under our supervision they are not presented along with the results we have verified; nor are they taken as evidence of the prevalence of excessive leaching since the conditions under which the samples were taken remain unknown and simultaneous controls were not included in the determination.

2) If adequate flushing of the piping system is performed, substantial re-accumulation of solvent concentrations to potentially toxic levels is unlikely; and

3) Normal water usage is likely to prevent the build-up of toxic levels of any of the major solvents.

The remaining question concerning the solvent contaminants is whether or not consumers are likely to drink water that has been standing in freshly installed pipe. The answer hinges in part on the pre-occupancy activities at a housing site that are likely to tap or bleed water for construction or testing purposes and thus flush the system of rapidly-leached solvents. A substantial amount of water is flushed through new structures by plumbing inspection procedures (Comm. from Norman J. Latter, Director of Standards for the International Association of Plumbing and Mechanical Officials to Mr. Jim Blumenkranz, September 10, 1980). Mr. Latter estimated that each plumbing fixture is filled and drained at least twice during an inspection. As a result, substantially more water (in the order of 200 gallons or so) than was flushed in our laboratory simulation systems may be expected to be flushed through the plumbing systems of an average residential houshold before occupancy (based on a toilet capacity of at least five gallons, and shallow fills of ancillary systems such as bath tubs, sinks, etc.) Additional water is also used during construction for washing up, preparing cement on site, and other activities, though only a single outlet might be turned on, leaving stagnant water in other parts of the system. Various sources estimate the amount of water used in these procedures as 900-1,000 gallons. (A copy of one such communication is attached as Appendix VIa). Nevertheless, we believe that a potential hazard to on-site workers and new occupants remains in any newly constructed dwelling because of variations in "standard" procedures and job-site activities that might otherwise flush the system adequately.

Lastly, we must address the potential problem of compounds that may leach more slowly from the plastic pipe material itself. Two such compounds were detected in the course of this analysis, dibutyl phthalate and bis-(2-ethyl hexyl) phthalate. Unlike the major ingredients of solvent cements, these substances appear to migrate more

slowly into water after days or weeks of pipe use, and to be independent of whether the initial joint was "good" or "bad". Specifically, as shown in Chart 2 (p. 30) and Montgomery Tables 3-8 through 3-12, a general trend is evident for the increased appearance of these compounds with time, whereas the solvent concentrations tend to diminish with time.

The full extent of the possible health effects of these two compounds is undetermined. A summary of the available literature study is included as Appendix VII. This initial review suggests that little human health hazard is posed by the compounds at the levels we have measured. Accumulations 2-3 times above those detected in our model systems might pose a hazard, since adverse reproductive effects and cancer have been reported at high doses (see Appendix VII and X). Since our simulation study showed little or no phthalates after 30 days of "normal" use, we are fairly confident that they are not a source of concern under normal use conditions. Since these relatively insoluble compounds appear to migrate from the pipe itself it is possible that appreciable build-ups could occur if the plumbing systems were left stagnant for a protracted period. This possibility indicates the need for formal notice to a home owner to take minimal precautions on re-entering a house in which the plumbing system has been out of use for a prolonged period.

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY EDMUND G. BROWN JR., Gover

DEPARTMENT OF HEALTH SERVICES / DEPARTMENT OF INDUSTRIAL RELATIONS
2151 BERKELEY WAY
BERKELEY, CA 94704
(415) 540-2115

February 2, 1981

Patrick J. Higgins
Technical Director
National Association of
Plumbing, Heating, Cooling Contractors
1016 20th Street, N.W.
Washington, DC 20036

Dear Mr. Higgins:

Thank you for your letter of January 19 inviting me to clarify the record on plastic pipe evaluations performed by this office and subsequent policy statements released by the Department of Health. Taking your attachments in order, I have the following comments:

a. Purported Chapter 3, RESULTS section of the Montgomery Report
This section is actually the findings of the preliminary Montgomery report As stated in the first line, it includes only tables 3-1 through 3-16, in fact there were 19 tables in the final report. Table 19 in particular, contained the highest readings on chemicals of concern to us, and substantially changed our analysis of the final results. (Table 19 attached for comparison).

b. Toxicological Analysis
This analysis was presented to us as an unsigned and unreferenced memo from John Stohlton at the end of September before the final Montgomery data were available for review. It is flawed, incomplete and does not reflect accurately our own interpretation of the findings, even from the preliminary material we had for review. Specifically, we found that solvent levels did exceed recommended values for some of the static tests (refer to our report of October 17, 1980). This analysis and the accompanying "RESULTS" section severely distort the actual findings of the report.

c. Summary Analysis of Final Report by HESIS
This analysis reflects the opinion of an unidentified industry group of toxicologists concerning our interpretations of the same data. We would have much preferred an independent analysis of the data itself. As it is, this so-called summary analysis contains both comment and recapitulation of selected aspects of our report. It is not an accurate description of our findings. We expressed considerable concern about the finding of excess levels of chloroform and carbon tetrachloride (data presented in Appendix 11 of our report). Specifically, we stated (p. 37 that "The significance of these recommendations is underscored by the discovery of excessive amounts of volatile organics in pipes..." Additionally, as you can see from page ii of our executive summary, section B. Consumer Health, we reached totally different conclusions regarding potential risks than did this review committee; we were clearly convinced that the risks were real and needed to be abated. We also resolved the issue of phthalates by repeat testing and concluded that the evidence pointed to the pipes or a combination of pipes and solvents as the source of DEHP and not laboratory artifact.

d. News Release of October,8, 1980

This release is factually in error and seriously misleading regarding our findings: we did not find that "in all cases the levels of solvent were well below the 'Suggested No Adverse Response Levels'..."; quite the contrary, the excesses we did find were taken as indicative of the need to require further flushing to reduce the levels to our proposed limits. Moreover, by mixing the Task Force findings with our own, the news release leaves the possible impression that we are the "task force" in question, when in fact they are an industry group whose findings differ significantly from our own.

Lastly, the executive summary that you sent to me is indeed the summary that is in the final report and reflects the conclusions of the Department of Health Services as a whole. Perhaps you could allude to this summary and the present letter as a way of setting the record straight. I strongly believe that it needs this type of action, and leave it to your obvious concern for objectivity and the truth to determine its exact content.

Sincerely,

Marc Lappé

Marc Lappe, Ph.D.
Chief
Hazard Evaluation System &
Information Service

ATTACHMENTS

cc: Ephraim Kahn, M.D., Chief
Epidemiological Studies Section

Kathleen Acree, M.D., Chief
Preventive Medical Services Branch

NATIONAL ASSOCIATION OF PLUMBING • HEATING • COOLING CONTRACTORS

1016 20th STREET, N.W., WASHINGTON, D.C. 20036 • (202) 331-7875

January 19, 1981

Dr. Marc Lappe
Chief of Hazard Evaluation
System and Information Service
Department of Health Service Department
of Industrial Relations California
2151 Berkeley Way
Berkeley, California 94704

Dear Dr. Lappe:

With regard to the issue of the use of plastic pipe in potable water systems, I would like to reiterate the concern of our association in the presentation of the facts issued by your department as to the dangers of solvent cements in plastic piping systems for potable water use. As I stated in our telephone conservation, there was a press release issued by the Plastic Pipe Fittings Association which stated entitled "Plastic Solvents Passed Health Tests". Our association printed this press release which prompted one of our local associations to complain as to the reliability of the report data. Further investigation into the article prompted us to contact your office at the request of Chuck Lott, Executive Director of our Oregon state association. We also contacted the source of the press release, the Plastic Pipe and Fittings Association of Glen Ellyn Illinois to receive additional information relative to their analysis of your toxicological report.

The following materials have been forwarded to our offices from PPFA regarding the total issue of the safety of plastic pipe potable water systems. The first item identified by the letter "A" at the top of the report, apparently is a chemical analysis of the analytical tests conducted by Montgomery Laboratories. As item A appears incomplete and the necessary tables for item A are not attached, therefore, we cannot draw any conclusions or derive any information from this material. Item "B", appears to be a toxicological analysis of the Montgomery report. This analysis was prepared by a toxicological task force representing the Plastic Pipe and Fittings Association. The PPFA representatives apparently analyzed the Montgomery findings and generated their own conclusions. Item "C" is a summary analysis also prepared by the PPFA toxicological task force reflecting their conclusions of your report entitled the "Final Report on the Potential Health Hazards Associated with the Use of Plastic Pipe in Potable Water Systems". This task force's conclusions relative to your report are issued in item C. It is interesting to note how your report is reworded or interpreted to mean something rather different from what was generated by your organization.

