State of California

Memorandum

To : Jack C. Parnell
Director

Date : July 24, 1987

Place : Sacramento

From : Department of Food and Agriculture – Lyndon S. Hawkins, Chair
Subcommittee of the Pesticide Registration and Evaluation Committee

Subject : Simazine

Attached is the Findings and Recommendations regarding simazine. This report is pursuant to the requirements of the Pesticide Contamination and Prevention Act and is submitted on behalf of the Subcommittee of the Pesticide Registration and Evaluation Committee.

Attachment

cc: Don Mengle
Syed Ali
Tobi Jones

SURNAME

SUBCOMMITTEE OF THE
PESTICIDE REGISTRATION AND EVALUATION COMMITTEE

IMPLEMENTATION OF THE PESTICIDE CONTAMINATION PREVENTION ACT
SIMAZINE: FINDINGS AND RECOMMENDATIONS

Simazine has been found in ground water in nine California counties, in soil at fifteen to twenty feet in Tulare County, and in several subsurface drains in the San Joaquin Valley. Computer modeling, ranking schemes based on simazine's chemical properties, and experimental data indicate that simazine has the potential to leach through the soil and contaminate ground water. Information substantiating these facts is on file with the California Department of Food and Agriculture.

Pursuant to California Notice 86-8, Notice of Simazine Finds in California Ground Water, and the Notice of Hearing Pertaining to Simazine (October 1, 1986), the subcommittee held hearings to review registrant reports, public comment, and other appropriate information regarding the presence of simazine in ground water and soil in California. After review of this information, the subcommittee offers the following findings and recommendations to the California Department of Food and Agriculture Director. These findings were unanimously agreed upon by the subcommittee on July 9, 1987.

FINDINGS

Finding One

1. The subcommittee finds that a pollution level for simazine cannot be identified due to lack of complete health data as specified in the Birth Defect Prevention Act (SB 950), and therefore, the subcommittee cannot make Finding One in the Food and Agricultural Code, Section 13150(c)(1).

Reason for Finding

Because a pollution level as specified in the Act has not yet been established, it is not possible to determine that simazine has not polluted or does not threaten to pollute the ground waters of the state.

Finding Two

2. The subcommittee finds that the agricultural use of simazine can be modified so that there is a high probability that continued simazine use will not threaten to pollute ground water of the state and, therefore, the subcommittee makes Finding Two in the Food and Agricultural Code, Section 13150(c)(2).

Reason for Finding

Testimony presented at hearings and information gathered during informal meetings with U.C. Cooperative Extension and County Agricultural Commissioner staffs indicate that recommendations regarding modifications of simazine use are appropriate. The subcommittee concludes that the high probability not to pollute can only be ensured provided that the recommended monitoring and accompanying specified actions are followed.

Finding Three

3. The subcommittee cannot determine whether modified use of simazine would cause severe economic hardship on the agricultural industry of the state. The subcommittee further cannot recommend a level of simazine that does not significantly diminish the margin of safety not to cause adverse health effects because the SB 950 health data base is not complete. Therefore, the subcommittee cannot make Finding Three in the Food and Agricultural Code, Section 13150(c)(3).

Reason For Finding

The information made available to the subcommittee regarding economic consequences of modification of simazine use or cancellation was not conclusive regarding economic hardship to the state's agricultural industry (Attachment 1).

Chronic Toxicity Determination

The bill requires that when the subcommittee makes Finding Two or Three, the subcommittee shall determine whether the economic poison is carcinogenic, mutagenic, teratogenic, or neurotoxic. The subcommittee cannot make this determination.

Reason for Determination

The toxicological data for simazine are not sufficient to establish its carcinogenicity, mutagenicity, teratogenicity, or neurotoxicity (Attachment 2).

RECOMMENDATIONS

1. To ensure that there is a high probability that pollution will not occur with the modifications of use specified in these recommendations, the subcommittee recommends that the Director require soil and ground water monitoring. This monitoring program should be established in cooperation with the Department of Health Services, the State Water Resources Control Board, County Agricultural Commissioners, registrants, and users of simazine.

