State of California
Department of Housing and Community Development

Negative Declaration / Initial Study

Multi-Agency Adoption of Regulations Related to the Use of PEX and PEX-AL-PEX for Potable Water

Arnold Schwarzenegger, Governor

Lynn Jacobs, Director
Department of Housing and Community Development

September 2006

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1.0 PROJECT BACKGROUND

1.1 PROJECT INTRODUCTION

History. During the adoption cycle for the 2001 triennial code the California Building Standards Commission (**BSC**) had originally intended to adopt the model code with the PEX provisions intact. However, BSC received a letter during the public comment period that alleged several potential problems with the use of PEX as a potable water pipe. BSC decided to withhold approval of the PEX provisions and adopt the code so that PEX was not approved for use in potable water distribution in California for occupancies under the authority of state agencies. BSC was sued by the Plastic Pipe and Fittings Association which was seeking a writ of mandate requiring BSC to adopt the PEX provisions. The lower court's grant of the writ was overturned on appeal. The appellate court concluded that the decision by BSC, to withhold approval until PEX could be reviewed further, was based on substantial evidence.[1]

In addition to the letter referenced by the court, the Lead Agency has received additional comments listing potential adverse environmental impacts associated with the use of PEX in potable water distribution.

PEX and PEX-AL-PEX. PEX is a high density polyethylene (**HDPE**) plastic material that has been chemically or physically changed in such a manner that the polymer chains are linked together (**cross-linked**). The result is a thermo-elastic product whose performance characteristics for potable water use are better than the starting material.

There are three major methods to commercially produce PEX:

1. Peroxide or Engle method is a chemical process where a peroxide is added to the HDPE material and through a combination of high temperature and presser, the cross-linking is created as the tube is produced;

2. Silane method is a chemical process where the HDPE resin, peroxide, and silane are mixed together. There are two main techniques for cross-linking: cross-linking is either formed during the melting phase or it occurs after the tube is formed; and

3. Electron beam is a physical process where a high-energy radiation beam is directed at pre-formed tubing. This high energy causes hydrogen atoms to be released and the polymer chains to link at the newly available sites on carbon atoms.

These three methods of production are sometimes referred to by their European labels: PEX-A, PEX-B, or PEX-C, respectively.

[1] Plastic Pipe and Fittings Association v. California Building Standards Commission et al., 124 Cal. App. 4th 1390 (2004)

Document Purpose and Organization. This Draft Negative Declaration and Initial Study (**ND/IS**) assesses the potential environmental effects of the proposed Multiple Agency Adoption of Regulations Related to PEX and PEX-Al-PEX Tubing for Potable Water Use. This document has been prepared in accordance with the California Environmental Quality Act (**CEQA**), Public Resources Code §2100 *et seq.*, and the CEQA Guidelines, California Code of Regulations §15000 *et seq.* The proposed project involves the adoption of regulations pertaining to crosslinked polyethylene (**PEX**) and crosslinked polyethylene-aluminum-crosslinked polyethylene (**PEX-Al-PEX**) tube use for potable water. The regulations cover applications under the jurisdiction of the California Department of Housing and Community Development (**HCD**), the California Department of General Services, Division of the State's Architect (**DSA-SS**) and the California Building Standards Commission (**BSC**). HCD is the CEQA "**Lead Agency**" for the proposed project while DSA-SS and BSC are CEQA "**Approving Agencies**".

An Initial Study is prepared by a Lead Agency to determine if a project may have one or more significant adverse effects on the environment. In accordance with the State CEQA Guidelines Section 15064(a), an Environmental Impact Report (**EIR**) must be prepared if there is substantial evidence (such as the results of the IS) that a project may have one or more significant adverse effects on the environment, and those respective effects can not be mitigated to a level of insignificance. A Negative Declaration or Mitigated Negative Declaration may be prepared if the Lead Agency determines that the project would have no potentially significant effects, or that revisions made to the project would mitigate the potentially significant effects to a less-than-significant level.

Section 1.0 of the Draft ND/IS provides a description of the proposed project, the purpose and need for the project, and the location of ~~where~~ the project ~~is located.~~ Section 1 also includes a summary of Environmental Findings

Section 2.0 of the Draft ND/IS provides a list of all the environmental findings from the Initial Study.

Section 3.0 of the Draft ND/IS is the Initial Study. The Initial Study serves as the support document for the proposed adoption of a Negative Declaration for the project. The proposed project consists of the adoption of regulations related to the use of PEX and PEX-AL-PEX tubing for potable water distribution. HCD will serve as the Lead Agency for the proposed project and DSA-SS and BSC are Approving Agencies.

Section 4.0 of the Draft ND/IS is a list of persons contacted during preparation of the document.

Section 5.0 is a list of references.

1.2 PROJECT LOCATION

The proposed Multiple Agency Adoption of Regulations Related to PEX and PEX-Al-PEX Tubing for Potable Water Use is a regulatory change. As such, it may take effect over the entire state of California.

1.3 PROJECT DESCRIPTION

Health and Safety Code Sections 17922 and 19990 direct the Lead Agency and the approving agencies to adopt the most recent edition of the model plumbing code. The California Building Standards Commission (**BSC**) selected the 2006 Uniform Plumbing Code (**UPC**) published by the International Association of Plumbing and Mechanical Officials (**IAPMO**) as the model code for the 2007 triennial code adoption cycle. The project is a proposed change to Part 5, Title 24, California Code of Regulations (hereinafter referred to as the California Plumbing Code) applicable to buildings under the jurisdiction of the Department of Housing and Community Development (**HCD**), California Building Standards Commission (**BSC**), and the Department of General Services, Division of the State Architect- Structural Safety (hereinafter referred to the Division of the State Architect or **DSA-SS**). For this project, HCD is the Lead Agency. BSC and DSA-SS are **Approving Agencies**.

The Lead Agency and the Approving Agencies have proposed changes to the California Plumbing Code that would result in the California code conforming more fully to the Uniform Plumbing Code: specifically, by allowing the use of crosslinked polyethylene (**PEX**) and crosslinked polyethylene-aluminum-crosslinked polyethylene (**PEX-AL-PEX**) pipe for potable water distribution. PEX is a flexible plastic used for radiant heating systems and in some jurisdictions, potable water distribution. PEX-AL-PEX is a layered pipe in which the outer and inner layers are PEX with a middle layer of aluminum.

The UPC has listed PEX as an approved material for potable water distribution since 2000. Although it was not incorporated into the California Plumbing Code, some local jurisdictions have approved its use for potable water. PEX-AL-PEX was listed in the UPC for the first time in 2003. There was no update to the California plumbing code in 2004. Thus, the 2001 California Plumbing Code would be modified by deleting the restriction on PEX and adopting the new model code language for PEX-AL-PEX. This environmental review is to evaluate the impacts associated with the code modifications related to the Lead and Approving Agencies only. Other California agencies may make changes or keep modifications related to PEX or PEX-AL-PEX.

Express code terms, for the Lead and Approving Agencies, with repealed text displayed in strikeout:

604.1 All pipe, tube, and fittings carrying water used in potable water systems intended to supply drinking water shall meet the requirements of NSF 61 as found in Table 14-1. 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 Authority Having Jurisdiction.

Materials for building water piping and building supply piping shall be in accordance with Table 6-4 and the standards in Table 14-1.

[For BSC & DSA/SS] ~~*Exception: 2.*~~
~~*Use of PEX piping is not adopted for applications under the authority of the Building Standards Commission or the Division of the State Architect.*~~

~~***604.1.1 [For HCD 1 & HCD2]*** *Water distribution pipe, building supply water pipe, and fittings shall be of brass, copper, cast iron, CPVC, galvanized malleable iron, galvanized wrought iron, galvanized steel, PEX or other approved materials. Asbestos-cement, CPVC, PE or PVC, water pipe manufactured to recognized standards may be used for cold water building supply distribution systems outside a building except as provided for CPVC use pursuant to section 604.1.2. 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.*~~

Table 6-4

Material	Water Distribution Pipe and Fittings		Building Supply Pipe and Fittings
	Hot	Cold	
Asbestos-Cement			X
Brass	X	X	X
Copper	X	X	X
Cast Iron	X	X	X
CPVC	X	X	X
Galvanized Malleable Iron	X	X	X
Galvanized Wrought Iron	X	X	X
Galvanized Steel	X	X	X
PE			X
PE-AL-PE	X	X	X
PEX	X	X	X
PEX-AL-PEX	X	X	X
PVC			X

604.11 PEX. ~~*[Not Adopted by BSC, HCD, DSA SS]*~~
Cross-linked polyethylene (PEX) tubing shall be marked with the appropriate standard designation(s) listed in Table 14-1 for which the tubing has been listed or approved. PEX tubing shall be installed incompliance with the provisions of this section.