Finally, in item "D", we see the press release circulated to the industry relative to plastic pipe solvents entitled, "Plastic Pipe Solvents Pass Health Tests". It was from this press release that we received so many controversial letters.

You will note sequentially that items "A" and "B" were first to be released in September of 1980, item "D" apparently was generated from items "A" and "B" and released on October 8th of 1980. Item "C" was generated in November of 1980.

We are very concerned to hear your comments relative to items "B", "C", and "D". From your conversation, you appear to be rather distressed at the possibility of misrepresentation of information by PPFA. It is our prime concern to set the record straight, therefore, we would appreciate your comments on items "B", "C" and "D". If such findings are a misrepresentation of the facts, we would like to publish your comments in our monthly newsletter to "right the wrong". We appreciate any and all additional background information so that we can produce a factual report which relates the truth of the matter.

We thank you for your concern about and prompt attention of our requests and we look forward to working with you and your organization in the resolution of this issue.

Best personal regards,

Patrick J. Higgins

Patrick J. Higgins
Technical Director

Enclosures

cc: A. T. Strother
Don Paull
Con Mahoney
Stuart Minor
The NAPHCC Technical Committee

PJH:jsj
T81005

TABLE 3-19

VOLATILE HALOGENATED COMPOUNDS IN TWO WEEKS STATIC SAMPLES

CONCENTRATION (µg/l)

System/Joint/Water	Chloroform	Dichlorobromomethane	Dibromochloromethane	Bromoform	Carbon Tetrachloride	Tetrachloroethene	Trichloroethene
CPVC/Good/Hot Pasadena	92	3,0	2.4	0.7	32	9.7	0.7
CPVC/Poor/Hot Pasadena	69	3.3	3.0	1.3	21	5.4	0.3
CPVC/Good/Cold Pasadena	78	3.5	2.9	0.9	32	7.6	0.7
CPVC/Poor/Cold Pasadena	146	3.3	2.6	0.8	50	7.5	0.7
PVC/Good/State Project	3.1	0.2	0.1	ND	0.4	0.1	4.0
PVC/Good/Colorado River	25	12	11	2.4	0.5	0.1	1.1

STATE OF CALIFORNIA - STATE AND CONSUMER SERVICES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF
Consumer Affairs
(916) 445-4465
1020 N STREET, SACRAMENTO, CALIFORNIA 95814

November 21, 1980

Myron Moskovitz
Chairman
Commission on Housing
and Community Development
921 Tenth Street
Sacramento, California 95814

Dear Chairman Moskovitz:

I am writing to urge the Housing and Community Development Commission not to authorize the expanded use of any kind of plastic pipe at your meeting next Monday, but rather to prepare an Environmental Impact Report before deciding whether or not to approve the use of the pipe for residential drinking water.

The Department of Health Services report, which has been available for analysis for only a few weeks, provides clear evidence of health hazards: toxic and carcinogenic chemicals were found at dangerous levels in water in plastic pipes. Furthermore, the report provides no statistically significant evidence that its proposed flushing procedure would reduce the levels of toxic contaminents in water in plastic pipes.

Of far greater import, however, is new information from the federal Environmental Protection Agency (EPA) which establishes a very high level of cancer potential in three carcinogens found in water in plastic pipes. After finding that no amount of these chemicals (chloroform, carbon tetrachloride, and tetrachloroethylene) is safe for humans to drink, the EPA has recently established final impact measurements for use in establishing standards for water quality. The EPA levels will be published in the Federal Register next week.

The average amounts of these carcinogens reported by Health Services as present in water in two kinds of plastic pipe are 433 times greater than the EPA level for chloroform, 85 times greater for carbon tetrachloride, and 9 times greater for tetrachloroethylene. Based on these figures, we can expect at least 1,476 new cancer cases in California in the next five years caused by these three carcinogens alone, if all new homes and mobile homes contain the kind of pipe in the Health Services study. This is of course a very conservative estimate, since it does not take into account the cumulative effects of these substances when combined as they are in pipes with other chemicals.

We do not yet have complete or totally conclusive date on the health

hazards of using plastic pipe for domestic water supply. The study analyzed in the Health Services report is limited to only two kinds of plastic pipe and has statistical features that make analysis of the significance of its findings difficult. Furthermore, there is no scientific information on polybutylene pipe and available information on Acrylonitrile-Butadiene-Styrene (ABS) pipe suggests that it is unsuitable for potable water in any circumstances.

As Director of Consumer Affairs, I share the Housing Commission's concern for meeting the need for affordable housing in California. It is the responsibility of government agencies like the Commission to encourage technological developments and other means of alleviating the housing crisis. Government must not, however, put aside its responsibility to protect the public health and safety. In light of the new information before us, it would clearly be unwise to decide now to expose Californians in their own homes to what may be an extremely serious health hazard. The best means for providing the Commission with the further information necessary to make a responsible policy decision is an Environmental Impact Report. My legal staff advises me that the California Environmental Quality Act requires an EIR in this instance. Preparing an EIR now, before plastic pipe is put to this new use, would be far less costly and cumbersome than having to remove the pipes after they are installed in homes.

I urge your caution and prudence in this matter.

Sincerely,

RICHARD B. SPOHN
Director

RBS:jmc

cc: Commissioners
I. Donald Terner

PAUL A. TAYLOR, PhD
PRESIDENT

CHARLES J. SODERQUIST, PhD
VICE PRESIDENT

ROBERT J. WORTH
VICE PRESIDENT

BOBBY A. DENNIS
SECRETARY/TREASURER

California Analytical Laboratories, Inc.

401 NORTH 16th STREET
SACRAMENTO, CALIFORNIA 95814
(916) 444-9602

December 31, 1980
Lab No. 12343
Received: 11/17/80

Mr. Raymond Leonardini
Attorney at Law
717 "K" St., Suite 510
Sacramento, CA 95814

Dear Mr. Leonardini:

Attached are the results of our GC/MS analysis of two polybutylene pipe samples received at CAL from a representative of the City of Sacramento Public Works Department and logged under CAL I.D. 12343.

The method of sample preparation and the GC/MS techniques were essentially the same as those employed for the previous analyses of PVC, ABS and CPVC pipe (refer to CAL report of 12 November, 1980, CAL I.D. 12295 and 12298).

Over fifteen components were identified and their levels in the pipe samples estimated. It must be emphasized that the levels are rough estimates only.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Charles J. Soderquist, PhD
Vice President
Agricultural and Environmental Chemist

CJS/slh

PAUL A. TAYLOR, PhD
PRESIDENT

CHARLES J. SODERQUIST, PhD
VICE PRESIDENT

ANTHONY L. WONG, PhD
VICE PRESIDENT

ROBY A. ULRICH
SECRETARY/TREASURER

California Analytical Laboratories, Inc.

401 NORTH 16th STREET
SACRAMENTO CALIFORNIA 95814
(916) 444-9602

December 31, 1980
Lab No. 12345
Received: 11/17/80

Mr. Raymond Leonardini
Attorney at Law
717 "K" St., Suite 510
Sacramento, CA 95814

Two lengths of polybutylene pipe for analysis.

Sample I.D.

1. Westpro Bluetube Bl-37-7 AWWA C902 BJO 52 1" CTS PB 2110 SDR 13.5 160 PSI @ 73°F D2666

2. 1" CTS PB 2110 SDR 13.5 160 PSI D2666 Westpro Colflare

The pipe samples were prepared for analysis as follows: Each piece was cleaned with a mild detergent solution to remove grease, oil or tape from the outside surface, rinsed with copious amounts of tap water and allowed to dry.

Subsamples were obtained by boring a series of 3/8-inch cores from each piece at least six inches in from the end. The turnings were collected on a piece of hexane rinsed aluminum foil. The drill bit was rinsed with acetone and hexane and dried between samples. The drill was run at low speed so that very thin turnings were obtained.

Standard CAL 40 mL vials which had been rinsed with methanol, baked at 110° overnight and capped with a teflon-lined septum were charged with about 1 gram (weighed exactly) of sample; three such vials were obtained per composite. Two of these were held for VOA GC/MS analysis. To the third was added 10 mL of hexane (Baker Resianalyzed Grade); these were shaken and held under ambient conditions overnight for Base/Neutral GC/MS analysis.