The subcommittee further recommends that the Director record certain parameters which define the range of characteristics of previous detections. Such parameters should include concentrations of simazine found in ground water and concentrations by depth of simazine found in soil. If detections of simazine with modified use exceed these parameters at or below eight feet in soil or in ground water, the subcommittee recommends that simazine be resubmitted into the detection response process. If these parameters are exceeded above eight feet in soil, depending upon site characteristics the Director should resubmit simazine into the detection response process.

2. The subcommittee recommends the following modifications of use:

a. Reduce simazine application rates (lb/acre) where possible. Rates lower than both minimum and maximum labeled rates for cropland have been suggested by U.C. Farm Advisor Harold Kempen (Growers Weed Management Guide, 1987, Thompson Publications). Representatives of Ciba-Geigy have also proposed a reduction in maximum application rates,

especially for non-cropland uses. For non-cropland uses, annual application rates should not exceed maximum application rates specified by soil type for cropland uses (up to six pounds per acre).

b. Alternate simazine use with herbicides that do not pose a threat to ground water.

c. In conjunction with county agricultural commissioners, re-emphasize the critical need for growers and PCO's to establish company programs that require employees handling pesticides to follow all laws and regulations regarding pesticide mixing and loading operations. These programs should give special focus to areas in proximity to wells, including dry wells, that are a potential source of ground water contamination. In this regard, recommendations by the Tulare County Farm Bureau regarding diuron are relevant for any pesticide, including simazine, and therefore should be consulted (Attachment 3).

d. Develop guidelines for storing pesticides around wells.

e. Act with the State Water Resources Control Board, Department of Water Resources, and Department of Health Services local agencies and users to:

(1) Identify the locations of abandoned (dry and other) wells and provide for their proper destruction (as specified in Water Well Standards: State of California. 1981. Bulletin 74-81).

(2) Establish guidelines for simazine users to prevent runoff water containing simazine residues from entering ground water through any well (Attachment 3).

f. Ban statewide the use of simazine in all artificial recharge areas. These areas shall be defined as any man-made structure which receives water or waste water to replenish ground water or to manage excess surface water. Many of these areas are identified in the Department of Water Resources' draft publications, "Ground Water Recharge Projects within the USBR Mid-Pacific Region (October 19, 1983)" and "Ground Water Recharge Projects within the USBR Lower Colorado River Region (October 18, 1983)." Consideration should also be given to monitoring surface water before it enters recharge areas, as simazine has been detected in surface waters in several counties (County of Los Angeles. Department of Agricultural Commissioner. 1987. Request for and Report of Analysis. Numbers SGV-015, -016, and -062; San Joaquin Valley Drainage Monitoring Program, Department of Water Resources, 1986). If simazine is found in surface waters entering managed recharge areas, the Director should consider restrictions on simazine use in adjacent areas.

g. Develop with appropriate state, county, and local agencies a program to minimize their use of pesticides which have been detected in ground water or which are potential ground water contaminants. This program would involve evaluating alternative pesticides and practices, improving water use, and, in general, implementing integrated pest management techniques that could help prevent pollution of ground water. The program adopted July 18, 1982 in Los Angeles County, is an example of the type of program that may be appropriate (County of Los Angeles. 1972. Report on the Use and Control of Simazin [sic] and other Herbicides by the County of Los Angeles).

3. Fund and conduct, cooperatively with the University of California and the agricultural industry, research to determine the relationship between the leaching potential of pesticides and the following factors: physical and chemical properties of soil; soil organic matter; pesticide application rates; time and method of application; chemical properties of pesticides; amount, timing, and method of irrigation; and depth to ground water. There are as yet no conclusive data which establish relationship between chemical properties, use and cultural practices, or geographical characteristics and the presence of pesticides in ground water.

ACKNOWLEDGMENTS

The subcommittee thanks those who provided information about simazine, including facts about toxicology, use, and potential relationships to ground water pollution. We also thank County Agricultural Commissioners, U,C. Extension Service staff and Regional Water Quality Control Board staff who took the time to discuss with us during our field investigations the agricultural practices in areas where simazine occurs in ground water.

