

**Memorandum**

o : Maureen Higgins, Director  
Department of Housing and  
Community Development  
P.O. Box 952051  
Sacramento, CA 94252-2051

Date :

Subject: Administrative  
Final February 1990  
EIR

rom : Health Hazard Assessment Division  
714 P Street, Room 442  
Sacramento, CA 95814  
8/454-7572

At your request, staff of the Office Of Environmental Health Hazard Assessment have reviewed the Administrative Final February 1990 Environmental Impact Report: Expanded Uses of Plastic Plumbing Pipe, prepared for the Department of Housing and Community Development (HCD) by SRI International. As previously, we focused exclusively on the worker health and safety aspects of the Environmental Impact Report (EIR). Also as before, we paid particular attention to whether or not the EIR correctly reflected the data and conclusions of the worker exposure study conducted by the Department of Health Services (DHS) in 1988.

**Summary**

We appreciate that our comments on the previous Draft EIR have been addressed, and we think that the current version is a major improvement over the Draft EIR. However, we continue to have concerns in two of the major areas that we commented on before: 1) the EIR accurately summarizes the data from our 1988 study of worker exposures during plastic pipe installation, but reaches conclusions that are not supported by the data; and 2) the mitigation measures as recommended are not specific enough to assure that they will be effective in reducing the worker health risks, and must be strengthened to provide meaningful protection of worker health and safety. The current version of the EIR contains a small but important ambiguity about the necessity of implementing the individual mitigation measures. Specific comments on these issues are detailed below.

Overall we think that the Administrative Final EIR, if strengthened somewhat as recommended below, could be a sound, well-balanced document that strengthens HCD's position by addressing public concerns. We appreciate the opportunity to again comment on the EIR, and look forward to continuing to work with your department as this process evolves.

**I. Data and conclusions on worker exposures**

- a. The Administrative Final EIR is considerably stronger than the Draft in its presentation of the available data on worker exposures during plastic pipe installation. However, the current version EIR curiously



leaves out the highest exposure levels measured during the DHS study (i.e. 529 ppm tetrahydrofuran and 160 ppm methyl ethyl ketone). The simple addition of these data would give readers a clearer indication of the exposure levels that can occur during plastic pipe installation.

- b. The section on Cumulative and Long-Term Implications contains the sentence "However, although available toxicologic data are not complete, repeated exposure would probably not accumulate to serious, long-term risks." For tetrahydrofuran, "data are not complete" is a vast understatement. The conclusion that any health damage resulting from exposure "probably would not accumulate to serious, long-term risks," based on such limited data, is too strong.
- c. The section on Significant Irreversible Changes contains the sentence "The expected more frequent exposure of plumbers to plastic pipe cement solvents would not be significant or irreversible." This sentence would be more accurate if it stated that the currently known health effects of such exposures are not irreversible. The exposures themselves, once they have occurred, cannot be reversed. If any irreversible toxicity is later found to be associated with exposure to these solvents, then workers who had been exposed might have sustained irreversible health damage.
- d. The Summary of the Worker Safety and Health section is mostly accurate and well-balanced. However, the sentence "The potential for such systemic effects--especially after chronic exposure--has not been fully assessed in the plumbing environment." seems to us to imply that a lack of exposure information is what prevents a full assessment. This should be changed to indicate that the lack of toxicity information (especially for tetrahydrofuran) is the limiting factor in assessing health risk.
- e. In the Conclusion (P. vi) the third sentence reads "worker exposure to solvents would increase, but could be limited to minor levels by the use of protective measures." The meaning of the term "minor" is unclear. We recommend that a more specific sentence be substituted.

#### Effectiveness of mitigation measures

Our concerns are in large part based on an over-reliance on Cal/OSHA in the face of serious limitations in Cal/OSHA resources.