Volatile organic compounds were determined by placing five mL portions of "clean" water (spiked with 100 ng of a deuterated standard) in the vials containing plastic pipe shavings. The vials were allowed to stand for 48 hours prior to analysis. At the time of analysis, the vials were purged for 15 minutes with 40 mL per minute of helium and trapped on a Tenax-silica gel trap. During the purge, the vial was immersed in an 80°C water bath. The trapped organics were desorbed into the GC/MS system and analyzed. Results are prefixed by a V in Table I.

Semi-volatile organic compounds were determined by injection of an aliquot of the hexane extract of the shavings; this constituted the Base/Neutral fraction

(prefixed by B in Table I).

Levels of identified compounds were estimated by comparison to the known levels of deuterated internal standards added before analysis. The reported levels are to be considered as rough estimates only.

Results are presented in Table I.

All raw GC/MS data will be retained at CAL for your future use.

Charles J. Soderquist, PhD
Vice President
Agricultural and Environmental Chemistry

Paul A. Taylor, PhD
President

Michael J. Miille, PhD
Director of GC/MS Services

CJS/PAT/MJM/lsh

TABLE I

Sample	Compound	GC/MS reference scan no. [a]	Estimated level, ppm (mg/kg)
12343-1	butene	V72	0.1-1.0
	acetone	V92	0.5-5.0
	diethyl ether	V160	0.01-0.1
	methyl cyclopentane	V226	0.1-1.0
	methyl cyclohexane	V324	1-10
	3-methyl hexane	V373	1-10
	3-ethyl-3-methyl pentane	V386	1-10
	heptane	V437	1-10
	5 alkanes ($>C_{16}$)	B407, B421, B479 B496, B647	100-1000 total
	butylated hydroxy toluene (BHT)	B533	50-500
	bis (2-ethylhexyl)phathalate (BEHP)	B633	50-500
	a C_{18}-C_{19} alkene	B681	5000-50,000
12343-2	acetone	V93	0.5-5.0
	diethyl ether	V161	0.05-0.5
	methyl cyclohexane	V325	0.5-5.0
	2,3,3-trimethyl hexane	V388	0.5-5.0
	10 alkanes ($>C_{16}$)	B388, B407, B420, B478, B488, B507, B540, B549, B596, B646	100-1,000 total

NOTES: [a] V = Volatile Organic fraction, B = Base/Neutral (hexane-extracted) fraction.

OFFICE OF PESTICIDES AND TOXIC SUBSTANCES, U.S. ENVIRONMENTAL PROTECTION AGENCY

(November 28, 1980)

Addendum

Priority Review Level I - Di-(2-ethylhexyl) Phthalate DEHP

After this assessment was completed, Assessment Division received information from the California Department of Health Services, and from representatives of the Plumbers Union concerning actual and projected levels of DEHP in drinking water resulting from the migration of DEHP from plastic water pipe.

Water pipe made from polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) and plasticized with DEHP is in common usage and is rapidly replacing copper pipe in new home construction. While the California studies were primarily concerned with solvents used to join the pipe together, data were developed from conditions simulating use situations that indicated that DEHP may be present at up to 246 ppb in drinking water. Limited evaluations of measured levels in drinking water supplies of new homes were up to 110 ppb. These levels are considerably higher than previously recorded for drinking water and represent a risk of 9.4×10^{-5} and 2.9×10^{-5} respectively.

The DEHP levels reported in these studies varied considerably. Factors such as the physical and chemical properties of the water, dwell time, and analytical methodology frequently lead to discrepencies in reported levels for DEHP. However, these data represent the most reliable data on levels or potentials levels in drinking water from DEHP containing plastic pipe.

PAUL A. TAYLOR, Ph D
PRESIDENT

CHARLES J. SODERQUIST, Ph D
VICE PRESIDENT

ANTHONY S. WONG, Ph D
VICE PRESIDENT

RUBY A. ULRICH
SECRETARY/TREASURER

California Analytical Laboratories, Inc.

401 NORTH 16th STREET
SACRAMENTO, CALIFORNIA 95814
(916) 444-9602

March 18, 1981
Lab Nos. 12752/12754
Received: 3/3/81

Ray Leonardini
717 "K" St., Suite 510
Sacramento, CA 95814

Four pipe and fixture connector samples were received from Mr. John Gorman to be analyzed for organic constituents.

CAL I.D.	Sample Description
12752-1	gray fixture connector, PB2110--QEST-H-PB2100-NSF-PW FDR 11-180°F 100 psi ASTM-D-3309 PAS CERT- (unreadable)-B137.80 1/4 CTS-062 080279
12752-2	gray fixture connector, PB2110-IAPMO UPC PB2110-SDR11-1 BSF-pw 1/4 X 3/8-180°-100 psi-D3309-CSA-CERT
12754-1	gray pipe, PB2110--QEST-H-IAPMO-UOC-PB2110-SDR11-NSF-pw 3/8 X 1/2 180°-100 psi-D-3309-CSA-CERT-B137.8 1/23/77
12754-2	black pipe, PB2110--NSF pw ASTM-D3309 100 psi-(unreadable)-180°F-122 1106C-(unreadable)-1/2" CTS SDR-11 P

Sample Preparation: Samples 12752 and 2-foot lengths of samples 12754 were cleaned with detergent, rinsed with copious amounts of water and air dried. Representative subsamples were obtained by filing with a coarse rasp. Each subsample was rinsed with hexane and portions then placed in clean sample tubes with 5 mL of hexane (-a series) and with benzene)-b series). Identical tubes were filled with the same solvents (both were Nanograde quality) to serve as controls. The samples were held under ambient conditions for five days (for GC/MS) and for an additional five days until selective detector GC analysis was made.

Analysis I--GC/MS. Just prior to analysis by gas-chromatography mass-spectrometry (GC/MS), a 1.0 mL aliquot of the extract was removed and spiked with D-10 anthracene as an internal standard. A 5 µL portion was then injected and processed per the EPA Priority Pollutant (B/N fraction) protocol. Compounds were identified by computer searches of an EPA library, and quantities were estimated by comparison to the known amount of D-10 anthracene added.

Only the hexane extracts (-a series) were analyzed by GC/MS. The hexane blank was clean.

II. Specific-detector GC. Sample extracts were examined by electron-capture gas chromatography (ECD-GC) and thermionic-specific gas chromatography (TSD-GC); these detectors are generally selective for halogenated and nitrogen and/or phosphorus organics, respectively, although ECD-GC is suitable for the determination of phthalate ester plasticizers.

Results: The GC/MS analyses indicated that all four samples were qualitatively similar in that a series of C_{21}-C_{31} hydrocarbons was present in each; their total concentation was estimated to be in the 500-2,500 ppm (mg/Kg) range. Butylated hydroxytoluene (BHT) was present in each sample at the 10-50 ppm level. Bis (ethylhexyl) phthalate (DEHP) was also found at varying levels in each sample as indicated in Table I.

The TSD-GC analyses indicated that no nitrogen or phosphorus containing organic compounds, which were amenable to GC analysis, were present above 10 ppm.

The ECD-GC analyses indicated that DEHP was present in all samples. Identification and quantitation was based on co-chromatography with an authentic DEHP reference standard. Results are summarized in Table I.

Results of Table I should be considered as minimum values since the efficiency of extraction with either solvent is not known and is probably less than 100%.

Charles J. Soderquist, PhD
Vice President
Agricultural and Environmental Chemistry

Michael J. Mille, PhD
Director of GC/MS Services

CJS/slh

TABLE I

Sample	Extractant	ppm DEHP found (mg/Kg)	
		by ECD-GC	by GC/MS
12752-1a	Hexane	4.0	4.5
-1b	Benzene	5.0	n.m.
-2a	Hexane	0.8	0.6
-2b	Benzene	0.7	n.m.
12754-1a	Hexane	≥20	32
-1b	Benzene	≥20	n.m.
-2a	Hexane	1.8	2.1
-2b	Benzene	1.4	n.m.

n.m. = not measured

DEPARTMENT OF HEALTH SERVICES/DEPARTMENT OF INDUSTRIAL RELATIONS
2151 BERKELEY WAY
BERKELEY, CA 94704
(415) 540-2115

January 28, 1981

Mr. Myron Moskovitz
Chairman
Commission on Housing &
Community Development
2371 Eunice St.
Berkeley, CA 94707

Dear Mr. Moskovitz:

I just received a preliminary analysis of polybutylene pipe performed by the California Analytical Laboratories, Inc. (Lab. No. 12343) that contains disturbing data in light of public comments by Steve Pregrun of Shell in response to my questioning about possible contamination of polybutylene.