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ALTERNATIVES TO SIMAZINE

Simazine has been found in California groundwater, under the conditions specified in the Pesticide Contamination Prevention Act (AB 2021). This act requires the subcommittee of the Pesticide Registration and Evaluation Committee to make and the Director to adopt, one or more of three findings regarding the continued use of simazine. For two of these findings, the subcommittee/Director must determine whether there are alternative products or practices that can be effectively used to not cause additional groundwater pollution. This report identifies the major uses of simazine, describes how simazine is used, discusses some of the factors that affect the selection of herbicides and lists possible alternatives to simazine.

For the purposes of this analysis, alternatives to simazine are limited to: (1) products and practices which are reasonably effective and practicable and (2) products which do not contain chemicals detected in soils or groundwater under the conditions specified in AB 2021.

Simazine is a selective, residual herbicide used for control of many annual grasses and broadleaf weeds in cropland. It is used at varying rates depending on soil type, soil organic matter, target weed species and use in combination with other herbicides. At higher rates, it is used for non-selective weed control in non-crop areas.

Simazine is registered for use on over 40 different crops/sites in California including rights-of-way, grapes, oranges, avocados, non-agricultural areas, almonds, other citrus crops, asparagus, walnuts, alfalfa and artichokes. Because 76% of all reported simazine use occurs on rights-of-way, grapes, and citrus, this analysis will focus on evaluating alternatives for these three sites. For six other

crops with reported simazine use, other registered herbicides are simply listed in Table I.

Almost 700 species of weeds have been identified in California, and the University of California has described more than 200 weed species in the Grower's Weed Identification Handbook. Although individual fields are more likely to be infested with 10-30 species, the weed spectrum of those fields can vary widely. Because most herbicides are species specific, weed control programs are designed to use the herbicide or combination of herbicides that most economically control a given spectrum of weeds.

Typically, no single herbicide will economically control all species of weeds found in a particular crop or site. At best, combinations or sequential applications of two or more herbicides, along with various cultural practices are needed to control weeds. Each herbicide used in a program has its own combination of strengths and weaknesses that is never exactly the same as any other herbicide. For example, in grapes herbicide A may control seven out of ten weed species present and herbicide B the other three. Herbicide C, if substituted for A, may control four of the seven species controlled by herbicide A and all three species controlled by herbicide B. However, another herbicide, D, is required to control the remaining three species previously controlled by A. Thus, in this simplified example, there is no single herbicide alternative to herbicide A; rather,

herbicides C and D are alternatives to herbicides A and B.

Herbicides, such as A-D above, are selected based on registration status in a given location, comparative efficacy under local conditions, cost, and possible adverse impacts. The latter three factors are in turn influenced by soil type and organic matter, irrigation method, topography, timing and amount of rainfall, specialized equiupment needed, and application timing, among other considerations. Thus, selection of appropriate herbicides is a complex process.

In order to simplify the complexity of identifying alternatives to simazine on the three principal uses, the following assumptions are made:

(1) Chemical alternatives to simazine are identified based on their ability to control, under optimum conditions: (a) 23 common annual weed species in grapes identified in the University of California (UC) Publication No. 4105, Grape Pest Management, and (b) 23 common annual weed species in oranges identified in the UC Publication No. 3303, Integrated Pest Management for Citrus (Table II).

(2) Comparative costs of materials are based on application at rates that are the average of the lowest and highest rate allowed on the label for agricultural crop use. Herbicide prices are based on those quoted in the April, 1987 edition of the publication, Agchemprice, or, if not available there, those quoted by selected distributors or registrants in California.

Rights-of-Way

Rights-of-way herbicides are used where crop tolerance levels and phytotoxicity to non-target species are not primary considerations. As a result, many active ingredients are registered for such uses. After eliminating pesticides subject to the conditions described above, there are at least nine residual and fifteen foliar active ingredients that could be used in weed control programs designed to control the same weeds as simazine (Table III). Although equally effective, the material and application costs of any such alternative herbicides would be greater than simazine.

Grapes

Simazine is primarily used as a band treatment on vineyard burms to control annual weeds. Typically, four out of the twelve feet between rows are treated. Weeds between the burms are usually controlled by tillage, mowing or contact herbicides.