604.11.1 PEX Fittings ~~*[Not Adopted by BSC, HCD, DSA SS]*~~
Metal insert fittings, metal compression fittings, and cold expansion fittings used with PEX tubing shall be manufactured to and marked in accordance with the standards for the fittings in Table 14-1.

604.11.2 Water Heater Connections ~~*[Not Adopted by BSC, HCD, DSA SS]*~~
PEX tubing shall not be installed within the first eighteen (18) inches (457mm) of piping connected to a water heater.

604.13 PEX-AL-PEX and PE-AL-PE
Crosslinked polyethylene-aluminum-crosslinked polyethylene (PEX-AL-PEX) and polyethylene-aluminum- polyethylene (PE-AL-PE) composite pipe shall be marked with the appropriate standard designations listed in Table 14-1 for which the piping has been listed or approved. PEX-AL-PEX and PE-AL-PE piping shall be installed in compliance with the provisions of this section.

604.13.1 PEX-AL-PEX and PE-AL-PE
Fittings used with PEX-AL-PEX and PE-AL-PE piping shall be manufactured to and marked in accordance with the standard for the fittings in Table 14-1.

604.13.2 Water Heater Connectors
PEX-AL-PEX or PE-AL-PE tubing shall not be installed within the first eighteen inches (18) (457 mm) of piping connected to a water heater.

1.4 LEAD/RESPONSIBLE AGENCY PROJECT APPROVALS AND PERMITS

Lead Agency – California Department of Housing and Community Development. Under the provisions of the California Environmental Quality Act, the California Department of Housing and Community Development (HCD) is the lead agency for this project. As noted earlier, this project combines the regulatory changes proposed to the California Plumbing Code (**CPC**) for HCD, the California Building Standards Commission (**BSC**), and the Department of General Services, Division of the State Architect - Structural Safety (**DSA-SS**).

Approvals that may be needed by other agencies include the California Building Standards Commission and the Department of General Services, Division of the State Architect.

1.5 SUMMARY OF FINDINGS

Section 2.0 of this document contains the environmental findings. The following is a summary of the issues:

Potentially Significant Issues Requiring Mitigation/Other Requirements:

None.

Issues Found Not to be Significant:

1. Aesthetic/Visual
2. Agricultural Resources
3. Air Quality
4. Biological Resources
5. Cultural Resources
6. Geology and Soils
7. Hazards
8. Hydrology and Water Quality
9. Land Use and Planning
10. Mineral Resources
11. Noise
12. Population and Housing
13. Public Services
14. Recreation
15. Transportation
16. Utilities and Service Systems

All technical studies and documents consulted during the preparation of this Negative Declaration/Initial Study are available upon request from the Lead Agency, the California Department of Housing and Community Development, unless otherwise noted. All references are listed in Section 5.0.

Contact: Ms. Robin Gilb, Staff Counsel
California Department of Housing and Community Development
Legal Affairs Division
P.O. Box 952052
Sacramento, CA 94252-2052

(916-324-5817)
FAX: 916-323-2815
Plastics@hcd.ca.gov

2.0 ENVIRONMENTAL FINDINGS AND MITIGATION MEASURES

On the basis of the Initial Study (Section 3.0) and in accordance with the provisions and regulations of the California Environmental Quality Act (CEQA) the Lead Agency makes the following environmental findings for the proposed project:

2.1 AESTHETICS/VISUAL RESOURCES

There would not be any direct impacts to aesthetics/visual resources as the project itself is the adoption of regulations. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, it is not likely that the pipe would be exposed to such a degree as to make it readily visible. Thus, the project would not have any indirect effects on aesthetics/visual resources.

No mitigation measures are necessary.

2.2 AGRICULTURAL RESOURCES

This project does not have a "site", as it consists of the adoption of regulations and is not a "bricks and mortar" type of project. The project will not affect any land designated as Prime Farmland, Unique Farmland or Farmland of Statewide Importance. The project will not interfere with any Williamson Act contracts. The project would have no significant adverse effect on agricultural resources and production. The proposed project would result in regulations being adopted into the California Plumbing Code.

No mitigation measures are necessary.

2.3 AIR QUALITY

The project would not result in the generation of any long-term combustion or particulate emissions, or other air pollutants. The project is limited to the adoption of regulations related to potable water pipes. Individuals that act on the proposed regulations may engage in activities that impact air quality, however, the proposed piping material does not require the use of glues, or primers. The proposed project would result in regulations being adopted into the California Plumbing Code.

No mitigation measures are necessary.

2.4 BIOLOGICAL RESOURCES

The project would not result in any habitat modifications, wetland impacts, interference with fish or wildlife movements, conflicts with any local policies or ordinances that protect biological resources, or conflicts with any conservation plans.

No mitigation measures are necessary.

2.5 CULTURAL RESOURCES

The project would not result in any changes in historical, archeological, or paleontological resources. The project would not disturb any human remains.

No mitigation measures are necessary.

2.6 GEOLOGY AND SOILS

The project would not result in the exposure of people or structures to substantial adverse effects involving earthquakes, seismic ground shaking, ground failure or landslides. The project is not located on a site, and thus would not be located on a geological unit or soil that is unstable, expansive or incapable of adequately supporting the use of waste disposal systems.

No mitigation measures are necessary.

2.7 HAZARDS

The project does not involve the use or transport of hazardous materials. Individuals who act on the regulation adoption may engage in activities associated with hazardous materials; however those activities would be regulated by other regulations and permits. The project would not require or regulate the use or transport of hazardous materials.

No mitigation measures are necessary.

2.8 HYDROLOGY AND WATER QUALITY

The project would not result in a significant change in any drainage patterns, stream course, or expose large areas of soil to erosion. The project will not result in the violation of any water quality standards or waste discharge requirements. The project will not contribute runoff water, substantially degrade water quality, require placement of housing in any particular area, including flood areas, or expose people or structures to a significant risk due to flooding. The project will not result in inundation by seiche, tsunami, or mudflow.

No mitigation measures are necessary.

2.9 LAND USE AND PLANNING

The project would not physically divide an established community. The project would not have an effect on land use planning or conservation plans.

No mitigation measures are necessary.

2.10 MINERAL RESOURCES

There are no known mineral resources that would be affected by the project.

No mitigation measures are necessary.

2.11 NOISE

The project would not generate any changes in noise levels. The proposed project would result in regulations being adopted into the California Plumbing Code.

No mitigation measures are necessary.

2.12 POPULATION AND HOUSING

The project would not result in any substantial direct or indirect population growth. The proposed project would result in regulations being adopted into the California Plumbing Code.

No mitigation measures are necessary.

2.13 PUBLIC SERVICES

The proposed project would not result in any substantial adverse physical impacts such that new or altered governmental facilities would be needed. This includes fire protection, police protection, schools, parks, and other public facilities.

No mitigation measures are necessary.

2.14 RECREATION

The proposed project would have no adverse effect on existing park facilities and would not generate a demand for additional recreational facilities.

No mitigation measures are necessary.

2.15 TRANSPORTATION

The project would not have any effect on traffic or transportation.

No mitigation measures are necessary.

2.16 UTILITIES AND SERVICE SYSTEMS

The project will cause the exceedance of wastewater treatment requirements or require the construction of new wastewater treatment facilities. The project will not impact storm water drainage facilities. The project will not require an increase in water supply resources or entitlements. The project will not exceed a landfill capacity. The project complies with all federal, state, and local statutes and regulations related to solid waste.

No mitigation measures are necessary.

2.17 DETERMINATION

Pursuant to Section 21082.1 of the California Environmental Quality Act, the Lead Agency has generated, reviewed, and analyzed the Initial Study and Negative Declaration for the proposed Multiple Agency Adoption of Regulations Related to PEX and PEX-Al-PEX Tubing for Potable Water Use project and finds that said documents reflect the independent judgment of the Lead Agency.

The Lead Agency further finds that no mitigation measures are necessary and that the project would no result in any potentially significant, adverse environmental effects. There is no substantial evidence that the proposed project, as mitigated and conditioned, would have a significant effect on the environment based on the available project information and environmental analysis presented in this document. Therefore, a proposed ND/IS has been prepared in accordance with the State CEQA Guidelines.

I hereby approve this project:

_____

Lynn Jacobs, Director
Department of Housing and Community Development

Dated: _____

3.0 ENVIRONMENTAL CHECKLIST

3.1 PROJECT SUMMARY INFORMATION

1. Project Title:

Multiple Agency Adoption of Regulations Related to PEX and PEX-Al-PEX Tubing for Potable Water Use

2. Lead Agency:

California Department of Housing and Community Development
P.O. Box 952052
Sacramento, CA 94252-2052

3. Lead Agency Contact Person:

Ms. Robin Gilb
Staff Counsel
California Department of Housing and Community Development
Legal Affairs Division
P.O. Box 952052
Sacramento, CA 94252-2052
916-324-5817
FAX: 916-323-2815
Plastics@hcd.ca.gov

4. Project Location:

Statewide

5. Project Sponsor

California Department of Housing and Community Development
P.O. Box 952052
Sacramento, CA 94252-2052

6. General Plan Designation and Zoning:

Not applicable; the project is the adoption of regulations and does not require a "site".