Specifically, Mr. Pregrun stated that polybutylene does not use plasticizers (p. 74 of the hearing record for 11/24/80). On Table 1, note that Cal Labs found 50-500 ppm of DEHP (DEHP or diethylhexylphthalate) a plasticizer singled out in my unit's final report because of its carcinogenicity in animal testing. It is disturbing that the Commission was given such apparently misleading testimony, since the potential leaching of this compound, if present in the type of PB used for potable water, poses a potential health hazard to consumers.

Obviously, this situation deserves immediate attention because of the health risk at stake. I would be happy to discuss this situation further with regard to the requirement for an EIR.

Sincerely,

Marc Lappe

Marc Lappe, Ph.D.
Chief
Hazard Evaluation System &
Information Service

Enclosure

ML:vk

cc: Ephraim Kahn, M.D.
Kathleen Acree, M.D.

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FEB 4 198.
Dept. of Consumer Affairs
EXECUTIVE OFFICE
SACRAMENTO

TABLE I

Sample	Compound	GC/MS reference scan no. [a]	Estimated level, ppm (mg/kg)
12343-1	butene	V72	0.1-1.0
	acetone	V92	0.5-5.0
	diethyl ether	V160	0.01-0.1
	methyl cyclopentane	V226	0.1-1.0
	methyl cyclohexane	V324	1-10
	3-methyl hexane	V373	1-10
	3-ethyl-3-methyl pentane	V386	1-10
	heptane	V437	1-10
	5 alkanes ($>C_{16}$)	B407, B421, B479 B496, B647	100-1000 total
	butylated hydroxy toluene (BHT)	B533	50-500
	bis (2-ethylhexyl)phathalate (BEHP)	B633	50-500
	a C_{18}-C_{19} alkene	B681	5000-50,000
12343-2	acetone	V93	0.5-5.0
	diethyl ether	V161	0.05-0.5
	methyl cyclohexane	V325	0.5-5.0
	2,3,3-trimethyl hexane	V388	0.5-5.0
	10 alkanes ($>C_{16}$)	B388, B407, B420, B478, B488, B507, B540, B549, B596, B646	100-1,000 total

NOTES: [a] V = Volatile Organic fraction, B = Base/Neutral (hexane-extracted) fraction.

Radian # 225-065

Analysis of Polybutene Pipe Leachate For Selected Organic Species

March, 1981

Presented to:

Shell Development Company
Westhollow Research Center
Houston, TX

RADIAN
CORPORATION

RADIAN
CORPORATION

Radian Contract No. 225-065-07

ANALYSIS OF POLYBUTENE PIPE LEACHATE FOR SELECTED ORGANIC SPECIES

12 March 1981

Presented to:

Shell Development Company
Westhollow Research Center
3333 Highway 6 South
Houston, Texas 77082

Prepared by:

Radian Corporation
P. O. Box 9948
Austin, Texas 78766

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1.0 INTRODUCTION

This report summarizes Radian's results from the determination of various organic species in four polybutene pipe leachate samples. The samples were analyzed for organic priority pollutants and other specific organic compounds.

This report contains in Section 2.0 Results, and in subsequent sections, a discussion of analytical methodology, sample control and quality assurance/quality control. A discussion of the results is presented in Section 5.0.

2.0 RESULTS

The results from the analyses of the organic priority pollutants and the specific organic compounds requested are summarized in Table 2-1. No other priority pollutants or specific organic compounds were detected in the samples. Table 2-2 summarizes the required sensitivity limit for these species in water according to the methodology employed. In order to obtain this sensitivity limit for the weakly responding compounds, the analytical instrumentation conditions are adjusted such that most of the compounds can be detected at concentrations well below the required limits. For example, the values for toluene reported are below this required sensitivity limit. Although the identification of this compound was done with a high degree of certainty, the quantitative measurement is less precise at these low concentrations.

The mass spectral data files were also examined to determine what other organic compounds were present. During this examination three deuterated compounds were detected in the base/neutral extract. Subsequent conversation with Shell personnel indicated that these compounds were spiked into the water before the leaching study as a quality control indicator. The concentration and percent recovery of these spikes is presented in Table 2-3.

The mass spectral data files were also searched for the following specific organic species:

VOA Fraction		Base/Neutral Fraction
tetrahydrofuran	methyl cyclopentane	alkanes - C_{10}-C_{30}
dimethyl formamide	methyl cyclohexane	butylated hydroxy
methyethyl ketone	3-methyl hexane	toluene (BHT)
cyclohexanone	3-ethyl-3-methyl pentane	alkenes C_{15} - C_{20}
butene	heptane	
diethyl ether	2,3,3-trimethylhexane	

With the exception of tetrahydrofuran none of these species were found in any of the samples.

2.0 RESULTS

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cyclohexanone	3-ethyl-3-methyl pentane	alkenes C_{15} - C_{20}
butene	heptane	
diethyl ether	2,3,3-trimethylhexane	

RADIAN CORPORATION

TABLE 2-1. RESULTS FROM ANALYSIS OF SHELL SAMPLES

Pollutant	Concentration, mg/L			
	180°	Room Temperature	Control 180°	Control, Room Temperature
I. Volatile Fraction				
Methylene chloride	.028	.023	.018	.016
Tetrahydrofuran*	.072	.063	.029	.036
Toluene	.002	ND	.002	.002
II. Base/Netural Fraction				
No Priority Pollutants Detected/No Specific Organic Pollutants Detected				
III. Acid Fraction				
No Priority Pollutants Detected/No Specific Organic Pollutants Detected				

*Not a priority pollutant. Compound was on list of specific organic pollutants.

TABLE 2-2. SENSITIVITY LIMITS FOR ORGANIC PRIORITY POLLUTANTS

Pollutant	Limit (ug/L)
I. VOLATILE COMPOUNDS	
1V Acrolein	0.1
2V Acrylonitrile	0.1
3V Benzene	0.01
4V bis(Chloromethyl)ether	0.01
5V Bromoform	0.01
6V Carbon tetrachloride	0.01
7V Chloro benzene	0.01
8V Chlorodibromomethane	0.01
9V Chloroethane	0.01
10V 2-Chloroethylvinyl ether	0.01
11V Chloroform	0.01
12V Dichlorobromomethane	0.01
13V Dichlorodifluoromethane	0.01
14V 1,1-Dichloroethane	0.01
15V 1,2-Dichloroethane	0.01
16V 1,1-Dichloroethylene	0.01
17V 1,2-Dichloropropane	0.01
18V 1,2-Dichloropropylene	0.01
19V Ethylbenzene	0.01
20V Methyl bromide	0.01
21V Methyl chloride	0.01
22V Methylene chloride	0.01
23V 1,1,2,2-Tetrachloroethane	0.01
24V Tetrachloroethylene	0.01
25V Toluene	0.01
26V 1,2-trans-Dichloroethylene	0.01
27V 1,1,1-Trichloroethane	0.01
28V 1,1,2-Trichloroethane	0.01
29V Trichloroethylene	0.01
30V Trichlorofluoromethane	0.01
31V Vinyl chloride	0.01
II. PESTICIDES	
1P Aldrin	0.01
2P α BHC	0.01
3P β BHC	0.01
4P γ BHC	0.01
5P δ BHC	0.01
6P Chlordane	†
7P 4,4'-DDT	0.01
8P 4,4'-DDE	0.01
9P 4,4'-DDD	0.01
10P α-endosulfan	0.01
12P β-endosulfan	0.01
13P Endosulfan sulfate	0.01
14P Endrin	0.01
15P Endrin aldehyde	0.01
16P Heptachlor	0.01
17P Heptachlor epoxide	0.01
18P PCB-1242	†
19P PCB-1254	†
20P PCB-1221	†
21P PCB-1232	†
22P PCB-1248	†
23P PCB-1260	†
24P PCB-1016	†
25P Toxaphene	†
III. BASE/NEUTRAL COMPOUNDS	
1B Acenaphene	0.01
2B Acenaphthylene	0.01
3B Anthracene	0.01
4B Benzidine	0.01
5B Benzo(a)anthracene	0.01
6B Benzo(a)pyrene	0.01
7B 3,4-Benzofluoranthene	0.01
8B Benzo(g,h,i)perylene	0.025
9B Benzo(k)fluoranthene	0.01
10B bis(2-chloroethoxy)methane	0.01
11B bis(2-chloroethyl)ether	0.01
12B bis(2-chloroisopropyl)ether	0.01
13B bis(2-ethylhexyl)phthalate	0.01
14B 4-bromophenyl phenylether	0.01
15B Butyl benzyl phthalate	0.01
16B 2-chloronaphthalene	0.01
17B 4-chlorophenyl phenyl ether	0.01
18B Chrysene	0.01
19B Dibenzo(a,h)anthracene	0.025
20B 1,2-Dichlorobenzene	0.01
21B 1,3-Dichlorobenzene	0.01
22B 1,4-Dichlorobenzene	0.01
23B 3,3'-Dichlorobenzidine	0.01
24B Diethyl phthalate	0.01
25B Dimethyl phthalate	0.01
26B Di-N-butyl phthalate	0.01
27B 2,4-Dinitrotoluene	0.01
28B 2,6-Dinitrotoluene	0.01
29B Di-N-octyl phthalate	0.01
30B 1,2-Diphenyl hydrazine (as Azobenzene)	0.01
31B Fluoranthene	0.01
32B Fluorene	0.01
33B Hexachlorobenzene	0.01
34B Hexachlorobutadiene	0.01
35B Hexachlorocyclopentadiene	0.01
36B Hexachloroethane	0.01
37B Indeno(1,2,3-c,d)pyrene	0.025
38B Isophorone	0.01
39B Naphthalene	0.01
40B Nitrobenzene	0.01
41B N-Nitrosodimethylamine	†
42B N-Nitrosodi-N-propylamine	0.01
43B N-Nitrosodiphenylamine (detected as diphenylamine)	0.01
44B Phenanthrene	0.01
45B Pyrene	0.01
46B 1,2,4-Trichlorobenzene	0.01
IV. ACID COMPOUNDS	
1A 2-chlorophenol	0.025
2A 2,4-Dichlorophenol	0.025
3A 2,4-Dimethylphenol	0.025
4A 2,6-Dinitro-o-cresol	0.250
5A 2,4-Dinitrophenol	0.025
6A 2-Nitrophenol	0.025
7A 4-Nitrophenol	0.025
8A p-Chloro-m-cresol	0.025
9A Pentachlorophenol	0.025
10A Phenol	0.025
11A 2,4,6-Trichlorophenol	0.025