The use of simazine alone on grapes fails to control 7 of the 23 weed species identified in Table II. Thus, it is often combined with diuron at moderate rates to improve control. This combination is usually considered the most effective low cost weed control program in grapes.

To identify possible alternatives to simazine, a comparison was made between glyphosate, various two-herbicide combinations, and the standard simazine + diuron program. Because all other single herbicide alternatives fail to control 6-13 of the weed species in Table II, glyphosate, which misses only 3 species, is the only single herbicide alternative compared. Only two foliar herbicides, glyphosate and gramoxone, are included among the various two-herbicide combinations. Dalapon and 2,4-D are two other foliar herbicide alternatives useful in specific situations. However, because they are generally

less effective or pose greater safety risks to crops than either glyphosate or gramoxone, these two herbicides are excluded from the comparisons.

The various potential alternatives are listed in Table IV in order of decreasing efficacy, and, within similar efficacy groups, in order of increasing cost. It should be noted in Table IV that the UC sample cost estimate for herbicide use in grapes is $39 per acre, which is $20 more than the cost of a single application of simazine + diuron. This difference results from producers either applying these herbicides at higher rates or frequencies than assumed in Table IV or spot treating annual and especially perennial weeds not controlled solely by these herbicides. Similarly, cost figures shown for all other two-herbicide combinations do not include costs of using such combinations at higher rates or frequencies, or spot treating weeds not controlled.

As shown in Table IV, the most effective alternatives to simazine (in combination with diuron) are various residual herbicides plus either glyphosate or gramoxone. These combinations generally miss one of the 23 selected weed species and cost $25-$64 more per acre than simazine + diuron. However, the greatest limitation of these alternatives is their reliance on a foliar herbicide to control certain weeds.

There are both advantages and disadvantages to using foliar herbicides:

Advantages

1. Emerged weeds can be controlled.
2. They may not pose a threat to groundwater.

Disadvantages

1. Timing is critical. If not controlled when small, weeds become more difficult and expensive to control. Because the application "window" is smaller for foliar versus residual herbicides, sufficient equipment must be available to cover the crop acreage more quickly.

2. Wet ground in early spring may prevent timely application.

3. If operated on wet soil, standard spray rigs can damage soil structure and cause compaction, which decreases water infiltration rates, irrigation efficiency, root growth and crop yields.

4. Drift or misting during application increases the chance for target and adjacent crop phytotoxicity, foliage "feathering," or delayed fruiting the following spring.

5. Repeated applications are necessary as weeds germinate--thus both soil compaction, chance for phytotoxicity, and costs increase.

Thus, the use of foliar herbicides increases the risk of weed control failures. Such failures increase clean-up costs, interfere with other production operations, and can increase weed seed production as well as reduce crop yields.

The most effective alternatives involving only residual herbicides are oryzalin + oxyfluorfen and napropamide + norflurazon. Both these combinations miss two of the 23 selected weed species and cost $25-$29 more per acre than simazine + diuron.

Some of the characteristics of simazine and other residual herbicides registered on grapes are summarized in Table V. As shown, there are limitations on the use of residual herbicides depending on location. For example, the combination napropamide + norflurazon would not be an alternative in a Kern County citrus grove under flood irrigation because 1) norflurazon cannot be used in Kern County, and 2) application of napropamide in a relatively low rainfall area like Kern County without sprinkler irrigation is likely to result in poor weed control. Thus, not all combinations shown in Table IV can be used in every vineyard situation.

Trifluralin is another residual herbicide used in grapes. However, it can only be applied as a band treatment when used in combination with French plowing. Although it does control 13 of the 23 selected weed species, its use is primarily to control bermudagrass and johnsongrass and thus is not considered an alternative to simazine.

Weed control on vineyard burms can also be accomplished by non-chemical methods. Such tillage methods include the use of French plows or row weeders in vineyards where drippers or mini-sprinklers are not on the burm. Some growers alternate French plowing (one year) with herbicides (several years) while other growers French plow exclusively. Additional benefits of tilling burms include reducing omnivorous leaf roller populations and allowing deep irrigation directly under vines.