7. Description of Project:

This project is the adoption of regulations related to PEX and PEX-Al-PEX tubing for potable water use. Health and Safety Code Sections 17922 and 19990 direct

the Lead Agency and the Approving Agencies to adopt the most recent edition of the model plumbing code. The California Building Standards Commission (**BSC**) selected the 2006 Uniform Plumbing Code (**UPC**) published by the International Association of Plumbing and Mechanical Officials (**IAPMO**) as the model code for the 2007 triennial code adoption cycle. The proposed change to the California Plumbing Code (**CPC**) would apply to buildings under the jurisdiction of the Department of Housing and Community Development (**HCD**), California Building Standards Commission (**BSC**), and Division of the State Architect- Structural Safety (**DSA-SS**). For this project, HCD is the Lead Agency. BSC and DSA-SS are **Approving Agencies**.

The Lead Agency and the Approving Agencies have proposed changes to the California Plumbing Code (**CPC**) that would result in the California code conforming more fully to the Uniform Plumbing Code: specifically, by allowing the use of crosslinked polyethylene (**PEX**) and crosslinked polyethylene-aluminum-crosslinked polyethylene (**PEX-AL-PEX**) pipe for potable water distribution. PEX is a flexible plastic used for radiant heating systems and in some jurisdictions, potable water distribution. PEX-AL-PEX is a layered pipe in which the outer and inner layers are PEX with a middle layer of aluminum.

The UPC has listed PEX as an approved material for potable water distribution since 2000. Although it was not incorporated into the CPC, some local jurisdictions have approved its use for potable water. PEX-AL-PEX was listed in the UPC for the first time in 2003. There was no update to the CPC in 2004. Thus, the 2001 CPC would be modified by deleting the restriction on PEX and adopting the new model code language for PEX-AL-PEX. This new language would appear in the 2007 CPC.

This environmental review is to evaluate the impacts associated with the code modifications related to the Lead and Approving Agencies only. Other California agencies may make changes or keep modifications related to PEX or PEX-AL-PEX. The express code terms relating to PEX and PEX-AL-PEX for the Lead and Approving Agencies are as follows, with repealed text in strikeout:

604.1 All pipe, tube, and fittings carrying water used in potable water systems intended to supply drinking water shall meet the requirements of NSF 61 as found in Table 14-1. 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 Authority Having Jurisdiction.

[For BSC & DSA/SS] ~~*Exception: 2.*~~
~~*Use of PEX piping is not adopted for applications under the authority of the Building Standards Commission or the Division of the State Architect.*~~

~~***604.1.1 [For HCD 1 & HCD2]** Water distribution pipe, building supply water pipe, and fittings shall be of brass, copper, cast iron, CPVC, galvanized malleable iron, galvanized wrought iron, galvanized steel, PEX or other approved materials. Asbestos-cement, CPVC, PE or PVC, water pipe manufactured to recognized standards may be used for cold water building supply distribution systems*~~

~~*outside a building except as provided for CPVC use pursuant to section 604.1.2. 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.*~~

Materials for building water piping and building supply piping shall be in accordance with Table 6-4 and the standards in Table 14-1.

Table 6-4

Material	Water Distribution Pipe and Fittings		Building Supply Pipe and Fittings
	Hot	Cold	
Asbestos-Cement			X
Brass	X	X	X
Copper	X	X	X
Cast Iron	X	X	X
CPVC	X	X	X
Galvanized Malleable Iron	X	X	X
Galvanized Wrought Iron	X	X	X
Galvanized Steel	X	X	X
PE			X
PE-AL-PE	X	X	X
PEX	X	X	X
PEX-AL-PEX	X	X	X
PVC			X

604.11 PEX. ~~*[Not Adopted by BSC, HCD, DSA SS]*~~
Cross-linked polyethylene (PEX) tubing shall be marked with the appropriate standard designation(s) listed in Table 14-1 for which the tubing has been listed or approved. PEX tubing shall be installed incompliance with the provisions of this section.

604.11.1 PEX Fittings ~~*[Not Adopted by BSC, HCD, DSA SS]*~~
Metal insert fittings, metal compression fittings, and cold expansion fittings used with PEX tubing shall be manufactured to and marked in accordance with the standards for the fittings in Table 14-1.

604.11.2 Water Heater Connections ~~*[Not Adopted by BSC, HCD, DSA SS]*~~
PEX tubing shall not be installed within the first eighteen (18) inches (457mm) of piping connected to a water heater.

8. Surrounding Land Uses and Setting:

Surrounding land uses: not applicable; the project is the adoption of regulations and does not require a "site," thus there are no surrounding land uses.

Setting: The project is a proposed change to the California Plumbing Code (**CPC**)

applicable to buildings under the jurisdiction of the Department of Housing and Community Development (**HCD**), California Building Standards Commission (**BSC**), and Division of the State Architect- Structural Safety (**DSA-SS**).

For HCD, the changes to the CPC would apply to: hotels, motels, lodging houses, apartment houses, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory-built housing and other types of dwellings containing sleeping accommodations with or without common toilet or cooking facilities including accessory buildings, and facilities; as well as permanent buildings and permanent accessory buildings or structures, constructed within mobilehome parks and special occupancy parks that are under the control and ownership of the park operator.

For BSC, the changes to the CPC would apply to: state buildings (all occupancies), including buildings constructed by the Trustees of the California State Universities and Colleges and the Regents of the University of California where no state agency has the authority to adopt building standards applicable to such buildings.

For DSA-SS, the changes to the CPC would apply to: public elementary and secondary schools, community college buildings and state-owned or state-leased essential services buildings.

9. Other approving agencies:

California Building Standards Commission
California Department of General Services, Division of the State Architect

3.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

	Aesthetics		Agriculture Resources		Air Quality
	Biological Resources		Cultural Resources		Geology / Soils
	Hazards & Hazardous Materials		Hydrology / Water Quality		Land Use / Planning
	Mineral Resources		Noise		Population / Housing
	Public Services		Recreation		Transportation / Traffic
	Utilities / Service Systems		Mandatory Findings of Significance	X	None

3.3 DETERMINATION

On the basis of this initial evaluation:

■ I find that the proposed project **COULD NOT** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared.

I find that although the proposed project **COULD** have a significant effect on the environment, there **WILL NOT** be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.

I find that the proposed project **MAY** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.

I find that the proposed project **MAY** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at lease one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier **EIR** or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier **EIR** or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed project, noting further is required.

Signature	**Date**
Lynn Jacobs **Printed Name**	Director **Title**

Department of Housing and Community Development
Agency

3.4 EVALUATION OF ENVIRONMENTAL IMPACTS

This section identifies the environmental impacts of this project by answering questions asked by Appendix G of CEQA, the Environmental Checklist Form. The environmental issues evaluated in this chapter include:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biology
- Cultural Resources
- Geology
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities and Services Systems
- Mandatory Findings of Significance

All analyses take account of the entire action involved, including cumulative as well as project-level and indirect as well as direct impacts. Impacts are categorized as follows:

Potentially Significant Impact is appropriate if there is substantial evidence that an effect is significant, or where the established threshold has been exceeded. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) may be required.

Less than Significant with Mitigation Incorporated applies where the incorporation of mitigation measures would reduce an effect from Potentially Significant Impact to a Less than Significant Impact. Mitigation measures are prescribed to reduce the effect to a less than significant level.

Less than Significant applies when the project will affect or is affected by the environment, but based on sources cited in the report, the impact will not have an adverse affect.

A **No Impact** answer is adequately supported if referenced information sources show that the impact simply does no apply to projects like the one involved. A No Impact Answer is explained where it is based on project-specific factors as well as general standards.

Wherever possible, references to information sources for potential impacts are incorporated into the analysis. The environmental impacts are displayed in table format immediately followed by a discussion of the impacts. The following abbreviations were used in the tables: **PS** = Potentially Significant; **LSM** = Less than Significant with Mitigation; **LS** = Less than Significant; **NI** = No Impact. As a convenience to the reader, the key to the abbreviations are displayed at the bottom of the pages throughout the rest of this document.