- a. Measure (1), "Strengthen Education and Training," states that "HCD will work with Cal/OSHA to define a means to ensure that employer education and training programs are in place." Unfortunately, Cal/OSHA has no means we are aware of, beyond enforcement of existing construction safety regulations or development and enforcement of a new specific standard, to ensure that employers provide education and training programs. We continue to believe that Cal/OSHA lacks resources for aggressive enforcement of training provisions, and promulgation of a



new specific standard, to ensure that employers provide education and training programs. We continue to believe that Cal/OSHA lacks resources for aggressive enforcement of training provisions, and promulgation of a new standard is unlikely. We think that the idea offered as an example, that "issuance of building permits to a licensed contractor could be made contingent on evidence that the contractor has an approved health and safety plan in place" is a sound concept. However, such a scheme would seem to depend mainly on action by HCD, acting in cooperation with local building officials. This plan, or some similar one, should be formalized explicitly in this Mitigation Measure, rather than referring the matter to an unspecified cooperative effort with Cal/OSHA. As we previously indicated, DHS would be willing to specify the elements that could be required to constitute a health and safety plan.

Even if an effective requirement for worker training programs was in place, however, the lack of good training resources would remain a problem. The current version of the EIR attempts to address this by stating that "HCD will request that cement manufacturers and plastic pipe and supplies distributors provide additional technical information." Our experience with employer-sponsored worker safety training programs is that their weaknesses rarely stem from a need for additional technical information. More often, the weaknesses of these programs are based on a shortage of good, well-trained trainers, on a lack of good, innovative training materials that adequately convey existing information, and on the small amount of time devoted to health and safety training. To address the shortages of good trainers and training materials, we think that HCD should press plastic pipe manufacturers and distributors to commit resources to creating effective training programs, rather than providing additional technical information. Training programs developed in this way could be disseminated for use by employers, contractors organizations, and labor organizations throughout the state.

- b. The EIR in Mitigation Measure (3) states that HCD will initiate "the action necessary" to prohibit sale of DMF-containing primers and cements. This is the most strongly-worded action among the mitigation measures written for the Worker Safety and Health section. However, it still falls short of the unambiguous language used in other sections of the EIR. Consider, for example, Mitigation Measure (6), which is apparently imported from the Water Quality and Public Health section. This Measure specifically recommends a regulatory change, and says what that change should be. If HCD intends to make a regulatory change to prohibit DMF-containing plastic pipe products, then this section should be made more explicit.



- c. Measure (4) of the Administrative Final EIR states that HCD "will work with Cal/OSHA to increase enforcement of ventilation requirements", and implies that Cal/OSHA will provide increased attention to instruction on ventilation through "a comprehensive alert." We know of no plans or mechanism for Cal/OSHA to actively engage in providing instruction on ventilation to plumbing contractors. Further, we doubt that significant increased enforcement is likely; Cal/OSHA's enforcement resources are already sufficiently strained that the vast majority of their enforcement actions are initiated by specific complaints. This is unlikely to change substantially unless Cal/OSHA is provided with additional resources. If HCD intends to augment Cal/OSHA resources to increase enforcement the Construction Safety Orders cited, then that should be specifically stated. Otherwise, we again urge that the EIR incorporate a role for local building inspectors-who already make frequent inspections at every construction site-in determining whether or not forced ventilation is being provided at sites where plastic pipe is being installed in enclosed spaces. The local building inspectors could be given enforcement authority through HCD-initiated regulation. Alternatively, a memorandum of understanding could be negotiated, under which the local building inspectors would check ventilation during their routine inspections and report apparent violations to Cal/OSHA, which would then follow-up with a prompt worksite inspection. This latter mechanism might be difficult to operate effectively, however, because construction workers move so frequently from site to site.
- d. Measure (5) also relies heavily on Cal/OSHA to "remind employers" about the importance of using protective gloves and providing eyewash facilities. Again, we doubt that Cal/OSHA resources are sufficient to make implementation of this recommendation widespread or persistent. A role for local building officials would make this measure much more effective.
- e. The Mitigation Measures in the Administrative Final EIR are much stronger than in the Draft, in large part because each measure now contains a sentence stating what actions HCD will take: "will request", "will work with", "will initiate the action necessary", etc. However, the current version does not make clear which of these action items represent HCD policy decisions and which are simply proposals made by HCD's EIR contractor. If some or all of the HCD actions in the mitigation measures are actually proposals rather than established policy, then these should be clearly distinguished.