The disadvantages of French plowing are higher associated costs, including hand hoeing required around vines (up to $30/acre), vine and stake replacement ($8-$10/acre), and yield losses until replacement vines reach full production ($11/acre). The comparative cost of French plowing is also shown in Table IV.

Oranges

In contrast to grapes, chemical weed control in oranges is usually practiced both in tree rows and in middles between rows. It is commonly stated that such a program maximizes frost protection; minimizes root pruning, compaction, and "plow pans" caused by repeated tillage; and avoids competition for water and nutrients by weeds under a mowing regime.

The least expensive herbicide program in oranges involves the use of simazine and diuron in combination. However, in many groves this combination misses puncture vine, sprangletop, spurge, and various perennial weeds. To keep these missed weeds to a minimum, the more expensive combination of bromacil and diuron is substituted for simazine and diuron in alternate years. This rotation allows producers to achieve maximum weed control at minimum cost.

In Table VI, the efficacy and cost of glyphosate and various two-herbicide combinations are compared to simazine + diuron. Because all other single herbicide alternatives fail to control 4-20 of the weed species in Table II, glyphosate, which misses only 2 species, is the only single herbicide compared. Again, only two contact herbicides, glyphosate and gramoxone, are included among the various two-herbicide combinations. Dalapon, MSMA, and 2,4-D are three other contact herbicide alternatives useful in specific situations. However, because they are generally less effective or pose greater safety risks to crops than either glyphosate or gramoxone, these three foliar herbicides are excluded from the comparisons.

The various potential alternatives are listed in Table VI in order of decreasing efficacy and, within similar efficacy groups, in order of increasing cost. It should be noted in Table VI that the UC sample cost estimate for herbicide use in oranges is $78 per acre, which is $35 and $9 more than the cost of a single application of simazine + diuron and bromacil + diuron,

respectively. As in grapes, these differences result from producers either applying these herbicides at higher rates or frequencies than assumed in Table VI, or spot treating annual and especially perennial weeds not controlled solely by these herbicide combinations. Similarly, cost figures shown for all other two-herbicide combinations do not include costs of using such combinations at higher rates or frequencies, or of spot treating weeds not controlled.

As with grapes, the most effective alternatives are various residual herbicides plus either glyphosate or gramoxone. The disadvantages of relying on contact herbicides are discussed under grapes. Because herbicides are used in middles as well as tree rows in oranges, the best alternative herbicides (except combinations with trifluralin) increase costs by at least $89 per acre compared to lower increases in grapes.

It should be noted that because the use of trifluralin requires soil incorporation, one of the reported advantages of chemical weed control in citrus--to minimize root pruning in shallow rooted citrus--is lost. In addition, soil incorporation in effect prepares a favorable seed bed for weed species not controlled by trifluralin. Thus, although alternatives involving trifluralin + contact herbicides are the least expensive, there are significant disadvantages to their use.

The least costly and most effective alternative combinations of residual herbicides are oryzalin + terbacil and napropamide + terbacil. Both combinations miss two weed species and increase costs $94-$96 per acre.

Various characteristics of residual herbicides registered on orange are given in Table IV. As indicated in Table IV, not all combinations shown in Table VI can be used in every orange grove situation.

Other weed control options in oranges are: 1) discing middles and applying herbicides in a band along the row, and 2) mowing middles and applying herbicides in a band along the row. Comparative direct cost figures of

these alternatives are also presented in Table VI. Potential indirect costs, such as increased frost damage, mechanical damage to fruit, and yield reductions often mentioned by growers and UC specialists are not included.

Some growers control weeds without the use of any herbicides. Such a program involves either extensive hand hoeing, which would require a large manual labor force, or discing or mowing in two directions, which is only feasible under furrow or flood irrigation. However, it is estimated that more than 70% of orange groves in Tulare County are under either sprinkler, mini-sprinkler, mister, or drip irrigation. Thus, controlling weeds without the use of any herbicides is not considered practicable for citrus in that area.