	PS	LSM	LS	N
I. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	**X**
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	**X**
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	**X**
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	**X**

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

Discussion:

a) *Have a substantial adverse effect on a scenic vista?*

There would not be any direct impacts to scenic vistas as the project itself is the adoption of regulations. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, it is not likely that the pipe would be exposed to such a degree as to make it readily visible. Thus, the project would not have any indirect effects on scenic vistas.

b) *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?*

There would not be any direct impacts to scenic resources as the project itself is the adoption of regulations. Although it cannot be said with certainty how an individual person may install or use potable water pipe in response to these regulations, it is not likely that the use of the project tubing would require damage to rock outcroppings, historic buildings or trees. Thus, the project would not have any indirect effects on scenic resources.

c) *Substantially degrade the existing visual character or quality of a site and its surroundings?*

The proposed project would not substantially degrade the visual character or quality of either a site or its surrounds. The project is the adoption of regulations. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, it is not likely that the pipe would be exposed to such a degree as to make it readily visible. Thus, the project would not indirectly substantially degrade the visual character or quality of either a site or its surrounds.

d) *Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?*

The proposed project is the adoption of regulations related to plumbing material. The project does not propose the use of any new sources of substantial light or glare. There may be some additional glare from equipment and lighting used during construction activities by those who act upon the new regulations. These indirect effects would be intermittent and of short duration.

Mitigation:
No mitigation measures are required.

	PS	LSM	LS	NI
II. AGRICULTURAL RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	**X**
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	**X**
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	**X**

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies. The project does not include a "site."

a) *Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

The project does not have a site and thus will not convert farmlands to non-agricultural uses. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice in plumbing material will not cause a conversion of Farmland to non-agricultural use.

b) *Conflict with existing zoning for agricultural use or a Williamson Act contract?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not conflict with existing zoning for agricultural use or a Williamson Act contract. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations,

the choice in plumbing material will not cause a conflict with existing zoning for agricultural use or a Williamson Act contract.

c) *Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not cause changes that could result in conversion of Farmland to non-agricultural use. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice in plumbing material will not cause changes in the existing environment that could result in conversion of Farmland to non-agricultural use.

Mitigation:
No mitigation measures are required.

	PS	LSM	LS	NI
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	**X**
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	**X**
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	**X**
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	**X**
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	**X**

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies. Neither PEX nor PEX-AL-PEX requires the use of welding, primers or glues for installation. The project may benefit air quality if PEX or PEX-AL-PEX is chosen as a plumbing material instead of piping that requires welding, glues, or primers.

how is it installed

a) Conflict with or obstruct implementation of an applicable air quality plan?

The project is a regulatory change related to plumbing materials. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the plumbing material does not require activities that would result in a conflict with or obstruction of the implementation of an air quality plan.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

The project is a regulatory change related to plumbing materials. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the plumbing material does not require activities that would result in a violation of any air quality standard or the contribution to an existing or projected air quality violation. The increase in use of the plumbing material may result in the increase in production of that material within California; however, those activities would be regulated by existing permits and regulations. The project does not authorize the violation of any permits or regulations.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which a project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

The project is a regulatory change related to plumbing materials. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the plumbing material does not require activities that would result in a cumulatively considerable net increase of any criteria pollutant. The increase in use of the plumbing material may result in the increase in production of that material within California; however, those activities would be regulated by existing permits and regulations. The project does not authorize the violation of any permits or regulations.

d) Expose sensitive receptors to substantial pollutant concentrations?

The project is a regulatory change related to plumbing materials. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the plumbing material does not require activities that would result in the exposure of sensitive receptors to substantial pollutant concentraions. The increase in use of the plumbing material may result in the increase in production of that material within California; however, those activities would be regulated by existing permits and regulations. The project does not authorize the violation of any permits or regulations.

e) Create objectionable odors affecting a substantial number of people?

The project is a regulatory change related to plumbing materials. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the plumbing material does not require activities that would result objectionable odors. The increase in use of the plumbing material may result in the increase in production of that material within California; however, those activities would be regulated by existing permits and regulations. The project does not authorize the violation of any permits or regulations.

	PS	LSM	LS	NI
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☐	X
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not cause changes that could result in direct impacts to a species. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not cause changes in the existing environment that could result in habitat modifications.

b) *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not cause changes in the existing environment that will have an effect on any riparian habitat or other sensitive natural community.

c) *Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not effect wetlands. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not have a substantial adverse effect on wetlands.

d) *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not interfere substantially with the movement of any fish or wildlife species or with established wildlife corridors, or impede the use of wildlife nursery sites. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

	PS	LSM	LS	NI
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	X
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	X
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not cause a substantial adverse change in the significance of a historical resource as defined in §15064.5 of the CEQA Guidelines.

b) *Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines?*

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the CEQA Guidelines.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

d) Disturb any human remains, including those interred outside of formal cemeteries?

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not disturb any human remains, including those interred outside of formal cemeteries. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not disturb any human remains, including those interred outside of formal cemeteries.

	PS	LSM	LS	NI
VI. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☐	X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	X
ii) Strong seismic ground shaking?	☐	☐	☐	X
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	X
iv) Landslides?	☐	☐	☐	X
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	X
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☐	X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

PS = Potentially Significant LSM = Less than Significant with Mitigation
LS = Less than Significant NI = No Impact

Discussion:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42; ii) Strong seismic ground shaking; iii Seismic-related ground failure, including liquefaction; iv) Landslides?

i) Fault Rupture. The project is a regulatory change related to plumbing materials. It does not have a site and thus will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving the rupture of a known earthquake fault. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving the rupture of a known earthquake fault.

ii) Ground Shaking. The project is a regulatory change related to plumbing materials. It does not have a site and thus will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.

iii) Ground Failure and Liquefaction. The project is a regulatory change related to plumbing materials. It does not have a site and thus will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction.

iv) Landslides. The project is a regulatory change related to plumbing materials. It does not have a site and thus will not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving the landslides. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.

b) Result in substantial soil erosion or the loss of topsoil?

The project is a regulatory change related to plumbing materials. It does not have a site and thus will not result in substantial soil erosion or the loss of topsoil. Although it cannot be said with certainty how an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not result in substantial soil erosion or the loss of topsoil.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

The project is a regulatory change related to plumbing materials. It does not have a site and thus cannot be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. Although it cannot be said with certainty where an individual person may install potable water pipe in response to these regulations, the choice of plumbing material will not cause a project to be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

The project is a regulatory change related to plumbing materials. It does not have a site and thus cannot be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property. Although it cannot be said with absolute certainty where an individual person may install potable water pipe in response to these regulations, the choice of plumbing material alone will not cause a project to be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

The project is a regulatory change related to plumbing materials. It does not have a site and thus cannot have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water. Although it cannot be said with absolute certainty where an individual person may install potable water pipe in response to these regulations, the choice of plumbing material alone cannot cause a project to have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

	PS	LSM	LS	NI
VII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	X

PS = Potentially Significant LSM = Less than Significant with Mitigation
LS = Less than Significant NI = No Impact

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

The project is a regulatory change related to plumbing materials. It does not involve the routine transport, use, or disposal of hazardous materials. The installation and use of the plumbing material does not require the routine transport, use, or disposal of hazardous materials. It is possible that resin production or tube extrusion may increase if the demand for the plumbing material increases, and that such an increase might involve the routine transport, use, or disposal of hazardous materials; however these activities would be covered by existing permits and regulations. The proposed project does not effect regulations related to hazardous materials.

b) *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

The project is a regulatory change related to plumbing materials. It does not involve the use of hazardous materials. The installation and use of the plumbing material does not require the use hazardous materials. It is possible that resin production or tube extrusion may increase if the demand for the plumbing material increases, and that such an increase might involve the use; however these activities would be covered by existing permits and regulations. The proposed project does not impact regulations related to hazardous materials, and is not reasonably expected to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

The project is a regulatory change related to plumbing materials. It will not emit hazardous emissions or require the handling of hazardous or acutely hazardous materials, substances, or waste. The installation and use of the plumbing material does not emit hazardous emissions or require the handling of hazardous or acutely hazardous materials, substances, or waste. It is possible that resin production or tube extrusion may increase if the demand for the plumbing material increases, and that such an increase might involve the hazardous emissions or require the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school; however these activities would be covered by existing permits and regulations. The proposed project does not effect regulations related to

material production sites or transportation routes.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

The project is a regulatory change related to plumbing materials. It does not have a site and thus cannot be located on a hazardous material site. Although it cannot be said with absolute certainty where an individual person may install potable water pipe in response to these regulations, the choice of plumbing material alone will not cause a project to be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

The project is a regulatory change related to plumbing materials. It is not located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport. The installation and use of the plumbing material does not require a location within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport. It is possible that resin production or tube extrusion may increase if the demand for the plumbing material increases, and that such production or extrusion may be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport; however these activities would be covered by existing permits and regulations. The proposed project does not effect regulations related to projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and therefore would not result in a safety hazard for people residing or working in the production or extrusion area.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

The project is a regulatory change related to plumbing materials. It is not located within the vicinity of a private airstrip. The installation and use of the plumbing material does not require a location within the vicinity of a private airstrip. It is possible that resin production or tube extrusion may increase if the demand for the plumbing material increases, and that such an increase might be located within the vicinity of a private airstrip; however these activities would be covered by existing permits and regulations. The proposed project does not effect regulations related to projects located within the vicinity of a private airstrip, and therefore would not result in a safety hazard for people residing or working in the production or extrusion area.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The project is a regulatory change related to plumbing materials. It will not impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The installation and use of the plumbing material does not require any activities that can reasonably be expected to impair the implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The project is a regulatory change related to plumbing materials. It will have no effect on wildland fires and will not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

	PS	LSM	LS	NI
VIII. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☐	X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	X
f) Otherwise substantially degrade water quality?	☐	☐	☐	X
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	X

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LS = Less than Significant NI = No Impact

	PS	LSM	LS	NI
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) Violate any water quality standards or waste discharge requirements?