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### 3. Necessity for implementation of mitigation measures

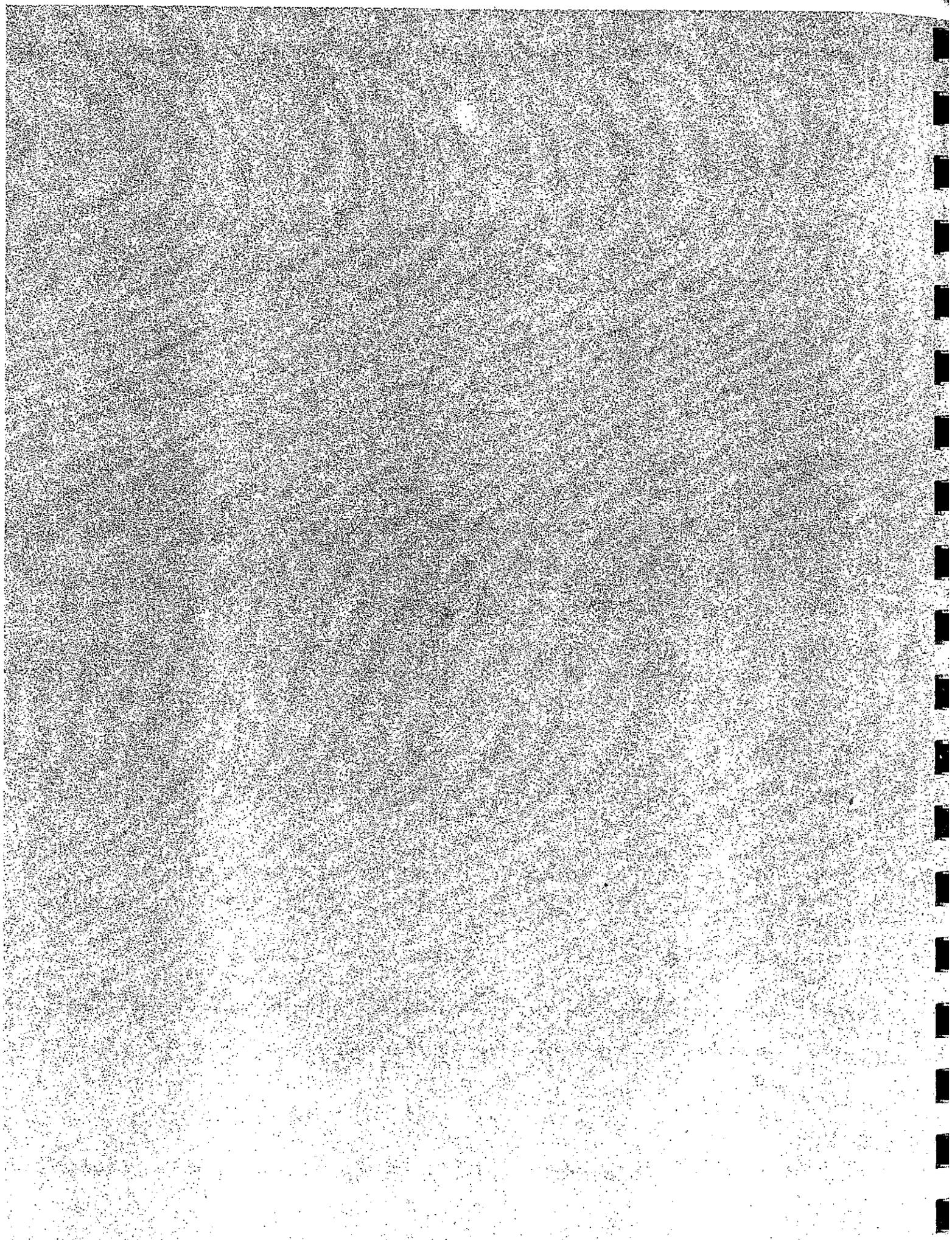
In our previous comments, we noted that the EIR was ambiguous about whether or not the recommended mitigation measures were essential to protect worker health or whether they were desirable but optional. The current version is much improved, stating explicitly which mitigation measures fall into the two categories. However, the wording of the key paragraph (P. 79, last paragraph) is still somewhat confusing.