†EPA has not yet published determination limits for these pollutants.

PAUL A. TAYLOR, Ph.D.
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CHARLES J. SODERQUIST, Ph.D
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California Analytical Laboratories, Inc.

401 NORTH 18th STREET
SACRAMENTO, CALIFORNIA 95814
(916) 444-9602

REVIEW AND EVALUATION

OF

RADIAN CORPORATION

(Under Contract for:
Shell Development Company)

"ANALYSIS OF POLYBUTENE PIPE LEACHATE

FOR SELECTED ORGANIC SPECIES" March 1981

Charles J. Soderquist

Charles J. Soderquist, Ph.D.

April 1981

INTRODUCTION

At the request of Mr. Raymond Leonardini, California Analytical Laboratories, Inc. (C.A.L.) has prepared a brief review and evaluation of the Radian Corporation's "Analysis of Polybutene Pipe Leachate for Selected Organic Species," March 1981. Radian's report was conducted under a contract with Shell Development Company.

While the Radian report is the core document, it cannot be adequately and properly evaluated without reference to the March 13, 1981, letter of S.E. Pregun, Staff Business Representative, Polybutylene Department, Shell Chemical Company, to the Chair of the California Commission on Housing and Community Development. As a result, analysis and evaluation of this letter is also included.

RADIAN REPORT

The Radian report ("Analysis of Polybutene[1/] Pipe Leachate For Selected Organic Species," March 1981) is typical of that expected from an analytical laboratory. The inclusion of Quality Assurance/Quality Control data (Tables 4-1 and 4-2) and the acceptable recovery of spiked surrogates (Table 2-3) indicates that adequate VOA, Base/Neutral, and Acid fraction GC-MS analyses were performed.

In brief, we find little fault with the Radian data as stated. Radian received certain water samples from an unknown water system, drawn by an unknown separate entity (apparently Shell), and used a standard EPA approved protocol (the standard protocol also used by C.A.L. and other labs for GC-MS analysis). The problem, if there is one, is in what Radian did not report. The inadequacy of the study, in other words, is not in the reporting of the data. Rather it is in the lack of any information regarding the methods of obtaining the leachates.

---

1. The terms "polybutene" and "polybutylene" are interchangeable from a chemical viewpoint. Whether or not this reflects actual differences in the constituent elements or functions of the chemical, e.g. potable water piping vis a vis piping for other purposes, is not known.

For example, we note that the Priority Pollutant List (of 112 selected pollutants) has been used by both Radian and C.A.L. mainly because of its convenience. That is, the protocol has been validated (under EPA sanction) to yield acceptable results, using routine methodology for 112 industrial compounds. There is no objective reason to suspect that any of these Priority Pollutants would be present in polybutylene (or any other) plastic pipe. The list was designed as a screen for industrial chemical plant effluents, not potable drinking water transport devices.

The potential presence of plastic pipe additives (stablizers, etc.) which are not amenable to this general (GC-MS) technique has not been successfully explored since independent investigators have not had access to manufacturing data. In other words, the method of sample preparation (e.g., the extraction technique) and the style of contaminant identification (GC-MS or others) is dependent, to a certain extent, on some prior knowledge of the potential contaminants.

Organotin compounds, for example, are known additives in some types of plastic pipe, yet their presence or absence would not be indicated by the Priority Pollutant GC-MS technique. Knowledge of the possible presence of organotin compounds would allow development of analytical methodologies consistent with assessment of their "leachability" into potable water.

One final comment, minor though troubling, on the Radian report itself. It is uncharacteristic of an analytical laboratory to use the terms "ultratrace" and "insignificant in terms of potential health effects." (Report p. 11) As to the former term, it is a relative term and unscientific. It connotes impressions inappropriate in date reporting.2/ As to the latter terms, analytical chemists are not qualified to render such medical judgments.3/

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2. For example, 0.072 mg/L THF is labelled "ultratrace," yet is 7 times greater than their presumed detection limit.

3. The toxicity questions and health-effect value judgments are reserved, appropriately, for epidemiologists, pathologists and the like.

SHELL CHEMICAL LETTER OF MARCH 13, 1981

With the absence of the expected scientific explanation in the Radian report, it becomes necessary to review Shell's letter to the Housing Commission wherein some scientific details are given.[4]

The Material Studied by Radian. At the outset, note that no experimental details of the materials used to leach the pipe are provided. More fundamentally, "water extractable material" (first sentence of Shell's letter) is vague and ambiguous. Since Radian did not construct the pipe experiment, does this terminology mean Radian received the water or some other "extractable material"?

Moreover, assuming Radian received water samples from certain pipe from Shell, what are the characteristics of the pipe itself? Is PB 4127 the same grade as PB 2110? Is it used for potable water? Was the manufacturing (extrusion) process conducted by Shell or an independent manufacturer?

Experimental Procedure. A number of questions should be answered before any useful scientific conclusions can be drawn on the validity of the water samples.

1) Was the pipe-to-water ratio consistent with expected consumer use ratios?

2) Was the pipe leached in a sealed container (to prevent loss of volatiles)?

3) What was the quality of the water?

4) Were the leachates delivered to Radian in glass containers? Sealed? With headspace? Bubbles?

5) Were samples transported in cold and amber bottles to prevent decomposition? Ambient and in clear glass?

---

4. Please note, however, the letter is written by a "Staff Business Representative" of the Shell Chemical Company. His scientific credentials are not stated. Moreover, it is unusual that the protocol described by this gentleman was not described by Radian. Apparently, though not stated in either document, some lab other than Radian constructed the pipe experiment.

Letter Item 1

"Five days" is not necessarily an "extended period" of time. By comparison, the Montgomery Study of PVC and CPVC for potable water designed multiple holding periods, up to 90 days.

Although unclear in the letter, the likelihood that the client (Shell) and not the independent contract laboratory (Radian) performed the leach procedure raises serious questions about the overall credibility of the study.

Letter Item 2

This item states that the methods were "proven capable of identifying materials at concentrations of one part per billion (ppb)." This is in direct contradiction to the actual Radian report wherein the lowest detection limit noted (Table 2-2) is 10 ppb (0/010 mg/L, ppm).

C.A.L. employs the same GC-MS technique using in-house GC/MS systems for our existing EPA contracts and for our polybutylene research.

Letter Item 3

EPA methods 624 and 625 utilize the same measurement techniques employed by C.A.L. during its pipe study.

Letter Item 4

See the discussion under the Radian test for Priority Pollutants. Note, however, that it is just as scientifically valid to theorize that such contamination resulted from ubiquitous chemical contamination in the manufacturing process.

