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FINAL
STATEMENT OF REASONS
22 CALIFORNIA CODE OF REGULATIONS

Section 12705(b) - Specific Regulatory Levels Posing No Significant Risk: Acrylonitrile, Bis(chloromethyl)ether, 3,3'-Dichlorobenzidine, Epichlorohydrin, Hexachlorobenzene, Hexachlorocyclohexane (technical grade), and Polybrominated biphenyls

The Safe Drinking Water and Toxic Enforcement Act of 1986 (hereinafter the Act) prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the State to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual (Health & Saf. Code Sec. 25249.6). The Act also prohibits a business from knowingly discharging a listed chemical into water or onto or into land where such chemical passes or probably will pass into a source of drinking water (Health & Saf. Code Sec. 25249.5).

For chemicals known to the state to cause cancer, an exemption is provided by the Act when a person in the course of doing business is able to demonstrate that an exposure for which it is responsible poses no significant risk, or that a discharge which otherwise complies with applicable requirements would result in an exposure through drinking water at a level which poses no significant risk (Health & Saf. Code Sec. 25249.10 and 25249.11).

A determination that a level of exposure poses no significant risk can be made utilizing regulations that have previously been adopted by the Health and Welfare Agency (Agency) (Sec. 12701 to 12721, Title 22, California Code of Regulations) (unless otherwise specified, all section references are to Title 22, CCR). Section 12701 describes alternative methods for making such a determination. One such method is through the application of the specific regulatory level established for the chemical in question in Section 12705. A level specified in Section 12705(b) supersedes Section 12709 (Exposure to Trace Elements), Section 12711 (Levels Based on State or Federal Standards), or Section 12713 (Exposure to Food, Drugs, Cosmetics and Medical Devices).

Procedural Background

On October 3, 1989, the Agency issued a notice of proposed rulemaking advising that the Agency intended to adopt a "no significant risk" level for acrylonitrile, bis(chloromethyl)ether, 3,3'-dichlorobenzidine, epichlorohydrin, hexachlorobenzene, hexachlorocyclohexane (technical grade), and polybrominated biphenyls. Pursuant to such notice, on November 28, 1989, a public hearing was held to receive public comments on the proposed regulation. One comment was received regarding a chemical which is the subject of this rulemaking action.

Purpose of Final Statement of Reasons

This final statement of reasons sets forth the reasons for the final regulation adopted by the Agency for Section 12705(b), and responds to the objections and recommendations submitted regarding the regulation. Government Code section 11346.7, subsection (b)(3) requires that the final statement of reasons submitted with an amended or adopted regulation contain a summary of each objection or recommendation made regarding the adoption or amendment, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. It specifically provides that this requirement applies only to objections or recommendations specifically directed at the Agency's proposed action or to the procedures followed by the Agency in proposing or adopting the action.

Some parties included in their written or oral comments remarks and observations about the regulation which do not constitute an objection or recommendation directed at the proposed action or the procedures followed. Accordingly, the Agency is not obligated under Government Code section 11346.7 to respond to such remarks in this final statement of reasons. Since the Agency is constrained by limitations upon its time and resources, and is not obligated by law to respond to such remarks, the Agency has not responded to these remarks in this final statement of reasons. The absence of response in this final statement of reasons to such remarks should not be construed to mean that the Agency agrees with them.

Specific Findings

Throughout the adoption process of this regulation, the Agency has considered the alternatives available to determine which would be more effective in carrying out the purpose for which the regulation was proposed, or would be as effective and less burdensome to affected private persons than the proposed regulation. The Agency has determined that no alternative considered would be more effective than, or as effective and less burdensome to affected persons than, the adopted regulation.

The Agency has determined that the regulation imposes no mandate on local agencies or school districts.

Rulemaking File

The rulemaking file submitted with the final regulation and this final statement of reasons is the complete rulemaking file for Section 12705(b). However, because regulations other than Section 12705(b) were also the topic of the public hearing on November 28, 1989, the rulemaking file contains some material not relevant to Section 12705(b). This final

statement of reasons cites only the relevant material. Comments regarding the regulations other than Section 12705(b) discussed at the November 28, 1989 hearing have been or will be discussed in separate final statements of reasons.

Necessity for Adoption of Regulations

For chemicals known to the State to cause cancer, the Act exempts discharges, releases and exposures which, making certain assumptions, pose no significant risk. The Act specifies that any claim of exemption under Health and Safety Code section 25249.10, subsection (c) must be based upon evidence and standards of comparable scientific validity to the evidence and standards which form the scientific basis for the listing of the chemical. However, the Act does not further clarify when a chemical risk is not significant, nor specify levels of chemical exposure posing no significant risk. Existing regulations describe methods for calculating levels which pose no significant risk.

This regulation provides a "safe harbor" no significant risk level which will allow persons to determine whether a discharge, release or exposure is exempt from the provisions of the Act.

Section 12705(b)

This regulation adopts the following no significant risk levels in Section 12705(b):

Acrylonitrile	0.7 microgram per day
Bis(chloromethyl)ether	0.02 microgram per day
3,3'-Dichlorobenzidine	0.6 microgram per day
Epichlorohydrin	9 micrograms per day
Hexachlorobenzene	0.4 microgram per day
Hexachlorocyclohexane (technical grade)	0.2 microgram per day
Polybrominated biphenyls	0.02 microgram per day

This regulation simultaneously repeals the no significant risk levels for these chemicals, where they exist, in Section 12711. Although Section 12701 explicitly states that Section 12711 applies only when no specific level is established for the chemical in Section 12705, deletion of the chemicals and their corresponding levels from Section 12711 is necessary for clarity and to avoid confusion.