Methyl-tert-butyl ether. In 2002, a lawsuit was filed in Arizona with the plaintiffs alleging that they were exposed to chemicals in their drinking water because of PEX pipes. The PEX pipe in question was manufactured by the Engle method (PEX-A). Methyl-tert-butyl ether (**MTBE**) and tert-butyl alcohol (**TBA**) are possible by-products of the Engle method of production. Water from the plaintiffs' house was tested and found to contain several chemicals, including MTBE, TBA, and several benzene compounds. Several chemicals were found that are not normally found with PEX pipe. The area around the house had been treated with a termiticide after the PEX pipe had been installed. The manufacturer claimed that the pipe was improperly treated after installation and that there were warnings on the label about allowing the pipe to come into contact with various chemicals. It is reasonable to conclude that the benzene compounds were introduced into the pipe by permeation.[2]

PEX pipe is subject to permeation by chemicals. There are many materials that PEX should not be exposed to including: pipe thread sealing compounds; some types of fire wall penetration sealing compounds; and petroleum-based materials. PEX should not be used in areas where the soil is heavily contaminated with compounds such as MTBE and other petroleum-based materials. PEX will not be an appropriate choice for plumbing pipe in all situations. Some areas of California have contaminated soil, and PEX would not be an appropriate choice when it would be exposed to that contamination.

The Lead Agency is only aware of one study where apparently normal (not exposed to chemicals and not known to be from an inferior lot of material) PEX pipe leached high levels of MTBE.[3]

In this study, the authors tested two pieces of PEX pipe. The surface area to volume ratio for the PEX pipe was 4:1. For the PEX pipe, test one showed 47.6 µ/L of MTBE and the second test showed 5.8 µ/L of MTBE. No information is available as to what

[2] Letter from Thomas Reid to California Building Standards Commission, January 13, 2003.

[3] *Volatile Organic Components Migrating from Plastic Pipes (HDPE, PEX, and PVC) into Drinking Water*, Water Research 37 (2003), p. 1912

the differences were between the two pipes, what manufacturing method was used, or what, if any, certifications were available for the pipe.

The California Office of Environmental Health Hazard Assessment (**OEHHA**) has adopted a public health goal (**PHG**) of 13 ppb for MTBE. The maximum contaminant level (**MCL**) for MTBE is also 13 ppb, the secondary MCL for MTBE is 5 ppb for taste and odor. There is no evidence that NSF certified PEX-A pipe will leach MTBE in excess of the California state standard of 13 ppb.

In addition to soil contamination, MTBE would also be a problem with PEX pipe if it were already in the drinking water prior to that water coming into contact with the pipe. MTBE has been found in California water supply systems. In all, 13,978 sources were tested. As of April 19, 2006, 111 water systems (0.8 percent of those tested) have been tested and had at least two reports of MTBE contamination of levels at least as high as 3 ppb. Of these 111 systems, 29 percent (32) have been found to have levels of MTBE at or exceeding the MCL of 13 ppb.[4] This works out to be 0.3 percent of the total water systems tested. While most of California's water sources are not contaminated, those few areas of the state with drinking water that is contaminated with MTBE should not use PEX pipe for potable water distribution.

MTBE Finding. The Lead Agency finds that there is evidence that when PEX pipe is exposed to petroleum-based products, the pipe will be compromised and may be permeated by various chemicals that may end up in the drinking water. There is also evidence that PEX pipe of unknown quality and origin has been tested and found to contain high (pipe one) and low (pipe two) levels of MTBE. However, there is no evidence that, under normal conditions, when PEX pipe is used for its intended purpose and according to the manufacturer's instructions, MTBE leaching exceeds California's limit of 13 ppb.

Biofilms. The term "biofilm" is used to describe a layer of microorganisms in an aquatic environment held together in a matrix attached to a surface such as pipes. Biofilm development is a result of successful attachment and subsequent growth of microorganisms on a surface. Under suitable conditions a biofilm develops, initially through the accumulation of organic matter on the metal surface, which is then colonized by bacteria.[5]

Experiments have shown that most pipe surfaces in distribution systems could contain biofilms with bacterial densities as high as 10^9 bacteria-cm^2. This includes, but is not limited to, pipes made of stainless steel, cement, PEX, copper, and PVC. For instance, copper piping material used in water distribution systems has been found to have two

[4] *MTBE: Drinking Water Standards and Monitoring Results*, Department of Health Services, http://www.dhs.ca.gov/ps/ddwem/chemicals/mtbe/mtbeindes.htm, last update: April 19, 2006, accessed 8/1/2006.

[5] *An Overview of Biofilm Formation in Distribution Systems and its Impact on the Deterioration of Water Quality*, Momba MNB, Kfir R, Venter SN, Cloete TE, Water SA Vol. 26 No.1 January 2000, also available at http://www.wrc.org.za

distinct biofilm layers: a layer in direct contact with the copper and a second layer consisting of bacteria.[6] Synthetic materials have been used in potable distribution systems for many years. Although plastics provide many advantageous properties, such as resistance to chemicals and corrosion, electrical non-conductivity, competitive cost, flexibility and ease of handling, storage and installation, these piping materials, like copper, contribute to biofilm formation in drinking water.[7]

Legionella pneumophila is a ubiquitous aquatic organism which can survive under a wide range of environmental conditions. This organism is the causative agent of Legionnaires disease, a severe form of pneumonia.[8] To combat such organisms, chlorine has been used for many years in the disinfection of potable water. However, there are certain disadvantages with chlorination. The concentration of hypochlorites required to be effective in inactivating *Legionella* species is relatively high and would most likely be corrosive to plumbing systems.[9]

Biofilms not only deteriorate the quality of water they can also contribute to corrosion. Corrosion can increase the metal concentration in water distributed by copper pipes.[10] This corrosion can have an unintended benefit. Corrosion of copper pipe releases copper ions. Copper and silver have been used for numerous years in the disinfection of water. These metals are known to affect a number of microorganisms including bacteria, viruses, and algae. Copper-silver ionization is a disinfection technology that has been used with increasing frequency to control *Legionella* in hospital hot water systems. In this method, copper and silver ions are electrolytically generated and introduced into recirculating hot water lines. These positively charged metallic ions attach to the negatively charged bacterial cell wall and cause cell lysis and death.[11]

Too much corrosion of the copper pipe can lead to degradation to the point where the integrity of the pipe is compromised. However, this biofilm-generated corrosion is limited. As the biofilm increases over time, the amount of copper released decreases.[12]

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[6] Ibid

[7] Ibid

[8] *Efficacy of Copper and Silver Ions and Reduced Levels of Free Chlorine in Inactivation of Legionella pneumophila*, Landeen LK, Yahya MT, Gerba CP, Applied and Environmental Microbiology, Dec 1989, p. 3045.

[9] Ibid

[10] *Microbiology, chemistry and biofilm development in a pilot drinking water distribution system with copper and plastic pipes*, Lehtola MJ, Miettinen IT, Keinanen MM, et al, Water Research, 38 (2004) 3769 – 3779.

[11] *Negative Effect of High pH on Biocidal Efficacy of Copper and Silver Ions in Controlling Legionella pneumophila*, Lin YE, Vidic RD, Stout JE, Yu VL, Applied and Environmental Microbiology, June 2002, 2711

[12] *Microbiology, chemistry and biofilm development in a pilot drinking water distribution system with copper and plastic pipes*, Lehtola MJ, Miettinen IT, Keinanen MM, et al, Water Research, 38 (2004) 3769 – 3779.