Once again, we appreciate the effort that HCD has put into improving the Worker Safety and Health section of the EIR, and are pleased that the EIR is much improved as a result of those efforts. We look forward to seeing the Final EIR, and to working further with HCD as the implementation of the mitigation measures proceeds. If you have any questions about these comments or related worker health and safety issues, please feel free to contact Dr. Linda Rudolph or Jim Bellows, of the DHS California Occupational Health Program, at (415) 540-2115 or ATSS 571-3448.

Steven A. Book, Ph.D., Chief

Attachments







## Memorandum

To : Kenneth W. Kizer, M.D., M.P.H.  
Director  
8/1253

Via : Harvey F. Collins, Ph.D.  
Deputy Director  
Public Health  
8/1353

From : Office of Environmental Health  
Hazard Assessment  
8/442 4-7572

Date :

Subject: Comments on  
Plastic Pipe  
Environmental Impact  
Report

Attached is a copy of comments on the Draft Environmental Impact Report (DEIR) on the expanded use of plastic plumbing pipe. The DEIR was recently released by the Department of Housing and Community Development (HCD). Maureen Higgins, the Director of HCD, requested that the Department of Health Services provide comments on the DEIR. At your request, Office of Environmental Health Hazard Assessment staff reviewed the Worker Health and Safety sections of the DEIR and our comments were transmitted directly to Ms. Higgins. Our comments are based on the expertise developed by the staff of our branch during a study--conducted in cooperation with the California Public Health Foundation--of worker exposures during installation of plastic plumbing pipe. Other branches within the Department may be submitting comments on the sections of the DEIR relating to public drinking water safety.

Our comments reflect two main concerns with the DEIR. First, it understates the magnitude of chemical exposures that occur during plastic pipe installation, and underrates the potential health impacts of those exposures. Second, the DEIR presents a series of measures that could limit the exposures, but it provides no mechanisms for assuring that the hazard control measures would actually be implemented by a significant fraction of employers and employees in the construction industry. In our comments we have made specific suggestions for improving the DEIR in these areas.

If you have any questions please contact me.

Richard J. Jackson, M.D., M.P.H.  
Chief

Attachment



**Memorandum**

To : Maureen Higgins, Director  
Department of Housing and  
Community Development  
P.O. Box 952051  
Sacramento, CA 94252-2051

Date :

Subject: Comments on  
Plastic Pipe  
Environmental  
Impact Report

From : Office of Environmental Health  
Hazard Assessment  
714 P Street, Room 442  
Sacramento, CA 95814  
324-7572

At your request, staff of the Office of Environmental Health Hazard Assessment has reviewed the Draft Environmental Impact Report (DEIR) on the expanded use of plastic plumbing pipe, recently released by the Department of Housing and Community Development (HCD). Because we were involved (in cooperation with the California Public Health Foundation) in producing much of the information used for assessing worker health and safety impacts, we focused our review on the worker health and safety sections of the DEIR.

We have two fundamental concerns about the DEIR. First, it understates the magnitude of toxic chemical exposures found to occur during plastic pipe installation, and underrates the potential health impact of those exposures. Second, the DEIR alludes to a series of measures that could minimize these impacts, yet it provides no substantive recommendations about how HCD could assure that these measures would be implemented.

We believe that the exposures known to occur during installation of plastic plumbing pipe are significant enough that HCD must provide some mechanism for assuring, more directly, that the recommended control measures are adopted throughout the industry. The following are recommendations for strengthening the DEIR in these areas. We believe that methods for effectively implementing the hazard control measures must be incorporated into the DEIR, or the inadequacy of existing toxicity data may hinder acceptance of the final Environmental Impact Report.