The no significant risk levels represent the levels of exposure calculated to result in no more than one excess case of cancer in an exposed population of 100,000, assuming exposure over a 70-year lifetime (10^{-5} lifetime risk of cancer), and are based on the following risk assessment documents prepared by the California Department of Health Services (CDHS), Office of Environmental Health Hazard Assessment, Reproductive and Cancer Hazard Assessment Section, utilizing the principles in Section 12703:

"Risk-Specific Intake Levels for the Proposition 65 Carcinogen Acrylonitrile," dated July 1, 1988.

"Risk-Specific Intake Levels for the Proposition 65 Carcinogen Bis(chloromethyl)ether," dated November 1, 1988.

"Risk-Specific Intake Levels for the Proposition 65 Carcinogen 3,3'-Dichlorobenzidine," dated October 1, 1988.

"Risk-Specific Intake Levels for the Proposition 65 Carcinogen Epichlorohydrin," dated October 1, 1988.

"Risk-Specific Intake Levels for the Proposition 65 Carcinogen Hexachlorobenzene," dated October 1, 1988.

"Risk-Specific Intake Levels for the Proposition 65 Carcinogen Hexachlorocyclohexane (technical grade)," dated October 1, 1988.

Memorandum to Steven A. Book, Ph.D., Health and Welfare Agency, from Kenneth W. Kizer, M.D., M.P.H., Department of Health Services, dated August 21, 1989, re: Risk specific intake level for Polybrominated biphenyls.

Acrylonitrile

The no significant risk level for acrylonitrile is based on an analysis of the study of O'Berg (1980) indicating significant increases in lung cancers in workers exposed to acrylonitrile. The potency value selected, 1.0 $(mg/kg\text{-}day)^{-1}$, was derived from this epidemiological study. From this value, the intake level associated with a 10^{-5} risk of cancer is 700 ng/day, or 0.7 microgram per day.

Potency estimates derived from dose response data of animal bioassays are comparable to the value derived from epidemiological data. Methods used to estimate potency from animal data follow default assumptions specified in Section 12703. Estimates of human cancer potency derived from animal bioassays on acrylonitrile are as follows:

Study	Cancer potency $(mg/kg\text{-}day)^{-1}$
Drinking Water	
Sprague Dawley rats/Biodynamics	0.7
Fisher rats/Biodynamics	0.5
Sprague Dawley rats/Quast et al.	2.3

Gavage	
Sprague Dawley rats/Biodynamics	0.9
Inhalation	
Sprague Dawley rats/Maltoni et al.	0.2
Sprague Dawley rats/Quast et al.	0.1

These animal studies, discussed in further detail in the CDHS risk assessment for acrylonitrile, are summarized below:

Drinking water studies:

Biodynamics (1980a): Male and female Sprague Dawley rats were given 1 or 100 ppm acrylonitrile in water, with interim necropsies at 6, 12, and 18 months and study termination at 19 months for females and 22 months for males. Brain astrocytomas, spinal cord astrocytomas, zymbal gland carcinomas, and stomach carcinomas and papillomas were increased in treated males and females. The cancer potency derived from dose response data at the most sensitive site and sex (brain astrocytoma in females) is 0.5 $(mg/kg\text{-}day)^{-1}$; from the dose response data for animals with tumors at sites of significant increases, the cancer potency estimate is 0.7 $(mg/kg\text{-}day)^{-1}$.

Biodynamics (1980b): Male and female Fisher 344 rats received 1, 3, 10, 30, and 100 ppm acrylonitrile in drinking water for 23 months (female) or 26 months (male) (with interim sacrifices at 6, 12, and 18 months). Brain astrocytomas, zymbal gland tumors, and forestomach squamous cell papillomas and carcinomas were observed in treated animals of both sexes. Spinal cord astrocytomas were also observed in male rats in the highest dose group. Premature mortality in treated animals was high, especially in the animals dosed at the highest levels. Because data available to CDHS does not enable mortality corrections, potency derived from this study may be underestimated. Potency derived from dose response data for sites from which significant increases in tumors were seen is 0.5 $(mg/kg\text{-}day)^{-1}$.

Quast et al. (1980): Groups of male and female Sprague Dawley rats were initially given 35, 85, and 210 ppm acrylonitrile in drinking water. After 21 days, the doses were increased to 35, 100 and 300 ppm. Brain and spinal cord astrocytomas, squamous papillomas and carcinomas of the forestomach and tongue and Zymbal gland tumors were seen in male and female rats. Survival significantly decreased with increasing dose in both male and female rats. Because data available to CDHS does not enable mortality corrections, potency derived from this study may be underestimated. Potency derived from dose response data for sites from which significant increases in tumors were seen is 2.3 $(mg/kg\text{-}day)^{-1}$ for female rats, and 1.0 $(mg/kg\text{-}day)^{-1}$ for male rats.

Gavage:

Biodynamics (1980c): Acrylonitrile was administered by gastric intubation to Sprague Dawley rats at doses of 0, 0.1, or 10 mg/kg for 5 days/week. Since few animals remained alive at the 20th month, the study was terminated at 20 months. Increased incidences of brain astrocytomas, squamous cell carcinomas of the zymbal gland and forestomach, and intestinal and mammary gland tumors were observed. Cancer potency derived from dose response data for the most sensitive site (forestomach in females) was 0.9 $(mg/kg\text{-}day)^{-1}$.

Inhalation studies:

Maltoni et al. (1977): Sprague Dawley rats of both sexes were exposed to 0, 5, 10, 20 or 40 ppm in air of acrylonitrile for 4 hours/day, 5 days/week for 12 months and observed for the rest of their lives. In male rats, mammary tumors were observed to increase significantly in incidence with increasing dose ($p \leq 0.025$). The corresponding cancer potency estimate for this site is 0.2 $(mg/kg\text{-}day)^{-1}$.