[13] In a study where polyethylene (PE) and copper pipe were analyzed for microbial growth potential, the PE pipe was found to reach a steady state of bacteria faster than the copper, but after 200 days, the copper pipe exhibited similar levels.[14] Another study compared PEX and copper pipes showed that although the copper pipe initially inhibited growth, after 760 days, the *Legionella* concentrations were about the same for both pipes.[15]

Biofilm Findings. All forms of water distribution pipe contribute to biofilm formation. While copper offers an initial advantage of inhibiting *Legionella* growth, this effect is limited in duration. The Lead Agency finds that PEX pipe will support biofilm growth and that new copper pipe will contaminate water with copper ions causing a temporary inhibition of some bacteria, including *Legionella*. Balancing the benefits of reduced short-term chances of *Legionella* infection against the risks associated with unregulated copper contamination of the water (due to pipe corrosion as opposed to a regulated copper-silver disinfection program), is not of such magnitude that the State ought to limit the consumer's choice in plumbing materials.

b) *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

The project is a regulatory change related to plumbing materials. It does not require the use of groundwater or effect groundwater recharge. The installation and use of the plumbing material does not require groundwater or effect groundwater recharge. It is possible that resin production or tube extrusion may increase if the demand for the plumbing material increases, and that such an increase might require an increase in water consumption; however these activities would be covered by existing permits and regulations. The proposed project does not effect regulations related to groundwater use or recharge, and therefore would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

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[13] *Pipeline materials modify the effectiveness of disinfectants in drinking water distributions systems*, Lehtola MJ, Miettinen IT, Lampola T, et al, Water Research 39 (2005) 1962-1791.

[14] *Microbiology, chemistry and biofilm development in a pilot drinking water distribution system with copper and plastic pipes*, Lehtola MJ, Miettinen IT, Keinanen MM, et al, Water Research, 38 (2004) 3769 – 3779.

[15] *Biofilm formation and multiplication of Legionella in a model warm water system with pipes of copper, stainless steel and cross-linked polyethylene*, Van der Kooij D, Veenendaal HR, Scheffer WJH, Water Research 39 (2005) 2789 – 2798.

c) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?*

The project is a regulatory change related to plumbing materials. It is not located on a site and will not alter drainage patterns. The installation and use of the plumbing material does not require the alteration of drainage patterns. The proposed project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

d) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?*

The project is a regulatory change related to plumbing materials. It is not located on a site and will not alter drainage patterns. The installation and use of the plumbing material does not require the alteration of drainage patterns. The proposed project will not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

e) *Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*

The project is a regulatory change related to plumbing materials. It is not located on a site and will not create or contribute runoff water. The installation and use of the plumbing material does not require the creation or contribution of runoff water. The proposed project will not create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

f) *Otherwise substantially degrade water quality?*

The project is a regulatory change related to plumbing materials. It will not have the potential to substantially degrade water quality.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

The project is a regulatory change related to plumbing materials. It is not located on a site and does not require the placement of houses in any particular area. The installation and use of the plumbing material does not require the placement of housing in any particular area. The proposed project will not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

The project is a regulatory change related to plumbing materials. It is not located on a site and does not require the placement of structures in any particular area. The installation and use of the plumbing material does not require the placement of structures in any particular area. The proposed project will not place structures which would impede or redirect flood flows within a 100-year flood hazard area.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

The project is a regulatory change related to plumbing materials. It is not located on a site and has no impacts on levees or dams. The installation and use of the plumbing material does not require any actions that could reasonably be expected to impact levees or dams. The proposed project does not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

j) Inundation by seiche, tsunami, or mudflow?

The project is a regulatory change related to plumbing materials. It is not located on a site and cannot reasonably be expected to cause impacts related to seiche, tsunami, or mudflows. The installation and use of the plumbing material does not require any actions that could reasonably be expected to cause impacts related to seiche, tsunami, or mudflows. The proposed project will not cause impacts related to inundation by seiche, tsunami, or mudflow.

	PS	LSM	LS	NI
IX. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	**X**
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	**X**
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	**X**

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) Physically divide an established community?

The project is a regulatory change related to plumbing materials. It is not located on a site and cannot reasonably be expected to cause the physical division of an established community. The installation and use of the plumbing material does not require any actions that could reasonably be expected to cause the physical division of an established community. The proposed project will not cause impacts related to reasonably be expected to cause the physical division of an established community.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

The project is a regulatory change related to plumbing materials. It is not located on a site and cannot reasonably be expected to conflict with land use plans, policies or regulations. The installation and use of the plumbing material does not require any actions that could reasonably be expected to conflict with land use plans, policies or regulations. The proposed project will not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

The project is a regulatory change related to plumbing materials. It is not located on a site and cannot reasonably be expected to conflict with any applicable habitat conservation plan or natural community conservation plan. The installation and use of the plumbing material does not require any actions that could reasonably be expected to conflict with any applicable habitat conservation plan or natural community conservation plan. The proposed project will not conflict with any applicable habitat conservation plan or natural community conservation plan.

	PS	LSM	LS	NI
X. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	**X**
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	**X**

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*

The project is a regulatory change related to plumbing materials. It is not located on a site and cannot reasonably be expected to result in the loss of availability of a known mineral resource. The installation and use of the plumbing material does not require any actions that could reasonably be expected to result in the use of a known miner resource. The proposed project will not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state and may result in enabling copper, a common plumbing material, to be used for other commodities or left in its natural state, and thus conserve copper resources that may be of value to the residents of the state.

b) *Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?*

The project is a regulatory change related to plumbing materials. It is not located on a site and cannot reasonably be expected to result in the loss of availability of a locally-important mineral resource recovery site. The installation and use of the plumbing material does not require any actions that could reasonably be expected to result in the loss of a locally-important mineral resource recovery site. The proposed project will not Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

	PS	LSM	LS	NI
XI. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

The project is a regulatory change related to plumbing materials. It does not involve any type of noise. The installation and use of the plumbing material may create a small amount of noise; however it would be minor and limited to the construction phase. The proposed project will not cause the exposure of persons to or generation of noise levels

in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

The project is a regulatory change related to plumbing materials. It does not involve any type of groundborne vibration or noise. The installation and use of the plumbing material will not create groundborne vibration or noise. The proposed project will not cause the *exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.*

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

The project is a regulatory change related to plumbing materials. It does not involve any type of noise. The installation and use of the plumbing material may create a small amount of noise; however it would be minor and limited to the construction phase. The proposed project will not cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

The project is a regulatory change related to plumbing materials. It does not involve any type of noise. The installation and use of the plumbing material may create a small amount of noise; however it would be minor and limited to the construction phase. The proposed project will not cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The project is a regulatory change related to plumbing materials. It is not located on a site and does not involve any type of noise. The installation and use of the plumbing material may create a small amount of noise and may be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport; however the noise would be minor and limited to the construction phase. The proposed project will not expose people residing or working in the project area to excessive noise levels for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

The project is a regulatory change related to plumbing materials. It is not located within the vicinity of a private airstrip and does not involve any type of noise. The installation and use of the plumbing material may occur within the vicinity of a private airstrip and may create a small amount of noise; however it would be minor and limited to the construction phase. The proposed project will not expose people residing or working within the vicinity of a private airstrip to excessive noise levels.

	PS	LSM	LS	NI
XII. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

The project is a regulatory change related to plumbing materials. It is not reasonably expected to induce substantial population growth in an area, either directly or indirectly. The installation and use of the plumbing material may occur within a particular developmental project that may, in turn, induce substantial population growth; however it is not reasonably expected that this growth would be related to the choice of plumbing material within the development. The proposed project will not Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).

b) *Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*

The project is a regulatory change related to plumbing materials. It is not reasonably expected to displace any housing. The installation and use of the plumbing material will usually occur within a repair or construction project; it is not reasonably expected that this use would cause housing displacement. The proposed project will not displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

The project is a regulatory change related to plumbing materials. It is not reasonably expected to displace any people. The installation and use of the plumbing material will usually occur within a repair or construction project; it is not reasonably expected that this use would cause the displacement of people. The proposed project will not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

	PS	LSM	LS	NI
XIII. PUBLIC SERVICES				
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	X
Police protection?	☐	☐	☐	X
Schools?	☐	☐	☐	X
Parks?	☐	☐	☐	X
Other public facilities?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

Discussion:
a) *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire protection, police protection, schools, parks, other public facilities?*

Fire Protection. The project is a regulatory change related to plumbing materials. It is not reasonably expected to result in the need for new or physically altered governmental facilities. The installation and use of the plumbing material is not reasonably expected to result in the need for new or physically altered governmental facilities. The proposed project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection services.

Police Protection. The project is a regulatory change related to plumbing materials. It is not reasonably expected to result in the need for new or physically altered governmental facilities. The installation and use of the plumbing material is not

reasonably expected to result in the need for new or physically altered governmental facilities. The proposed project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police protection services.

Schools. The project is a regulatory change related to plumbing materials. It is not reasonably expected to result in the need for new or physically altered governmental facilities. The installation and use of the plumbing material is not reasonably expected to result in the need for new or physically altered governmental facilities. The proposed project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services.

Parks. The project is a regulatory change related to plumbing materials. It is not reasonably expected to result in the need for new or physically altered governmental facilities. The installation and use of the plumbing material is not reasonably expected to result in the need for new or physically altered governmental facilities. The proposed project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for park services.

Other public facilities. The project is a regulatory change related to plumbing materials. It is not reasonably expected to result in the need for new or physically altered governmental facilities. The installation and use of the plumbing material is not reasonably expected to result in the need for new or physically altered governmental facilities. The proposed project will not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for other public facility services.