1. State fully the extent of chemical exposures during installation of plastic plumbing pipe.

The DEIR Summary correctly states that "installation using current procedures may cause short-term exposure limits to be exceeded one or more times on a substantial fraction of work days." However, the body of the DEIR fails to cite much of the strongest data from our worker exposure study. For example, the DEIR discusses the somewhat abstract concept of short-term exceedance probabilities, but nowhere mentions that worker exposures to tetrahydrofuran (THF) reached 529 ppm, more than twice the federal Permissible Exposure Limit. The DEIR does not clearly state that



workers installing plastic pipe for extended periods in highly-enclosed spaces are almost certain to experience repeated exposures above the legal exposure limit.

Similarly, the DEIR correctly states the highest measured exposures to THF and methyl ethyl ketone (MEK), 77% and 22.5% of their respective legal exposure limits. However, the DEIR does not point out that the highest measured exposure to all pipe cement solvents exceeded the exposure limit, based on an accepted index of combined exposure. Nor does it cite our estimate that workers installing chlorinated polyvinylchloride (CPVC) potable water pipe will be overexposed to these chemicals on approximately one of every ten work days.

Perhaps most importantly, the DEIR gives only brief mention to the importance of skin contact with plastic pipe cements and primers as a route of entry of toxic chemicals into the body. Specifically, the DEIR does not cite our data showing that some plumbers with heavy skin contact with cements and primers had concentrations of THF in their urine far in excess of the amount that would be expected from their airborne exposures alone. The estimated equivalent airborne THF exposures for these plumbers were up to 740 ppm, nearly four times the full-shift exposure limit. While the exact values are subject to some interpretation, these data give important evidence that some plumbers may absorb very substantial amounts of THF through their skin, and that the extent of skin contact must be given careful consideration when assessing overall exposure.

2. State more clearly the inadequacy of available toxicity information, especially for THF, and the limits thus placed on assessing the health impact of documented exposures.

The DEIR, in its summary of Cumulative and Long-Term Implications, acknowledges that the toxicologic data are not complete, yet asserts that "repeated exposure would probably not accumulate to serious, long-term health risks." In the case of THF, the chemical present at highest concentrations during CPVC water pipe installation, a statement that the toxicologic data are "not complete" seriously misrepresents the level of inadequacy. To our knowledge, no studies of the chronic toxicity of THF have been reported. Even the effects of short-term exposures at various exposure levels are relatively unknown in humans. Therefore, the ability of THF to cause such adverse health effects as cancer, nervous system damage, or reproductive toxicity must be considered unknown. The DEIR's conclusion that repeated exposure would "probably not accumulate to serious, long-term health risks" is entirely inappropriate. This unfounded assertion should be removed from the DEIR, especially from the sections on Cumulative and Long-Term Implications and on Significant Irreversible Changes.



Since the publication of our report on worker health hazards during plastic pipe installation, new information has been published about possible liver damage in workers exposed to THF (Garnier et al., Tetrahydrofuran Poisoning After Occupational Exposure. British Journal of Industrial Medicine 43: 577-78, 1989). This underscores the imprudence of assuming that long-term health risks would not be significant, in the absence of any chronic toxicity data. Forming public policy on such an assumption would be similarly imprudent.

Additionally, the consequences of repeated irritation of eyes, nose, and throat should not be lightly dismissed. A growing body of evidence suggests that repeated irritation may contribute to chronic illness (see, for example, Barnhart, S., Occupational Bronchitis: A Marker for Irritant Exposure. Seminars in Respiratory Medicine 7: 249-256, 1986 or Woutersen, R.A., et al., Nasal Tumors in Rats after Severe Injury to the Nasal Mucosa and Prolonged Exposure to 10 ppm Formaldehyde. Journal of Applied Toxicology 9: 39-46, 1986).

In a similar vein of underestimating the possible health impacts of documented risk factors, the DEIR states, in the Conclusion of the Worker Health and Safety section, that "increased use of plastic pipe may also lead to a decrease of unknown magnitude in the risk of accidental injury." This conclusion was apparently not based on any supporting evidence, and ignores two risk factors cited in our study that could well lead to an increase in serious accidents (namely, less-trained workers and a faster work pace).