Quast et al. (1980b): Sprague Dawley rats of both sexes were exposed to 0, 20, or 80 ppm of acrylonitrile in air 6 hours/day, 5 days/week, for 2 years. Several different types of tumors (zymbal gland, brain and spinal cord in both sexes; small intestine and tongue in males) were observed to increase with increasing dose, with the most sensitive site being glial cell tumors of the brain and spinal cord in females; the corresponding estimate of human potency of 0.1 $(mg/kg\text{-}day)^{-1}$.

One commentor (Exhibit 2) stated that the proposed level for acrylonitrile is "clearly arbitrary and plainly contrary to the scientific data," and that "no appropriate or valid data or information ...would warrant changing the current 3 micrograms per day no significant risk level" in Section 12711. The commentor argued that there is no human evidence for the carcinogenicity of acrylonitrile, criticized the epidemiological study which was relied upon in the risk assessment, and questioned the relevance of carcinogenicity data in rats to humans.

The commentor appears to prefer the higher level found in Section 12711 (deleted as part of this regulatory action), which was based upon the same human data which provides the basis for the regulatory no significant risk level established by this amendment to Section 12705(b). The data are the same with only some simple calculation to convert the level in Section 12711 to one consistent with the methods outlined in Sections 12703 and 12721. Use of the epidemiological data is discussed below.

If the commentor believes that there is no risk associated with human exposures to acrylonitrile, or that an alternative level is appropriate, the commentor may approach compliance with the Act from that standpoint. Pursuant to Section 12701, the no significant risk levels in Section

12705 are intended to provide safe harbors and do not preclude the use of alternative levels that can be demonstrated by their users to be scientifically valid.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for acrylonitrile and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on September 16, 1988. According to the panel, the exposure data in the epidemiological study of human cancers were based on recall rather than actual measurements of exposure levels, and confounding factors which could have affected the incidence of lung cancer (such as smoking and exposure to radon) were not considered. The discussion centered on the appropriateness of the human data for risk assessment and whether an evaluation of a 1983 EPA document would benefit from an update of epidemiological findings. In that discussion, CDHS staff pointed out that both animal data and human data yielded similar risk coefficients. (Calculation of cancer potency estimates using animal data was discussed above.) The Agency believes these points would not affect the final level either in terms of the calculations or the soundness of the scientific analysis.

Bis(chloromethyl)ether

A human cancer potency value of 46 $(mg/kg\text{-}day)^{-1}$ is estimated from data on respiratory tumors in Sprague-Dawley rats. This potency is selected for use in determining cancer risk and risk specific intake levels for low dose rate exposures to bis(chloromethyl)ether. An intake level of 0.02 microgram per day corresponds to a 10^{-5} risk of cancer.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for bis(chloromethyl)ether and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on April 14, 1989. No panelists presented specific recommendations on, or objections to, the proposed level.

3,3'-Dichlorobenzidine

A cancer potency of 1.2 $(mg/kg\text{-}day)^{-1}$ has been selected for estimating risks from exposure to 3,3'-dichlorobenzidine. This value was estimated from dose-response data on induction of mammary adenocarcinoma in female ChR-CD rats fed a diet containing 3,3'-dichlorobenzidine. From this value, the intake level associated with a 10^{-5} lifetime risk of cancer is 0.6 microgram per day.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on

any proposed no significant risk level, the proposed level for 3,3'-dichlorobenzidine and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on December 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level.

Epichlorohydrin

Cancer potency values of 0.03 to 2.1 $(mg/kg\text{-}day)^{-1}$ were estimated from epidemiology and cancer bioassay data. A value of 0.08 $(mg/kg\text{-}day)^{-1}$, calculated from a drinking water study in male Wistar rats, was selected. From this value, the intake level associated with a 10^{-5} lifetime risk of cancer is 9 micrograms per day.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for epichlorohydrin and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on December 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level.

Hexachlorobenzene

Based on hepatomas in male hamsters and on hepatocellular carcinomas and pheochromocytomas in female rats, a cancer potency of 1.8 $(mg/kg\text{-}day)^{-1}$ was selected for estimating risks from exposure to hexachlorobenzene. From this value, the intake level associated with 10^{-5} lifetime risk of cancer is 0.4 microgram per day.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for hexachlorobenzene and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on December 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level.

Hexacholorocyclohexane (technical grade)

Cancer potency estimates were calculated for technical grade hexachlorocyclohexane from several positive animal bioassay data. Similar potency values were estimated from these studies. The potency estimate of 4 $(mg/kg\text{-}day)^{-1}$ based on liver tumors in male Swiss mice was the most reliable estimate from sensitive studies. From this value, the intake level associated with 10^{-5} lifetime risk of cancer is 0.2 microgram per day.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on

any proposed no significant risk level, the proposed level for hexachlorocyclohexane and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on December 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level.

Polybrominated biphenyls

A bioassay in male $B6C3F_1$ mice was determined to be the most sensitive study of sufficient quality. From the dose response data for hepatocellular carcinoma observed in these male mice, a potency estimate of 30 $(mg/kg\text{-}day)^{-1}$ was derived. This corresponds to an intake of 0.02 microgram per day for an increased risk of 10^{-5}.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for polybrominated biphenyls and the risk assessment document which provides the basis for the level were submitted to the Scientific Advisory Panel on October 29, 1989. No panelists presented specific recommendations on, or objections to, the proposed level.

dbcp

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Section 12705(b) - Specific Regulatory Levels Posing No Significant Risk: 1,2-Dibromo-3-chloropropane

The Safe Drinking Water and Toxic Enforcement Act of 1986 (hereinafter the Act) prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the State to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual (Health & Saf. Code Sec. 25249.6). The Act also prohibits a business from knowingly discharging a listed chemical into water or onto or into land where such chemical passes or probably will pass into a source of drinking water (Health & Saf. Code Sec. 25249.5).