	PS	LSM	LS	NI
XIV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	**X**
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	**X**

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

The project is a regulatory change related to plumbing materials. It is not reasonably expected to increase the use of existing park or recreational facilities. The installation and use of the plumbing material will usually occur within a repair or construction project; this use will not cause an increase in the use of parks or recreational facilities. The proposed project will not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.

b) *Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*

The project is a regulatory change related to plumbing materials. It does not include or require the construction or expansion of recreational facilities. The installation and use of the plumbing material does not include or require the construction or expansion of recreational facilities. The proposed project does not include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

	PS	LSM	LS	NI
XV. TRANSPORTATION/TRAFFIC. Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☐	X
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, which results in substantial safety risks?	☐	☐	☐	X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	X
e) Result in inadequate emergency access?	☐	☐	☐	X
f) Result in inadequate parking capacity?	☐	☐	☐	X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?*

The project is a regulatory change related to plumbing materials. It is not reasonably expected to cause an increase in traffic, substantial or otherwise. The installation and use of the plumbing material will usually occur within a repair or construction project;

choosing this type of plumbing material over another will not cause a substantial increase in traffic. The proposed project will not cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).

b) *Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?*

The project is a regulatory change related to plumbing materials. It is not reasonably expected to cause an exceedance of service standards for any roads or highways. The installation and use of the plumbing material will usually occur within a repair or construction project; choosing this type of plumbing material over another will not cause an exceedance of service standards for any roads or highways. The proposed project will not exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.

c) *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, which results in substantial safety risks?*

The project is a regulatory change related to plumbing materials. It is not reasonably expected to result in any changes in air traffic patterns. The installation and use of the plumbing material will usually occur within a repair or construction project; this use will not result in any changes in air traffic patterns. The proposed project will not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location, which results in substantial safety risks.

d) *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

The project is a regulatory change related to plumbing materials. It will not increase hazards due to a design feature or incompatible use. The regulation itself does not have any design features and specifically authorizes applications (compatible uses). The proposed project is part of the California Plumbing Code (CPC). Use of the plumbing material for the authorized applications would require compliance with the other regulations found within the CPC. The project will not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

e) *Result in inadequate emergency access?*

The project is a regulatory change related to plumbing materials. It will not result in inadequate emergency access. The installation and use of the plumbing material will usually occur within a repair or construction project; this use will not result in inadequate

emergency access. The proposed project will not result in inadequate emergency access.

f) Result in inadequate parking capacity?

The project is a regulatory change related to plumbing materials. It will have no impacts on parking capacity. The installation and use of the plumbing material will usually occur within a repair or construction project; the choice of plumbing material will not cause inadequate parking capacity. The proposed project will not result in inadequate parking capacity.

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

The project is a regulatory change related to plumbing materials. It is not related to transportation and will not conflict with alternative transportation policies, plans or programs. The installation and use of the plumbing material will usually occur within a repair or construction project; the choice of plumbing material will not conflict with alternative transportation policies, plans or programs. The proposed project will not conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

	PS	LSM	LS	NI
XVI. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	X
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	X
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	X
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

The project is a regulatory change related to plumbing materials. It will not cause an exceedance of wastewater treatment requirements. The installation and use of the

plumbing material will usually occur within a repair or construction project; the plumbing material will not cause any exceedance of wastewater treatment requirements.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

The project is a regulatory change related to plumbing materials. It will not require or result in the construction of new water or wastewater treatment facilities or the expansion of existing facilities. The installation and use of the plumbing material will usually occur within a repair or construction project; the choice of plumbing material will not require or result in the construction of new water or wastewater treatment facilities or the expansion of existing facilities. The proposed project will not require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

The project is a regulatory change related to plumbing materials. It will have no impacts on storm water drainage facilities. The installation and use of the plumbing material will usually occur within a repair or construction project; the choice of plumbing material will not impact storm water drainage facilities. The proposed project will not require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

The project is a regulatory change related to plumbing materials. It does not require water supplies. The installation and use of the plumbing material will usually occur within a repair or construction project; the choice of plumbing material will not impact the availability of water. The proposed project will not require water supplies to serve the project from existing entitlements and resources, and does not require new or expanded entitlements.

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The project is a regulatory change related to plumbing materials. It does not require the services of a wastewater treatment provider. The installation and use of the plumbing material will usually occur within a repair or construction project; the choice of plumbing material will not cause a change in the capacity of a wastewater treatment provider. The proposed project will not result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

The project is a regulatory change related to plumbing materials. The installation and use of the plumbing material will usually occur within a repair or construction project. It is possible that if there is an increase in the use of the plumbing material, there would eventually be an increase in the volume of demolition debris requiring disposal (assuming the pipe is not recycled or down-cycled). The majority of the debris would be generated when the buildings using the plumbing material are demolished.

On average, 7,359 housing units are demolished in California every year. The highest percentage of this occurs in Los Angeles County where approximately 2,531 housing units are demolished each year.[16] While it would not be reasonable to assume that every demolished housing unit would contain PEX plumbing, it is likely that some PEX pipe will need to be disposed of each year. There is no way of predicting the exact amount or location of this disposal. PEX plumbed units probably would not make up a significant portion of the demolished housing units until those structures reach an advanced age. Of course, natural disasters, major building projects, and other factors could result in fairly new housing units being demolished, but estimating where and when this would occur and what percentage of those units would contain PEX would be mere speculation. No numbers are available on the annual demolition of the other applications that would be authorized by the project; however those numbers are expected to be small and scattered about the state.

Given the small amount of the plumbing material expected to be disposed of annually, and the scattered placement of such disposal, the Lead Agency does not anticipate that there will be a landfill capacity issue.

g) Comply with federal, State and local statues or regulations related to solid waste?

The proposed project will comply with federal State, and local statutes and regulations related to solid waste.

[16] Data supplied by the Department of Housing and Community Development's Housing Policy Development Division.

	PS	LSM	LS	NI
XVII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☐	X
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively Considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	X
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	X

Affected Environment:
The proposed project is the adoption of regulations to be included in the California Plumbing Code. These regulations would allow the use of PEX and PEX-AL-PEX tubing to be used for potable water distribution for applications under the jurisdictions of the Lead and Approving Agencies.

a) *Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?*

The project is a regulatory change related to plumbing materials. It does not have a physical site or any direct impacts on the environment. The installation and use of the plumbing material will usually occur within a repair or construction project; the use and installation of the plumbing material does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a

plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively Considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Other similar projects include the approval of chlorinated polyvinyl chloride (CPVC) pipe for potable water use. CPVC, PEX, and PEX-AL-PEX, are all potential potable water pipe choices. The use of PEX or PEX-AL-PEX would be a choice over CPVC, not in addition to it. The Project should not have impacts that are individually limited, but cumulatively considerable ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects).

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Substances that have the ability to oxidize other substances are known as oxidizing agents, oxidants or oxidizers. An oxidant removes electrons from another substance. Chlorine and ultraviolet light (**UV**) are both oxidizers. Sunlight contains a mixture of light wavelengths, including those that are called UV.

PEX is subject to oxidation. PEX oxidation is accelerated by heat and exposure to sunlight. Pipe manufacturers blend antioxidants in the pipe to protect against oxidation. Like all plumbing materials, PEX will not maintain its physical integrity indefinitely. When PEX is exposed to oxidizers the antioxidants will eventually be consumed and the tube will begin to degrade. The addition of antioxidants to the PEX tubing allows for a reasonable anticipated lifespan for PEX tubing, even when it will be exposed daily to the residual chlorine in drinking water. The crucial issue is what the predicted lifetime of the pipe will be when it is used for potable water distribution.

UV Oxidation. There is an industry standard for testing PEX resistance to chlorine oxidation: *Standard Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water,* ASTM F2023-04 (ASTM CR Standard). PEX that meets the ASTM CR Standard is expected to last for at least 50 years in the field. Meeting the ASTM CR Standard is not a guarantee of pipe performance. Pipe that meets the standard may fail in the field before 50 years, especially if it has also suffered significant stabilizer loss due to other factors. Like all testing standards, the ASTM CR Standard provides a standard method of testing, it is a means to compare products and estimate their resistance to chlorine.

At least one study has shown that when PEX pipe that does not contain UV stabilizer is exposed to UV light, its expected lifetime is half of that of PEX pipe that does contain UV stabilizers. This same study showed that with no UV exposure, pipes with and

pipes without UV stabilizers have approximately twice the lifetime of pipe that contains neither UV stabilizers nor antioxidants. [17] As this study clearly demonstrates, PEX pipe is vulnerable to oxidative attack from UV. PEX manufacturers are aware of this vulnerability and those products that do not contain UV stabilizers have warnings in the product literature that the pipe should not be exposed to sunlight. If the non-UV stabilized PEX product is not treated in accordance with the manufacturer's instructions to avoid UV exposure, the pipe will be compromised and fail to perform as expected.