Letter Items 6, 7, 8

Regarding these questions raised as to the source of DEHP found in the PB pipe by C.A.L., volumes could be written. In the C.A.L. report to Mr. Leonardini (C.A.L. ID # 12343, completed 31 December 80), a summary of the extraction procedure was provided. While the report did not mention the use of reagent "controls," adequate controls were included in the procedure as they are in all analytical work at C.A.L., and in any competent laboratory. C.A.L. is well aware of the ubiquitous

nature of phthalate ester plasticizers, notably DEHP. As mentioned before, stronger scientific hypotheses could be suggested for manufacturing contamination of phthalates in the Shell manufacturing process (or the pipe extrusion process) than in the laboratory context. Given the large amount of DEHP sold annually (2 billion pounds) contamination is indeed more likely at the chemical factory site than the analytical chemist test tube.

Shell Chemical Company
A Division of Shell Oil Company

One Shell Plaza
P.O. Box 2463
Houston, Texas 77001

March 13, 1981

Mr. Myron Moskovitz, Chairman
Commission on Housing and Community Development
921 Tenth Street
Sacramento, CA 95814

Dear Mr. Moskovitz:

As a followup to our meeting of February 23, 1981, we have enclosed data developed on water extractable material leached from PB 4127 polybutylene pipe. We will attempt to summarize the position of Shell Chemical Company on the reason, procedure, and conclusions derived from the analysis.

There have been repeated claims by the California Pipe Trades Council that polybutylene might contain chlorinated hydrocarbons, aromatic hydrocarbons, phathalate plasticizers, or polychlorinated biphenyls and might leach these materials into potable water. Two separate tests have been conducted which challenge all of these allegations. The tests were conducted by Radian Corporation of Austin, Texas, at Shell's request and by California Analytical Laboratories, Inc. for the California Pipe Trades Council.

Let us first dicuss the Radian report (copy enclosed) and its findings. Radian is a recognized EPA contractor and often performs analyses of trace contaminants in water for various governmental agencies as well as private industry.

1) Polybutylene, PB 4127 pipe, produced from commercial lot No. 10APP016, was cut up and allowed to soak in pure water for five days at temperatures of 73°F and 180°F. This set of conditions was chosen in order to test the pipe under environmental conditions similar to its intended service use. The steps of cutting the pipe and soaking for an extended period were intended to maximize the amount of any extractable materials in the aqueous phase.

2) The water leachate was then analyzed by the most sophisticated chemical techniques (i.e., GC/MS). These methods were proven capable of identifying materials at concentrations of one part per billion (ppb).

3) The water was analyzed using procedures for water as suggested by the Environmental Protection Agency Methods 624 and 625 as published in the Federal Register on December 3, 1979.

4) The data were analyzed for any evidence of the 112 materials listed on the federal Priority Pollutants list. Three materials were found at ultra trace contamination levels in the pipe extract. These are common laboratory contaminants and may have come from a source other than the pipe leachate. (See Table 2-[illegible].)

5) No trace of any of the alleged carcinogenic materials suggested as possible pollutants by the California Pipe Trades Council were found in the water extract -- meaning that a homeowner would not be exposed to any hazardous materials as a result of having a polybutylene plumbing system. The same statement, of course, cannot be made for metal pipes.

6) California Analytical Laboratories, Inc., under the sponsorship of the California Pipe Trades Council, conducted a separate test under conditions which differed in protocol from the Radian procedure. Nevertheless, they were also unable to find any of the many carcinogens which were alleged to exist in polybutylene plumbing pipe. None of the materials claimed to be found by California Analytical Laboratories, Inc. (Table I, Letter of Dr. M. Lappe to the Commission on January 28, 1981) were found in the Radian extraction test.

   The basic difference in methodology was that Radian used a water leachate study to represent conditions the pipe would see in service. California Analytical Laboratories, Inc. used large volumes of solvent with small amounts of pipe, thus magnifying the effect of any trace contaminants which might occur in the solvent. Necessary controls to correct for such contamination, if performed at all, were not indicated in the report.

7) California Analytical Laboratories, Inc. did claim to find an estimated 50 - 500 ppm of DEHP in their polybutylene extract. Shell maintains that no DEHP is used to produce our pipe resin and, in addition, it is not used for the production or installation of PB pipe. We suggest that whatever was found was not introduced by Shell or our customers and is most likely a result of outside contamination or laboratory procedure.

8) As a point of information, an estimated two billion pounds of DEHP was sold in the U.S. during the past five years. This has gone into numerous applications such as shower curtains, seat covers, umbrellas, paper tissue, and notably, scientific laboratory tubing; but none has been used for PB pipe production. It is entirely conceivable, in fact, that the DEHP "found" by California Analytical Laboratories, Inc. was likely contamination from a source within their laboratory.

9) As additional backup, we plan to pick up random samples of PB 4127 pipe during the week of March 30, 1981, from various northern California suppliers. These will be tested as a composite sample, to represent a cross section of PB manufacturers. These samples will then be tested in accordance with protocol specified in the Radian report (hopefully prior to the April 20, 1981, meeting).

We invite the California Pipe Trades Council to assist in the sample gathering so they may obtain representative specimens for any further tests they may wish to conduct.

We feel the information already developed clearly indicates that polybutylene plumbing pipe not only does not present a health hazard; in fact, it is now

clearly demonstrated to be less of a concern than any approved piping material. We see no need for this Commission to require an Environmental Impact Report -- rather, it seems, continued delay poses a risk to the health of the consumers of California by depriving them of the opportunity to use this new material.

Sincerely,

S. E. Pregun
Staff Business Representative
Polybutylene Department

Enclosure

cc - Mr. William Holliman

TO: GRACE PLS DISTRIBUTE TO COMMISSIONERS WB 6/30/81

276

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY/AGRICULTURE AND SERVICES AGENCY
EDMUND G. BROWN JR., Governor

DEPARTMENT OF HEALTH SERVICES/DEPARTMENT OF INDUSTRIAL RELATIONS
HAZARD EVALUATION SYSTEM AND INFORMATION SERVICE (HESIS)
2151 BERKELEY WAY
BERKELEY, CA 94704
(415) 540-2115

June 15, 1981

William Holliman
McDonough, Holland & Allen
Attorneys at Law
555 Capitol Mall, Suite 950
Sacramento, CA 95814

Dear Mr. Holliman:

Two important groups of data remain outstanding for assessing polybutylene's potential toxicity. The first deals with the toxicological effects of the antioxidant, Irganox 1010 or its hydrolysis products in water carried by PB pipe. As you may be aware, Irganox is a chemical analog of butylated hydroxy-toluene (BHT), a food additive in use for over 20 years. Both BHT and Irganox have been represented by Shell as being FDA-approved and, therefore, safe.

Recent developmental toxicological studies have shown that chronic, relatively low level (0.25 - 0.5% in diet) ingestion of BHT can lead to reduced weight gain, increased liver size and raised serum cholesterol in a number of separate animal tests. Other studies have shown reduced litter size following exposure during embryonic development. (For a current review, see C.V. Vorhess, et al, "Developmental neurobehavioural toxicity of butylated hydro-toluene in rats," Food and Cosmetic Toxicology 19: 153-162, 1981.)

These studies do not, of course, directly implicate Irganox; but they suggest by analogy the critical importance of obtaining two types of data for a substance otherwise considered "safe": 1) Leaching rates of Irganox from PB in different water qualities; and 2) Toxicological data pertinent to the levels of exposure likely to be encountered from ingestion of Irganox in water. I understand that latter data has been promised from Ciba-Geigy, but has not yet been received.

The second issue that deserves further study from a toxicological perspective is the possible presence of alkylbenzene sulphonate from PB pipe. Ambiguous data from the first Radian test suggested the presence of this emulsifier in PB pipe. I would like to see further evidence pertaining to this chemical since it is readily soluble and, if present in PB pipe, would be expected to be found in water leachates. However, it might not be seen in washed pipe, a process that I believe is undesirable prior to testing, unless the same washing process is used commercially prior to installation.

Alkylbenzene sulphonate is of concern because it can cause lysis of cells in vitro at levels as low as 5 ppm. While the relevance of such finding for possible occupational or consumer hazards of this substance is currently under review (see G.H. Pigott and J. Ishmael, "A comparison between in vitro toxicity

of PVC powders and their tissue reaction in vivo," Annals of Occupational Hygiene 22: 111-119, 1979), the presence of more than trace quantities of this potent cellular toxin in drinking water would be a cause for concern.