For chemicals known to the state to cause cancer, an exemption is provided by the Act when a person in the course of doing business is able to demonstrate that an exposure for which it is responsible poses no significant risk, or that a discharge which otherwise complies with applicable requirements would result in an exposure through drinking water at a level which poses no significant risk (Health & Saf. Code Sec. 25249.10 and 25249.11).

A determination that a level of exposure poses no significant risk can be made utilizing regulations that have previously been adopted by the Health and Welfare Agency (Agency) (Sec. 12701 to 12721, Title 22, California Code of Regulations) (unless otherwise specified, all section references are to Title 22, CCR). Section 12701 describes alternative methods for making such a determination. One such method is through the application of the specific regulatory level established for the chemical in question in Section 12705. A level specified in Section 12705(b) supersedes Section 12709 (Exposure to Trace Elements), Section 12711 (Levels Based on State or Federal Standards), or Section 12713 (Exposure to Food, Drugs, Cosmetics and Medical Devices).

Procedural Background

On October 3, 1989, the Agency issued a notice of proposed rulemaking advising that the Agency intended to adopt a "no significant risk" level for 1,2-dibromo-3-chloropropane (DBCP). Pursuant to such notice, on November 28, 1989, a public hearing was held to receive public comments on the proposed regulation. No comments regarding DBCP were received.

Purpose of Final Statement of Reasons

This final statement of reasons sets forth the reasons for the final regulation adopted by the Agency for Section 12705(b), and responds to the objections and recommendations submitted regarding the regulation. Government Code section 11346.7, subsection (b)(3) requires that the final statement of reasons submitted with an amended or adopted

regulation contain a summary of each objection or recommendation made regarding the adoption or amendment, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. It specifically provides that this requirement applies only to objections or recommendations specifically directed at the Agency's proposed action or to the procedures followed by the Agency in proposing or adopting the action.

Some parties included in their written or oral comments remarks and observations about the regulation which do not constitute an objection or recommendation directed at the proposed action or the procedures followed. Accordingly, the Agency is not obligated under Government Code section 11346.7 to respond to such remarks in this final statement of reasons. Since the Agency is constrained by limitations upon its time and resources, and is not obligated by law to respond to such remarks, the Agency has not responded to these remarks in this final statement of reasons. The absence of response in this final statement of reasons to such remarks should not be construed to mean that the Agency agrees with them.

Specific Findings

Throughout the adoption process of this regulation, the Agency has considered the alternatives available to determine which would be more effective in carrying out the purpose for which the regulation was proposed, or would be as effective and less burdensome to affected private persons than the proposed regulation. The Agency has determined that no alternative considered would be more effective than, or as effective and less burdensome to affected persons than, the adopted regulation.

The Agency has determined that the regulation imposes no mandate on local agencies or school districts.

Rulemaking File

The rulemaking file submitted with the final regulation and this final statement of reasons is the complete rulemaking file for Section 12705(b). However, because regulations other than Section 12705(b) were also the topic of the public hearing on November 28, 1989, the rulemaking file contains some material not relevant to Section 12705(b). This final statement of reasons cites only the relevant material. Comments regarding the regulations other than Section 12705(b) discussed at the November 28, 1989 hearing have been or will be discussed in separate final statements of reasons.

Necessity for Adoption of Regulations

For chemicals known to the State to cause cancer, the Act exempts discharges, releases and exposures which, making certain assumptions, pose no significant risk. The Act specifies that any claim of exemption under Health and Safety Code section 25249.10, subsection (c) must be based upon evidence and standards of comparable scientific validity to the evidence and standards which form the scientific basis for the listing of the chemical. However, the Act does not further clarify when

a chemical risk is not significant, nor specify levels of chemical exposure posing no significant risk. Existing regulations describe methods for calculating levels which pose no significant risk.

This regulation provides a "safe harbor" no significant risk level which will assist persons in determining whether a discharge, release or exposure is exempt from the provisions of the Act.

Section 12705(b)

This regulation adopts a no significant risk level for DBCP of 0.1 microgram per day for purposes of the Act in Section 12705(b). This no significant risk level represents the level of exposure which is calculated to result in no more than one excess case of cancer in an exposed population of 100,000, assuming exposure over a 70-year lifetime (10^{-5} lifetime risk of cancer), and is based on the risk assessment document prepared by the California Department of Health Services (CDHS) utilizing the principles in Section 12703 ("Proposition 65 Risk-Specific Intake Levels, 1,2-Dibromo-3-chloropropane," Reproductive and Cancer Hazard Assessment Section, Office of Environmental Health Hazard Assessment, California Department of Health Services, July 1, 1988).

Estimates of theoretical cancer risk to humans exposed to DBCP depend on estimates of cancer potencies, which, in turn, vary with the tumor site and the animal study considered. Potency estimates for particular distant tumors, or for tumors at the site of application are reasonably consistent for each strain and sex considered. Induction of squamous cell carcinomas of the forestomach in mice receiving DBCP by gavage is used as the basis for extrapolation to man: a theoretical potency value of 7 $(mg/kg\text{-}day)^{-1}$ for mice was derived for this case. For any route of exposure, the intake level of DBCP which is associated with a 10^{-5} risk of cancer is 0.1 microgram per day.

No recommendations on, or objections to, the proposed level were received during the public comment period.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for DBCP and the risk assessment document which provides the basis for the proposed regulation were submitted to the Scientific Advisory Panel at a meeting held September 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level for DBCP.

edc

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Section 12705(b) - Specific Regulatory Levels Posing No Significant Risk: Ethylene dichloride

The Safe Drinking Water and Toxic Enforcement Act of 1986 (hereinafter the Act) prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the State to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual (Health & Saf. Code Sec. 25249.6). The Act also prohibits a business from knowingly discharging a listed chemical into water or onto or into land where such chemical passes or probably will pass into a source of drinking water (Health & Saf. Code Sec. 25249.5).