Finally, the Worker Health and Safety section also concludes that "No major outbreaks of solvent-related illness are known among plumbers in California." While this may be a true statement, it is meaningless since no effort has been made to identify any such outbreaks or to compile cases of solvent-related illness among plumbers. It should be removed.

3. The recommended measures for limiting exposures should be made much more concrete, and specific implementation proposals should be assessed to determine whether real improvements in working conditions and work practices would be made.

The DEIR Summary concludes, in the worker health section, that "the occasionally excessive short-term exposures as well as total biological uptake could be reduced by instituting reasonable control measures that are not now widely used." However, unless HCD devises specific, effective implementation proposals, the hazard control recommendations included in the DEIR should not be expected to have much real impact on working conditions or exposure levels. In the absence of specific, effective implementation strategies, HCD must give much more serious consideration to the worker exposures, and possible health risks, likely to occur with increased use of plastic pipe.



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Since the DEIR contains few concrete implementation proposals, we offer some possibilities below. Of course, numerous other strategies could also be devised. In any case, HCD should assess the ability of these strategies to assure safe and healthful working conditions.

On the subject of worker education and training, the DEIR states that "HCD could encourage primer and cement manufacturers and plastic pipe and supplies distributors to provide additional technical information to employers." Unfortunately, unavailability of technical information is not the weak link that prevents employers from mounting effective health and safety training programs. Rather, such programs are generally not offered because plumbing contractors have no background (and often no skill) in health and safety training, and because good training resources for plumbers are not generally available. Additionally, Cal/OSHA has previously devoted few of its limited resources to enforcement of training requirements in the current construction safety regulations, and lacks resources to enforce the training provisions aggressively in the near future.

To effectively implement a recommendation for better training, HCD could encourage or require plastic pipe manufacturers and distributors to commit substantial resources in an effort to create effective training programs for safe use of plastic pipe. These programs could be offered directly by the manufacturers and suppliers, or could be sponsored by these groups but provided by unions, contractors' associations, and private consultants.

Similarly, the DEIR properly points to plastic pipe installation in enclosed spaces as a particular problem area, and suggests that Cal/OSHA enforce existing regulations that require forced ventilation to reduce exposures to acceptable levels. However, Cal/OSHA enforcement resources are limited, so unless a specific agreement can be reached to focus enforcement efforts on these regulations, Cal/OSHA activity should not be relied upon to prevent installation of plastic pipe in enclosed areas or to assure that proper ventilation will be provided. We recommend that HCD consider a role for local building inspectors, who already make frequent inspections at every construction site. While these inspectors should not be expected to evaluate exposure levels, they could easily determine whether plastic pipe was being installed in enclosed areas and whether forced ventilation was provided. Perhaps HCD could devise a mechanism for granting some enforcement authority to local building inspectors, or at least a mechanism for assuring that appropriate referrals to Cal/OSHA were made.

The DEIR recommends adding worker health and safety questions to licensing examinations given by the Contractors State Licensing Board. Many contractors could be expected to answer these questions correctly, although they may not have effective health and safety programs for their workers. Therefore, this recommendation should be made more substantial. For example, individual plumbing contractors could be required to provide



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documentation that they had instituted a comprehensive worker health and safety program whenever they applied for a building permit that called for installation of plastic pipe. At your request, we would be willing to specify the elements that would be required as part of a comprehensive health and safety training program.

The DEIR suggests that HCD recommend to the National Sanitation Foundation (NSF) that they prohibit use of dimethylformamide in plastic pipe cements and primers, and that they require an addition of indelible dyes (to discourage skin contact to the few primers and cements that currently do not contain dyes). Such a recommendation may influence NSF, but certainly do not constitute a guarantee that these measures will be carried out. HCD should explore other measures that more directly assure these simple yet effective measures.

We recognize that the suggestions above imply a role for HCD in the area of worker health and safety that goes beyond its previous activities. Essentially, this expanded responsibility began with HCD's inclusion of worker health and safety in the environmental impact review process. However, we believe that the measures recommended above are feasible, and that in the absence of other effective means of protecting worker health they are also appropriate.

We would be happy to discuss these recommendations in greater detail, and look forward to continuing our productive working relationship with your Department.

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