Please inform me of your intention to provide this additional material so that a reasonably complete preliminary assessment of polybutylene may be expeditiously completed.

Sincerely,

Marc Lappé

Marc Lappe', Ph.D.
Staff Toxicologist

cc: Myron Moskovitch
Commission on Housing &
Community Development

ML/sb

State of California

Business and Transportation Agency

Memorandum

MEMBERS OF THE COMMISSION OF
HOUSING AND COMMUNITY DEVELOPMENT

Date April 27, 1981

From: Department of Housing and Community Development
Office of the Director

Subject:

I have recently reviewed the current status of the Commission's proceedings concerning the proposed adoption of regulations permitting the expanded use of plastic pipe. I am informed that the Commission is scheduled to decide whether or not an Environmental Impact Report should be prepared prior to taking any action to approve the expanded use of PB water pipe and ABS/PVC vent pipe.

I have reviewed this matter with members of my staff and interested members of the public. After having considered the evidence and discussed the issues with our legal counsel I am convinced that it would be most prudent for the Commission for prepare an EIR before proceeding with any decision to expand the use of plastic pipe.

My recommendation is based upon several factors. There presently is evidence in the record of the existence of potentially hazardous substances such as DEHP in polybutylene pipe and fittings. I am aware that there is also evidence in the record which suggests that there is no potential hazard from PB. Likewise, there is conflicting evidence concerning potential hazards associated with the use of ABS and PVC vent pipe. However, regardless of whether or not there is conflicting evidence, the evidence of potential hazards that has been presented to date is sufficient to legally compel the preparation of an EIR.

The issues in this matter have become extremely complex and esoteric. You are being asked to resolve highly technical questions such as the validity of laboratory studies, a matter which only highly trained specialists in these areas can truly answer. In addition, only within the framework of the preparation of an EIR can a reliable and unbiased answer to these questions be obtained. Such an approach would also serve to reassure an already apprehensive public and instill confidence in the ultimate decision on the merits of plastic pipe.

Finally, it is illustrative to remember the tremendous amount of time the Commission has devoted to deliberations on this issue. The Commission started holding hearings on plastic pipe over four years ago, in 1977. Throughout these proceedings the chief controversy has been compliance with CEQA. In this regard, numerous studies, substantial testimony and reams of documents have been presented for your consideration. This controversy could continue before the Commission for months to come. For example, further environmental evidence might be presented to the Commission at the last minute which, as has occured throughout these proceedings, can lead to further hearings.

The evidence presented to date compels the preparation of an EIR. The only method of ensuring adherence to the law and directing this matter to a reasonable conclusion is for the Commission to require the preparation of an EIR before it takes any action to approve the use of plastic pipe. Therefore, I strongly urge the Commission to take such action.

Sincerely,

J. Donald Terner
Secretary to the Commission

STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY

EDMUND G. BROWN JR., Governor

DEPARTMENT OF
Consumer Affairs

1020 N STREET, SACRAMENTO, CALIFORNIA 95814
(916) 445-4465

April 16, 1981

Mr. Myron Moskovitz, Chairman
Commission on Housing and
Community Development
921 Tenth Street
Sacramento, CA 95814

Dear Chairman Moskovitz:

Transmitted herewith is our argument which demonstrates why, as a matter of law, an environmental impact report regarding polybutylene pipe is required prior to any decision by the Commission as to whether it should be approved for transporting potable water. While the appended document is sufficient to provide the legal justification necessary in this matter, I cannot allow to pass without comment the appalling procedural irregularities in this case and the highly questionable Radian report submitted by Shell Chemical Company with their accompanying letter of March 13, 1981.

I. Procedure

After being informed on April 6 that the April 20 hearing had been postponed for one month, we discovered indirectly on April 14 that the hearing had not been postponed after all! We have only subsequently discovered the intervening sequence of events which must be characterized as incomprehensible and deplorable:

April 6 -- Upon chance inquiry by Department of Consumer Affairs staff, we were informed the April 20 hearing was postponed one month because Shell claimed it could not be prepared in time. As a result, our brief was not submitted and Commission members have not had the opportunity to review it.

April 7 -- California Pipe Trades Council attorney was informed of postponement by Housing and Community Development attorney.

April 7 -- Later the same day, California Pipe Trades Council attorney was informed postponement had been reconsidered and April 20 meeting would be held as previously scheduled.

April 9 -- Department of Consumer Affairs received a Commission agenda for May 18, 1981, which showed plastic pipe consideration on the agenda.

April 9 -- Department of Consumer Affairs Director sent a mailgram to the Housing and Community Development Commission Chairman deploring the postponement of the April 20 hearing (copy attached).

April 10 -- California Pipe Trades Council attorney received Commission agenda for April 20, 1981, which showed plastic pipe consideration on the agenda.

April 14 -- Member of Community Health Action Coalition (CHAC) informed Roger Dickinson, Department of Consumer Affairs attorney, that he was told by Paul Reynaga, Housing and Community Development attorney, that the hearing on PB pipe is rescheduled for April 20.

April 15 -- Confirmation of April 20 date by Department of Consumer Affairs by phone with California Pipe Trades Council attorney who also related prior conversations and notices detailed above.

We, the petitioners in this instance, have never received a call from Housing and Community Development staff regarding the on-again, off-again status of the April 20 meeting, nor have we been provided with a copy of the information submitted subsequent to the February 23 Commission meeting. We have only obtained information through our own direct inquiry or from a third party. As a result, we have suffered from a lack of information which has unreasonably affected our ability to fully prepare for the April 20 hearing and unfairly prejudiced our opportunity to provide a full, complete, and thorough presentation before the Commission.

II. The Shell Test Results

Two sets of test results submitted by California Analytical Laboratories, Inc. show the presence of DEHP. Dr. Marc Lappe, Chief of the Hazard Evaluation System for the State, has characterized these results as posing "a potential health hazard to consumers." Given this substantial evidence of potential adverse environmental effects, the courts have made it clear that contrary evidence is insufficient to overcome

the need for an EIR. Therefore, the Shell test results are insignificant in considering whether an EIR is required with respect to PB pipe.

Nonetheless, I am deeply disturbed by the lack of basic information, the lack of specificity, and the lack of consistency in the report and letter submitted by Shell. These shortcomings must certainly call into question the very validity of the testing performed and the results apparently obtained.

For example, the Radian report fails to state at any point how the samples analyzed were prepared. It is only Shell's accompanying letter which reveals that Shell itself procured some unspecified pipe and prepared the samples of "water extractable material," whatever that might be. Not only should these samples, to assure scientific integrity, have been prepared by the laboratory itself, but we have subsequently discovered the pipe analyzed is designed to conduct <u>heat</u> not transport <u>water</u>.

In addition, on page two, the Radian report reveals that Shell personnel spiked the water before the leaching study! Why was the spiking done? Should not the laboratory itself have prepared sufficient samples, including control samples, to assure both the validity and the veracity of their results? How are we to know that Shell followed the recommended EPA protocol? Absent some unimaginable explanation, such a procedure must surely be considered invalid for offering reliable evidence of the potential leaching properties of polybutylene pipe.

Shell claims the pipe was soaked for five days, "an extended period". This characterization must be considered disingenuous at best considering the Montgomery test was based on leaching periods of 30, 60, and 90 days. Further, Shell states in its letter that the methods used to analyze the water leachate were "capable of identifying materials at concentrations of one part per billion (ppb)." In fact, the Radian report shows a detection capability of only 10 parts per billion.

Finally, the Radian results detected the presence of tetrahyrofuran, a compound not previously suggested to be present in polybutylene pipe. Where did it come from and how can a laboratory analysis by an unknown author presume to label it "insignificant in terms of potential health effects"?

In short, it requires no scientific training to harbor serious reservations regarding the validity or utility of the test

results so obligingly supplied by Shell. While, even if fully believable such results would not obviate the need for an EIR, it is distressing indeed to witness such an attempt to influence the Commission.