For chemicals known to the state to cause cancer, an exemption is provided by the Act when a person in the course of doing business is able to demonstrate that an exposure for which it is responsible poses no significant risk, or that a discharge which otherwise complies with applicable requirements would result in an exposure through drinking water at a level which poses no significant risk (Health & Saf. Code Sec. 25249.10 and 25249.11).

A determination that a level of exposure poses no significant risk can be made utilizing regulations that have previously been adopted by the Health and Welfare Agency (Agency) (Sec. 12701 to 12721, Title 22, California Code of Regulations) (unless otherwise specified, all section references are to Title 22, CCR). Section 12701 describes alternative methods for making such a determination. One such method is through the application of the specific regulatory level established for the chemical in question in Section 12705. A level specified in Section 12705(b) supersedes Section 12709 (Exposure to Trace Elements), Section 12711 (Levels Based on State or Federal Standards), or Section 12713 (Exposure to Food, Drugs, Cosmetics and Medical Devices).

Procedural Background

On October 3, 1989, the Agency issued a notice of proposed rulemaking advising that the Agency intended to adopt a "no significant risk" level for ethylene dichloride (EDC). Pursuant to such notice, on November 28, 1989, a public hearing was held to receive public comments on the proposed regulation. One comment regarding EDC was received.

Purpose of Final Statement of Reasons

This final statement of reasons sets forth the reasons for the final regulation adopted by the Agency for Section 12705(b), and responds to the objections and recommendations submitted regarding the regulation. Government Code section 11346.7, subsection (b)(3) requires that the final statement of reasons submitted with an amended or adopted regulation contain a summary of each objection or recommendation made

regarding the adoption or amendment, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. It specifically provides that this requirement applies only to objections or recommendations specifically directed at the Agency's proposed action or to the procedures followed by the Agency in proposing or adopting the action.

Some parties included in their written or oral comments remarks and observations about the regulation which do not constitute an objection or recommendation directed at the proposed action or the procedures followed. Accordingly, the Agency is not obligated under Government Code section 11346.7 to respond to such remarks in this final statement of reasons. Since the Agency is constrained by limitations upon its time and resources, and is not obligated by law to respond to such remarks, the Agency has not responded to these remarks in this final statement of reasons. The absence of response in this final statement of reasons to such remarks should not be construed to mean that the Agency agrees with them.

Specific Findings

Throughout the adoption process of this regulation, the Agency has considered the alternatives available to determine which would be more effective in carrying out the purpose for which the regulation was proposed, or would be as effective and less burdensome to affected private persons than the proposed regulation. The Agency has determined that no alternative considered would be more effective than, or as effective and less burdensome to affected persons than, the adopted regulation.

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Necessity for Adoption of Regulations

For chemicals known to the State to cause cancer, the Act exempts discharges, releases and exposures which, making certain assumptions, pose no significant risk. The Act specifies that any claim of exemption under Health and Safety Code section 25249.10, subsection (c) must be based upon evidence and standards of comparable scientific validity to the evidence and standards which form the scientific basis for the

listing of the chemical. However, the Act does not further clarify when a chemical risk is not significant, nor specify levels of chemical exposure posing no significant risk. Existing regulations describe methods for calculating levels which pose no significant risk.

This regulation provides a "safe harbor" no significant risk level which will allow persons to determine whether a discharge, release or exposure is exempt from the provisions of the Act.

Section 12705(b)

This regulation adopts a no significant risk level for ethylene dichloride of 10 micrograms per day for purposes of the Act in Section 12705(b), and repeals the no significant risk level for this chemical in Section 12711. Although Section 12701 explicitly states that Section 12711 applies only when no specific level is established for the chemical in Section 12705, deletion of the chemical and its level from Section 12711 is necessary for clarity and to avoid confusion.

The no significant risk level represents the level of exposure which is calculated to result in no more than one excess case of cancer in an exposed population of 100,000, assuming exposure over a 70-year lifetime (10^{-5} lifetime risk of cancer), and is based on the risk assessment document prepared by the California Department of Health Services (CDHS) utilizing the principles in Section 12703 ("Proposition 65 Risk-Specific Intake Levels, Ethylene Dichloride," Reproductive and Cancer Hazard Assessment Section, Office of Environmental Health Hazard Assessment, California Department of Health Services, July 1, 1988).

The risk assessment recommends that the potency value of 0.07 $(mg/kg\text{-}day)^{-1}$ derived by the CDHS in 1985 for the Air Resources Board's toxic air contaminant program be used to estimate risk-specific intakes for EDC. At this potency estimate, the intake level associated with a 10^{-5} risk of cancer is 10 micrograms per day.

One commentor (C-22) contended that the no significant risk level proposed for EDC does not appear to be based on the most sensitive site, species, and study, and that no adequate evidence is presented to indicate that such study is not representative. The commentor stated that the risk assessment document presented cancer potency estimates ranging from 0.01 to 1.9 $(mg/kg\text{-}day)^{-1}$, and a cancer potency estimate of 0.07 $(mg/kg\text{-}day)^{-1}$ was selected without adequate explanation for rejection of the higher values. The commentor appears to suggest that a nearly 200-fold difference in risk coefficients exists and that the Agency's choice is inappropriate.

The commentor has lumped the data from Table 1, and should have considered the data from the individual columns separately. By more appropriately keeping the data sets separate, the commentor would have found the Crump Multistage Polynomial q_1^* to range from 0.02 to 0.09 $(mg/kg\text{-}day)^{-1}$ (a 4.5-fold range), the Gold et al. TD50 column to range from 0.1 to 1.9 $(mg/kg\text{-}day)^{-1}$ (a 19-fold range), and the Weibull-in-time columns ranging from 0.01 to 0.1 $(mg/kg\text{-}day)^{-1}$ (a 10-fold range for "lethal") and 0.02 to 0.2 $(mg/kg\text{-}day)^{-1}$ (a 10-fold range for

"incidental"). When viewed in this perspective, the range of values is seen to be narrower than the commentor has suggested to be the case. The 0.07 $(mg/kg\text{-}day)^{-1}$ is bracketed by the Crump and Weibull ranges, and lower than the Gold et al. range, the latter of which is based on different assumptions about the influence of age, as described in the background risk assessment document.