Chlorine Oxidation. In the United States, chlorine is added to most potable water as a disinfectant. Chlorine is a strong oxidizer. When chlorine is added to water, the chlorine converts to hypochlorous acid (**HOCl**). The HOCl can then convert to hypochlorite ion (**OCl^-**). The HOCl chemical reaction is pH dependent. At pH 6.5, most of the chlorine is in the form of HOCl. At pH 8.5, most of the HOCL is converted into OCl^-. HOCl is a much stronger oxidant than OCl^-. Thus at the slightly basic pH of 8.5, the chlorine is a weaker oxidant than it is at the slightly acidic pH of 6.5.[18]

Oxidation Reduction Potential (**ORP**) is a measure of oxidation ability of a solution. The ORP value includes all oxidizers, not just chlorine. A high ORP correlates to a high ability to oxidize. Deionized water has an ORP of about 200 – 300 mV. If one adds 0.5 mg/L (ppm) of chlorine to the deionized water, the ORP increases to about 600 mV at pH 8.5, and about 820 mV at a pH of 6.5. These numbers correlate with what was described in the previous paragraph; as the pH increases (more basic), OCl^- is the major form of chlorine and it has a lower ORP than the same water at a lower pH (more acidic) where HOCl is the dominant form of the chlorine.[19]

As stated previously, PEX pipe is vulnerable to oxidation and antioxidants are incorporated into the tubing. PEX pipe that was tested at 840 mV ORP was found to have an extrapolated test lifetime of 93 years with a lower 95% confidence limit (**95% CI**) of 52 years.[20] Using data from the same study on PEX performance forecasting and substituting in the extrapolated number of years that the pipe is expected to last, one can see the effect that ORP can have on PEX serviceable lifetime:

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[17] *Chlorine Resistance Testing of UV Exposed Pipe*, Couch J, Toro M, Oliphant K, and Vibien P, Annual Technical Conference of the Society of Plastics Engineers, ANTEC 2002, p.3140.

[18] Ibid

[19] *Chlorine Resistance Testing of UV Exposed Pipe*, Couch J, Toro M, Oliphant K, and Vibien P, Annual Technical Conference of the Society of Plastics Engineers, ANTEC 2002, p.3140.

[20] *Environmental Factors in Performance Forecasting of Plastic Piping Materials*, Chung S, Couch J, Kim JD, Oliphant K, and Vibien P, Annual Technical Conference of the Society of Plastics Engineers, ANTEC 2003, p.2942.

Table 1

ORP	Relative Estimated Test Lifetime @ 60° C	Extrapolated lifetime in years	Extrapolated lifetime in years (lower 95% CI)
840	1	93	52
825	1.2	112	62
800	1.6	149	83
775	2.2	205	114
750	2.9	270	151
500	57	5,301	2,964

As shown in Table 1, if PEX pipe is exposed to only low levels of oxidizers, it will last much longer. California water characteristics will vary depending upon the region and the disinfection methods. For example, the Lead Agency has information that the potable water in the City of Sacramento has an ORP value of 550 mV for water that comes from the river and an ORP value of 750 mV for water that comes from wells.[21] This would correlate to an expected PEX pipe lifetime of 2,976 (1,664 at 95% CI) years with river water and 270 (151 at 95% CI) years with well water.[22] Although the expected lifetimes are very different, they are both within a reasonable range. ASTM CR Standard requires testing at 825 mV.

It is important to note that these expected lifetimes for PEX pipe are extrapolated from data obtained through accelerated testing methods. Accelerated testing methods are a common means of testing the performance of many products.[23] Although accelerated testing does not provide a guarantee of product performance, it is a standard method of predicting reasonably expected performance values.

The Lead Agency finds that there is no evidence that, under normal conditions, when PEX pipe is used for its intended purpose and according to the manufacturer's instructions, oxidation poses an unreasonable risk to the integrity of the pipe.

↳ what would be the impact to human beings to mold?

[21] Letter from Thomas Reid to Thomas Enslow, July 15, 2005.

[22] The Estimated Relative Lifetime for 550 mV was stated to be 32. Letter from Thomas Reid to Thomas Enslow, July 15, 2005.

[23] See, for example, *Guidance for Industry Q1A (R2) Stability Testing of New Drug Substances and Products,* U.S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research (CDER), Center for Biologics Evaluation and Research (CBER), November 2003, Revision 2.

Mechanical Failure. In Washington state and Canada there were several PEX pipe failures.[24] All of the failures involved piping manufactured by a single vendor, Plasco Manufacturing, Ltd. that was labeled as UltraPEX™ and identified as Lot 7.[25] UltraPEX™ was manufactured by the silane cross-linking process, PEX-B.

The Washington state failures were initially noted where the pipe was in contact with intumescent firestop material. However, pipe degradation was also found in residences where no firestop material was employed. Testing revealed that the UltraPEX™ Lot 7 pipe was "virtually devoid" of residual effective stabilizer after two weeks of rooftop exposure to sunlight.[26]

The UltraPEX™ tubing originated from a single resin source, Flexet™ 5100 resin/Flexet™ 725 catalyst. This same resin was used by several PEX-B manufacturers. The UltraPEX™ Lot 7 tubing is the only tubing known to have performed in a faulty manner.[27]

Given that the failures were limited to a particular lot of material manufactured by a single company, it would seem that this was an isolated incidence of poor quality control within an individual company. It is important to note that conformance to standards does not guarantee performance. If a manufacturer makes a mistake or does not maintain adequate quality control standards, inferior products may be produced.

The Lead Agency finds that there is evidence that an inferior batch of PEX piping was manufactured and installed in homes. The installation and use of that inferior PEX piping led to multiple failures of PEX pipe. However, there is no evidence that, under normal conditions, when PEX pipe is used for its intended purpose and according to the manufacturer's instructions, PEX pipe will not provide a reasonable predicted lifetime that would make it a reasonable, if not preferable choice for a plumbing material.

Fire Hazards. When pipe penetrates walls, floors, ceilings, etc..., there is a small empty space around the pipe. Plastic pipes of all types may burst or melt when exposed to high heat. If this occurs, an air gap will form and may provide a means for fire spread. In fire rated buildings, this area is filled in with a firestop material. The firestop prevents air from flowing between the partitions and thus in the event of a fire, helps to contain the fire in the area of origination.

PEX pipes can only be exposed to certain types of firestop materials. Exposure to other types of firestop materials will cause the pipe to degrade and limit its serviceable lifetime. The types of firestop materials that must be avoided will vary with the individual

[24] Blueberry HOA v Plasco Mfg, et al, Kings County Superior Court, No. 01-2-35783-2 KNT

[25] Letter from Robert A. Clark, Ph.D., Principal – Materials Scientist, GT Engineering to California Building Standards Commission, June 29, 2005.

[26] Ibid

[27] Ibid

type of pipe. The manufacturers list either the prohibited or the acceptable firestop materials in their installation guides. The appropriate firestop materials may be more expensive than those that can be used with other types of pipes.

The California plumbing code requires that all plumbing materials, including PEX materials, be installed in a manner conforming to the code, applicable standards, and the manufacturer's installation instructions (CPC 310.4). It is possible that the PEX materials may be improperly installed or may be exposed to inappropriate firestop materials. Improper workmanship can occur with any building material. However, the possibility that it will be installed inappropriately is no reason to limit the alternative materials. The proper firestop materials are readily available on the market. While it is possible that using the appropriate materials with PEX and ensuring that the installation is performed by a competent professional may increase the price of the plumbing system, it does not mean the system is inherently unsafe.

Plastics often produce toxic combustion products when they are exposed to extremely high heat. Wood and other organic fibers also can produce toxic combustion products. The quantity of plastic pipes is relatively insignificant when compared to all the other materials within a building and thus the added toxic products of combustion generated by these materials in a fire would be comparatively minor.[28]

Mechanical Failure Findings. Plastic pipes melt in extreme heat and the subsequent collapse of a pipe can cause the formation of an air gap that provides an opportunity for fire spread. However, the current requirements of fire stopping materials contained in and proposed for adoption in California in the 2006 Uniform Plumbing Code mitigate the fire spread hazard associated with PEX pipe.[29] The Lead Agency finds that the provisions in the plumbing code are adequate to protect against fire spread when PEX or PEX-AL-PEX is used for potable water.

[28] Letter from Kevin Reinertson, Senior Deputy State Fire Marshall, Department of Forestry and Fire Protection, Office of the State Fire Marshal to Robin Gilb, Staff Counsel, Department of Housing and Community Development, September 7, 2006.

[29] Ibid

4.0 PERSONS CONTACTED

- Kevin Reinertson, Senior Deputy State Fire Marshall, Department of Forestry and Fire Protection, Office of the State Fire Marshal
- Deborah Kerns, Staff Counsel III, Department of General Services
- Howard Smith, JOB TITLE, Department of General Services, Division of the State's Architect

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