Sincerely,

RICHARD B. SPOHN
Director

cc: William Holliman

MAILGRAM SE ...TER
MIDDLETOWN, VA, 22645

western union Mailgram

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Dep... of ...
EXECUTIVE OFFICE
Dep...
EX...CRAMENTO

CALIFORNIA DEPT OF CONSUMER AFFAIRS ROOM 516
1020 N ST
SACRAMENTO CA 95814

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

9164454465 MGM TDRN SACRAMENTO CA 157 04=08 0818P EST
ZIP
MYRON MOSKOVITZ
2371 EUNICE ST
BERKELEY CA 94708
I DEPLORE YOUR UNILATERAL DECISION TO DELAY THE HEARING ON
OUR
PETITION REGARDING PB PIPE. YOUR ACTION APPEARS TO BE ANOTHER
IN THE
LINE OF ADMINISTRATIVE MISFIRES WHICH CAUSED POSTPONEMENT
OF THE
DECEMBER AND JANUARY COMMISSION MEETING. WE SEE NO JUSTIFICATION
FOR
DELAY IN THE APRIL 20 HEARING ON THE BASIS THAT SHELL WILL
NOT BE
PREPARED TO OFFER REBUTTAL EVIDENCE TO THE CALIFORNIA LABORATORIES

ANALYSIS. CEQA MAKES IT CLEAR THAT SUBSTANTIAL EVIDENCE OF
A
POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECT CANNOT BE NEGATED
BY
CONTRARY EVIDENCE. THE APPROPRIATE VEHICLE FOR OBJECTIVELY
DEVELOPING
AND ANALYZING EVIDENCE OF SIGNIFICANT ENVIRONMENTAL EFFECTS
IS AN
EIR. I WOULD APPRECIATE BEING CONSULTED PRIOR TO ANY FUTURE
ACTION OF
THE COMMISSION ON THIS MATTER SO THAT THE INTERESTS OF CALIFORNIA

CONSUMERS WILL BE ADEQUATELY CONSIDERED. I ALSO FORMALLY REQUEST
THAT
THE COMMUNICATION BE ENTERED ON THE RECORD.
RICHARD B SPOHN, DIRECTOR
CALIFORNIA DEPT OF CONSUMER AFFAIRS
(EX).
1850 EST

23101 EST

MGMCOMP MGM

4 San Francisco Chronicle Tues., April 21, 1981

Plastic Water Pipes Flunk A State Test

Sacramento

Some laboratory tests indicate plastic water pipes considered for widespread residential use in California may cause sterility and cancer in humans, a state commission was told yesterday.

The Commission on Housing and Community Development had tentatively approved use of the polybutylene pipe, manufactured by Shell Chemical Co., beginning on November 24.

The commission later delayed final authorization for expanded use of the pipe in California to allow more time to consider potential health hazards.

The pipe would be used instead of galvanized or copper pipes.

In yesterday's hearing, state Consumer Affairs Director Richard Spohn said tests by the California Analytical Laboratory indicated a chemical known as DEHP, which has been found to cause cancer and sterility in laboratory animals, may exist in hazardous quantities in the pipe.

"One scientist has dubbed DEHP the equivalent of a chemical vasectomy," Spohn said. "If you do approve the use of this pipe, it is quite likely there will be widespread use throughout the state. You'd want to be pretty certain that you don't cause a massive sterilization."

The commission also received a letter from I. Donald Terner, director of the Department of Housing and Community Development, and a telephone call from state Fire Marshal Phil Favro. Both asked for further study of the pipe.

But Shell's lawyer, William Holliman, told the commission that Spohn gathered all his data from one set of test results and that another laboratory, financed by Shell, has repeatedly found nothing linking the pipe to cancer.

Before Holliman's testimony, Myron Moskovitz, chairman of the Housing and Community Development Commission, said he already had decided to require further study before the pipe was authorized. This statement angered Holliman, who said it "prejudiced the other commissioners" before they had a chance to vote on the issue.

United Press

Capitol Digest

Cancer Fears Delay Plastic Pipe OK

Laboratory tests indicate that plastic water pipes considered for widespread residential use in California may cause sterility and cancer in humans, a state commission was told Monday.

The Commission on Housing and Community Development has delayed final authorization for use of the polybutylene pipe, manufactured by Shell Chemical Co., on Nov. 24.

In Monday's hearing, state Consumer Affairs Director Richard Spohn said tests by the California Analytical Laboratory indicated a chemical known as DEHP, which has been found to cause cancer and sterility in laboratory animals, may exist in hazardous quantities in the pipe.

State and Consumer Services Agency

OFFICE OF THE SECRETARY
1220 N STREET SUITE 409
SACRAMENTO CA 95814
(916) 445-1935

DEPARTMENT OF CONSUMER AFFAIRS
DEPARTMENT OF GENERAL SERVICES
DEPARTMENT OF VETERANS AFFAIRS
FRANCHISE TAX BOARD
OFFICE OF THE STATE FIRE MARSHAL
STATE PERSONNEL BOARD
STATE TEACHERS' RETIREMENT SYSTEM
PUBLIC EMPLOYEES' RETIREMENT SYSTEM
CALIFORNIA PUBLIC BROADCASTING COMMISSION
MUSEUM OF SCIENCE AND INDUSTRY
INTERGOVERNMENTAL PERSONNEL ACT GRANT PROGRAM

July 21, 1981

John Gorman
California Pipe Trades Council
614 Gibson Road
Woodland, California 95695

Dear John,

This is in reply to your request for clarification of the legal relationship between the California Building Standards Law and the California Environmental Quality Act (CEQA).

I

Housing and Community Development Commission
Amendments to 1979 Uniform Plumbing Code

HCD is proposing several amendments to the 1979 UPC by allowing for expanded use of plastic plumbing pipe. After several months of public testimony, the HCD determined (and voted) that prior to any decision to adopt these regulations, an Environmental Impact Report (EIR) must be developed in compliance with the California Environmental Quality Act (CEQA). As you well recall, I appeared at one such hearing (November 24, 1980) and stated on the record that HCD must comply with requirements for an EIR prior to submitting proposed building standards to the SBSC.

While beginning the EIR process, the HCD budget was deleted by the Legislature, casting doubt as to when, if at all, the EIR will be completed. Nonetheless, several legal issues remain. In particular, should the 1982 UPC incorporate all of the HCD proposed amendments to the 79 UPC, may HCD adopt the new code by reference without filing an EIR?

As discussed below, HCD may not adopt such building standards by reference without complying with CEQA. Furthermore, the SBSC cannot approve such adoption without a demonstration of compliance with CEQA by the adopting agency.

II

Building Standards and CEQA*

The new California State Building Standards Law (Chapters 1 - 5 of Part 2.5 of Division 13, Health and Safety Code, Sections 18901 et. seq.) provides for uniformity and consistency in code promulgation through compliance with eight specified criteria (Health and Safety Code § 18930). State agencies, including the Commission on Housing and Community Development, must comply with all of these criteria before any of their "proposed" regulations** can be "approved and have full binding legal effect." (Cf. Health and Safety Code § 18905.)

One such criterion states: "the proposed building standard (must be) within the parameters established by enabling legislation. (Health and Safety Code § 18930(a)(2).) To meet this criterion, the adopting agency must demonstrate compliance with other applicable substantive and procedural requirements of law in its adoption of building standards." 24 Cal. Admin. C. §§ 1-304(c)(2)(C).

The California Environmental Quality Act (Pub. Res. C. §§ 21000 et. seq., "CEQA") is clearly "applicable substantive law." The Legislature, it appears, specifically sought to include building standards within the scope of CEQA:

> "All agencies of state government which regulate activities of private individuals, corporations.... shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian.: (Pub. Res. C. § 21000(g).) (Emphasis added.)

Therefore, once an adopting agency has made a finding that its proposed building standards are subject to CEQA, and the public record indicates that they have made such a finding, then the SBSC must review and evaluate such building standards in light of CEQA. (Health and Safety Code § 18930(a)(2).)

---

* This analysis is confined to an interpretation of the Building Standards law (1979 Statutes, Chapter 1152) as it relates to CEQA. An analysis of the State Housing Law, although subject to CEQA, is not provided here.

** Regulations "adopted" by HCD have the character only of "proposed" standards when before the BSC.

Should the adopting agency submit its building standards without compliance with CEQA (whether the submittals are in the form of amendments to model codes or in the model code itself) the standards would fail the above-noted criterion. It would be then my direction to the SBSC that such standards not be approved for failure to comply with clearly applicable statutes.

III

Conclusion

An adopting agency cannot avoid compliance with CEQA by adopting a "model" code by reference where the code contains material that was previously found to be subject to CEQA. To do otherwise would violate both the State Building Standards Law and the California Environmental Quality Act.

I hope this letter responds to your concerns. Please call if you have any questions.

Very truly yours,

Amanda Behe

M. Amanda Behe
Commission Counsel

MAB:jlr

cc: William Hastie
Wayne Jensen

RECORDS CERTIFICATION

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Signature of Camera Operator

4/5/89
Date

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