The commentor evidently missed the explanation for selecting the cancer potency estimate of 0.07 $(mg/kg\text{-}day)^{-1}$ contained in the risk assessment document, which also refers to a risk assessment prepared by CDHS for the Air Resources Board's toxic air contaminant program. The cancer potency estimate was derived using the multistage Weibull-in-time model for time to tumor data for hemangiosarcomas in male rats. When expected tumor rates corrected for effective dosage and time to tumor were calculated, CDHS determined that hemangiosarcomas in male rats represented the most appropriate site, sex, and species.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for EDC and the risk assessment document which provides the basis for the proposed regulation were submitted to the Scientific Advisory Panel at a meeting held September 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level for EDC.

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FINAL
STATEMENT OF REASONS
22 CALIFORNIA CODE OF REGULATIONS

Section 12705(b) - Specific Regulatory Levels Posing No Significant Risk: Ethylene oxide

The Safe Drinking Water and Toxic Enforcement Act of 1986 (hereinafter the Act) prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the State to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual (Health & Saf. Code Sec. 25249.6). The Act also prohibits a business from knowingly discharging a listed chemical into water or onto or into land where such chemical passes or probably will pass into a source of drinking water (Health & Saf. Code Sec. 25249.5).

For chemicals known to the state to cause cancer, an exemption is provided by the Act when a person in the course of doing business is able to demonstrate that an exposure for which it is responsible poses no significant risk, or that a discharge which otherwise complies with applicable requirements would result in an exposure through drinking water at a level which poses no significant risk (Health & Saf. Code Sec. 25249.10 and 25249.11).

A determination that a level of exposure poses no significant risk can be made utilizing regulations that have previously been adopted by the Health and Welfare Agency (Agency) (Sec. 12701 to 12721, Title 22, California Code of Regulations) (unless otherwise specified, all section references are to Title 22, CCR). Section 12701 describes alternative methods for making such a determination. One such method is through the application of the specific regulatory level established for the chemical in question in Section 12705. A level specified in Section 12705(b) supersedes Section 12709 (Exposure to Trace Elements), Section 12711 (Levels Based on State or Federal Standards), or Section 12713 (Exposure to Food, Drugs, Cosmetics and Medical Devices).

Procedural Background

On October 3, 1989, the Agency issued a notice of proposed rulemaking advising that the Agency intended to adopt a "no significant risk" level for ethylene oxide. Pursuant to such notice, on November 28, 1989, a public hearing was held to receive public comments on the proposed regulation. Two comments regarding ethylene oxide were received.

Purpose of Final Statement of Reasons

This final statement of reasons sets forth the reasons for the final regulation adopted by the Agency for Section 12705(b), and responds to the objections and recommendations submitted regarding the regulation. Government Code section 11346.7, subsection (b)(3) requires that the final statement of reasons submitted with an amended or adopted regulation contain a summary of each objection or recommendation made

regarding the adoption or amendment, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. It specifically provides that this requirement applies only to objections or recommendations specifically directed at the Agency's proposed action or to the procedures followed by the Agency in proposing or adopting the action.

Some parties included in their written or oral comments remarks and observations about the regulation which do not constitute an objection or recommendation directed at the proposed action or the procedures followed. Accordingly, the Agency is not obligated under Government Code section 11346.7 to respond to such remarks in this final statement of reasons. Since the Agency is constrained by limitations upon its time and resources, and is not obligated by law to respond to such remarks, the Agency has not responded to these remarks in this final statement of reasons. The absence of response in this final statement of reasons to such remarks should not be construed to mean that the Agency agrees with them.

Specific Findings

Throughout the adoption process of this regulation, the Agency has considered the alternatives available to determine which would be more effective in carrying out the purpose for which the regulation was proposed, or would be as effective and less burdensome to affected private persons than the proposed regulation. The Agency has determined that no alternative considered would be more effective than, or as effective and less burdensome to affected persons than, the adopted regulation.

The Agency has determined that the regulation imposes no mandate on local agencies or school districts.

Rulemaking File

The rulemaking file submitted with the final regulation and this final statement of reasons is the complete rulemaking file for Section 12705(b). However, because regulations other than Section 12705(b) were also the topic of the public hearing on November 28, 1989, the rulemaking file contains some material not relevant to Section 12705(b). This final statement of reasons cites only the relevant material. Comments regarding the regulations other than Section 12705(b) discussed at the November 28, 1989 hearing have been or will be discussed in separate final statements of reasons.

Necessity for Adoption of Regulations

For chemicals known to the State to cause cancer, the Act exempts discharges, releases and exposures which, making certain assumptions, pose no significant risk. The Act specifies that any claim of exemption under Health and Safety Code section 25249.10, subsection (c) must be based upon evidence and standards of comparable scientific validity to the evidence and standards which form the scientific basis for the

listing of the chemical. However, the Act does not further clarify when a chemical risk is not significant, nor specify levels of chemical exposure posing no significant risk. Existing regulations describe methods for calculating levels which pose no significant risk.

This regulation provides a "safe harbor" no significant risk level which will allow persons to determine whether a discharge, release or exposure is exempt from the provisions of the Act.

Section 12705(b)

This regulation adopts a no significant risk level for ethylene oxide of 2 micrograms per day for purposes of the Act in Section 12705(b), and repeals the no significant risk level for this chemical in Section 12711. Although Section 12701 explicitly states that Section 12711 applies only when no specific level is established for the chemical in Section 12705, deletion of the chemical and its level from Section 12711 is necessary for clarity and to avoid confusion.

The no significant risk level represents the level of exposure which is calculated to result in no more than one excess case of cancer in an exposed population of 100,000, assuming exposure over a 70-year lifetime (10^{-5} lifetime risk of cancer), and is based on the risk assessment document prepared by the California Department of Health Services (CDHS) utilizing the principles in Section 12703 ("Proposition 65 Risk-Specific Intake Levels, Ethylene Oxide," Reproductive and Cancer Hazard Assessment Section, Office of Environmental Health Hazard Assessment, California Department of Health Services, July 1, 1988).

A cancer potency of 9×10^{-5} $(\text{micrograms/m}^3)^{-1}$, based on the incidence of mononuclear cell leukemias in female rats, was used to estimate the upper-limit incremental risk to humans exposed to ethylene oxide. Based on this estimate, the air concentration associated with a 10^{-5} risk of cancer is 110 ng/m^3. The intake levels associated with a 10^{-5} risk of cancer is 2 micrograms per day.

One commentor (C-16) stated that the risk assessment document provided little detail concerning methods and rationale, and that the document contains a number of errors that the commentor acknowledged do not affect the accuracy of the intake determinations, but "raise the question concerning the accuracy of other details in the report" (e.g., ethylene oxide was listed as a carcinogen on July 1, 1987, not February 27, 1987 as indicated in the document). The commentor contends that the assumptions used in calculating the cancer potency estimate are not consistent with the default assumptions in Section 12703. The commentor argued that the use of a surface area scaling factor equivalent to the ratio of human to animal body weight taken to the one-third power results in an overly conservative estimate and is not consistent with the approach used by other California agencies such as the Department of Food and Agriculture. The commentor recommends a level approximately 6 times higher than the CDHS level as one that poses no significant risk.

The Agency disagrees with this commentor's assertion that the risk assessment for ethylene oxide did not follow the principles and

assumptions outlined in Section 12703. As this commentor noted, a surface area scaling factor equivalent to the ratio of human to animal body weight taken to the one-third power was used. This approach is consistent with the default assumptions in the regulations. It is also consistent with the approach used by other California agencies, including the Department of Health Services in its assessments for the Air Resources Board. It is also consistent with the approach used by the U.S. Environmental Protection Agency. The difference between the CDHS level and the level recommended by this commentor primarily reflects the commentor's belief that body weight should be used as the basis for interspecies scaling, rather than surface area. The Agency disagrees, and believes the conservative surface area correction to be appropriate. However, as with any person subject to the Act, the commentor always has the option of using an alternative no significant risk level based on his own risk assessment, utilizing data, principles and assumptions which he can establish as being scientifically valid. Pursuant to section 12701, no significant risk levels in Section 12705 are intended to provide safe harbors and do not preclude the use of alternative levels that can be demonstrated by its users as being scientifically valid.

Another commentor (C-17) included comments regarding the presentation of information in the risk assessment documents that discuss the significance of animal data and various human epidemiologic data, but which are not directed to the proposed regulatory level. Such points, while of scientific interest, are beyond the scope of quantification of a level for regulatory purposes. However, as was pointed out above, if this commentor believes the animal and human data support a different approach, the regulations allow the use of a scientifically valid alternative. Pursuant to Section 12701, the no significant risk levels in Section 12705 are intended to provide safe harbors and do not preclude the use of alternative levels that can be demonstrated by their users to be scientifically valid. The same commentor also stated that the no significant risk level should be 2.4 micrograms per day instead of 2.2 micrograms per day. Both values can be rounded off to 2 micrograms per day, the Agency's no significant risk level.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for ethylene oxide and the risk assessment document which provides the basis for the proposed regulation were submitted to the Scientific Advisory Panel at a meeting held September 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level for ethylene oxide.

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FINAL
STATEMENT OF REASONS
22 CALIFORNIA CODE OF REGULATIONS

Section 12705(b) - Specific Regulatory Levels Posing No Significant Risk: Ethylene dibromide

The Safe Drinking Water and Toxic Enforcement Act of 1986 (hereinafter the Act) prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the State to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual (Health & Saf. Code Sec. 25249.6). The Act also prohibits a business from knowingly discharging a listed chemical into water or onto or into land where such chemical passes or probably will pass into a source of drinking water (Health & Saf. Code Sec. 25249.5).

For chemicals known to the state to cause cancer, an exemption is provided by the Act when a person in the course of doing business is able to demonstrate that an exposure for which it is responsible poses no significant risk, or that a discharge which otherwise complies with applicable requirements would result in an exposure through drinking water at a level which poses no significant risk (Health & Saf. Code Sec. 25249.10 and 25249.11).

A determination that a level of exposure poses no significant risk can be made utilizing regulations that have previously been adopted by the Health and Welfare Agency (Agency) (Sec. 12701 to 12721, Title 22, California Code of Regulations) (unless otherwise specified, all section references are to Title 22, CCR). Section 12701 describes alternative methods for making such a determination. One such method is through the application of the specific regulatory level established for the chemical in question in Section 12705. A level specified in Section 12705(b) supersedes Section 12709 (Exposure to Trace Elements), Section 12711 (Levels Based on State or Federal Standards), or Section 12713 (Exposure to Food, Drugs, Cosmetics and Medical Devices).

Procedural Background

On October 3, 1989, the Agency issued a notice of proposed rulemaking advising that the Agency intended to adopt a "no significant risk" level for ethylene dibromide (EDB). Pursuant to such notice, on November 28, 1989, a public hearing was held to receive public comments on the proposed regulation. One comment addressing EDB was received.

Purpose of Final Statement of Reasons

This final statement of reasons sets forth the reasons for the final regulation adopted by the Agency for Section 12705(b), and responds to the objections and recommendations submitted regarding the regulation. Government Code section 11346.7, subsection (b)(3) requires that the final statement of reasons submitted with an amended or adopted

regulation contain a summary of each objection or recommendation made regarding the adoption or amendment, together with an explanation of how the proposed action has been changed to accommodate each objection or recommendation, or the reasons for making no change. It specifically provides that this requirement applies only to objections or recommendations specifically directed at the Agency's proposed action or to the procedures followed by the Agency in proposing or adopting the action.

Some parties included in their written or oral comments remarks and observations about the regulation which do not constitute an objection or recommendation directed at the proposed action or the procedures followed. Accordingly, the Agency is not obligated under Government Code section 11346.7 to respond to such remarks in this final statement of reasons. Since the Agency is constrained by limitations upon its time and resources, and is not obligated by law to respond to such remarks, the Agency has not responded to these remarks in this final statement of reasons. The absence of response in this final statement of reasons to such remarks should not be construed to mean that the Agency agrees with them.

Specific Findings

Throughout the adoption process of this regulation, the Agency has considered the alternatives available to determine which would be more effective in carrying out the purpose for which the regulation was proposed, or would be as effective and less burdensome to affected private persons than the proposed regulation. The Agency has determined that no alternative considered would be more effective than, or as effective and less burdensome to affected persons than, the adopted regulation.

The Agency has determined that the regulation imposes no mandate on local agencies or school districts.

Rulemaking File

The rulemaking file submitted with the final regulation and this final statement of reasons is the complete rulemaking file for Section 12705(b). However, because regulations other than Section 12705(b) were also the topic of the public hearing on November 28, 1989, the rulemaking file contains some material not relevant to Section 12705(b). This final statement of reasons cites only the relevant material. Comments regarding the regulations other than Section 12705(b) discussed at the November 28, 1989 hearing have been or will be discussed in separate final statements of reasons.

Necessity for Adoption of Regulations

For chemicals known to the State to cause cancer, the Act exempts discharges, releases and exposures which, making certain assumptions, pose no significant risk. The Act specifies that any claim of exemption based upon evidence and standards of comparable scientific validity to

the evidence and standards which form the scientific basis for the listing of the chemical. However, the Act does not further clarify when a chemical risk is not significant, nor specify levels of chemical exposure posing no significant risk. Existing regulations describe methods for calculating levels which pose no significant risk.

This regulation provides a "safe harbor" no significant risk level which will allow persons to determine whether a discharge, release or exposure is exempt from the provisions of the Act.

Section 12705(b)

This regulation adopts a no significant risk level for ethylene dibromide of 0.2 microgram ingested per day, and 3 micrograms inhaled per day for purposes of the Act in Section 12705(b), and repeals the single no significant risk level for this chemical in Section 12711. Although Section 12701 explicitly states that Section 12711 applies only when no specific level is established for the chemical in Section 12705, deletion of the chemical and its level from Section 12711 is necessary for clarity and to avoid confusion.

The no significant risk level represents the level of exposure which is calculated to result in no more than one excess case of cancer in an exposed population of 100,000, assuming exposure over a 70-year lifetime (10^{-5} lifetime risk of cancer), and is based on the risk assessment document prepared by the California Department of Health Services (CDHS) utilizing the principles in Section 12703 ("Proposition 65 Risk-Specific Intake Levels, Ethylene Dibromide," Reproductive and Cancer Hazard Assessment Section, Office of Environmental Health Hazard Assessment, California Department of Health Services, July 1, 1988).

Cancer potencies of 3.6 $(mg/kg\text{-}day)^{-1}$ for oral exposure and 0.25 $(mg/kg\text{-}day)^{-1}$ for inhalation exposure were estimated. A cancer risk of 10^{-5} is associated with ingestion of 0.2 microgram per day and with inhalation of 3 micrograms per day.

One commentor (C-22) contended that the no significant risk level proposed for ingestion of EDB does not appear to be based on the most sensitive site, species, and study, and that no adequate evidence is presented to indicate that such study is not representative. Further, the commentor states that no justification is given for rejecting the second highest potency estimate in favor of taking the geometric mean of the remaining studies.

The commentor appears to be unaware of the general approach of the risk assessment methodology in which, according to Section 12703(a), default principles and assumptions are to apply in the absence of scientifically more appropriate principles or assumptions. Hence, even though the default methodology focuses the risk assessment on the most sensitive site, species and study, the availability of a number of studies in different species with several tumor sites gives the risk assessor more confidence about the appropriateness of moving away from the most sensitive data set. When the additional data are of such quality that they may be taken into account with confidence, they may be used in the

risk assessment. Also, when sufficient data are available, the geometric mean is an appropriate way to utilize the various data sets. Using the second highest potency value would still require ignoring the body of information that exists beyond the second most sensitive study.

The commentor also stated that no justification was given for selecting the cancer potency estimates calculated by CDHS in 1985 over the estimates calculated in a later risk assessment (1987). For purposes of establishing no significant risk levels for EDB, the Agency believes it appropriate to establish such levels in a route-specific manner. The background risk assessment document points out that for inhalation, the CDHS risk assessment for the Air Resources Board's toxic air contaminant program is considered appropriate, and, for ingestion, the later CDHS risk assessment in support of a drinking water maximum contaminant level is considered appropriate. Since the regulations (Article 7, 22 CCR) allow the use of scientifically more appropriate data, and differentiation between routes of exposure, such an approach for EDB is reasonable.

Pursuant to Section 12705(c), which requires the lead agency to provide an opportunity for the Scientific Advisory Panel to review and comment on any proposed no significant risk level, the proposed level for ethylene dibromide (EDB) and the risk assessment document which provides the basis for the proposed regulation were submitted to the Scientific Advisory Panel at a meeting held September 16, 1988. No panelists presented specific recommendations on, or objections to, the proposed level for EDB.