Table 1. Other Registered Herbicides on Selected Crops

Avocado	Almonds	Asparagus	Walnut	Alfalfa	Artichoke
Pre-emergent					
Napropamide	Cyanazine	Chloramben	Diuron	Benfluralin	Diuron
Oryzalin	Dichlobenil	Diuron	EPTC	Chlorthal-dimethyl	Napropamide
	EPTC	Linuron	Napropamide	Chlorprophan	Oxyfluorfen
	Napropamide	Metribuzin	Norflurazon	Dichlobenil	Pronamide
	Norflurazon	Napropamide	Oryzalin	EPTC	
	Oryzalin	Trifluralin	Oxyfluorfen	Hexazinone	
	Oxyfluorfen			Oxyfluorfen	
	Trifluralin			Pronamide	
				Propham	
				Terbacil	
				Trifluralin	
Post-emergent					
Glyphosate	2,4-D	Dalapon	2,4-D	Asulam	Glyphosate
Gramoxone	Glyphosate	Glyphosate	Glyphosate	Diquat	
	Gramoxone	Gramoxone	Gramoxone	Gramoxone	

Table 2. Common Weed Species

Grapes	Oranges
Burning Nettle	Cheeseweed
Cheeseweed	Chickweek
Chickweed	Fiddleneck
Fiddleneck	Filaree
Filaree	Flax-leaved fleabane
Flax-leaved fleabane	Groundsel
Groundsel	Henbit
Horseweed	Horseweed
Knotweed	Knotweed
Lambsquarters	Lambsquarters
Mustards	Mustards
Nightshade	Nightshade
Pigweed	Pigweed
Puncturevine	Puncturevine
Purslane	Purslane
Russian Thistle	Shepherdspurse
Shepherdspurse	Sowthistle
Sowthistle	Annual bluegrass
Annual bluegrass	Barnyardgrass
Barnyardgrass	Crabgrass
Crabgrass	Foxtail
Foxtail	Lovegrass
Lovegrass	Sprangletop

Table 3. Herbicides Registered for Rights-of-Way Use

Residual	Foliar
Chlorfenac	Ametryn
Chlorsulfuron	Ammonium thiosulfate
Hexazinone	Bentazon
Linuron	Chlorfenac
Metribuzin	Chlorsulfuron
Monuron	Dicamba
Oxyfluorfen	Glyphosate
Picloram	Gramoxone
Prometryn	Metsulfluron
Tebuthiuron	Oxyfluorfen
Terbutryn	Picloram
	Sodium chlorate
	Sulfometuron
	Trifluralin
	Triclopyr

Table 4. Potential alternatives to simazine on grapes.

Potential[1,2] Alternatives	No. Weed Species in Table II Not Controlled	Cost per Planted Acre	% of Pre-harvest Cash Costs	Increase (Decrease) in Cost over Simazine + Diuron	Typical Weed Species Not Controlled
UC Sample Cost	-	39	7	20	-
Simazine	7	16	3	(4)	Many
Simazine + diuron[3]	1	19	4	0	Puncturevine
Oxyfluorfen + glyphosate[4]	0	57	11	38	-
Pronamide + glyphosate	1	44	8	25	Filaree
Oxyfluorfen + gramoxone	1	57	11	38	Barnyardgrass
Napropamide + gramoxone	1	59	11	40	Russian thistle
Napropamide + glyphosate	1	59	11	40	Burning nettle
Dichlobenil + glyphosate	1	83	16	64	Filaree
Napropamide + norflurazon	2	44	8	25	Flax-leaved fleabane, horseweed
Pronamide + gramoxone	2	44	8	25	Filaree, Russian thistle
Oryzalin + oxyfluorfen	2	48	9	29	Flax-leaved fleabane, horseweed
Norflurazon + glyphosate	2	53	10	34	Cheeseweed, filaree
Oryzalin + gramoxone	2	58	11	39	Cheeseweed, filaree
Pronamide + oxyfluorfen	3	33	6	14	Flax-leaved fleabane, horseweed, puncturevine
Napropamide + oxyfluorfen	3	49	9	30	Flax-leaved fleabane, horseweed, puncturevine
Oryzalin + glyphosate	3	58	11	39	Burning nettle, cheeseweed, filaree
Glyphosate[5]	3	68	13	49	Burning nettle, cheeseweed, filaree
Dichlobenil + oryzalin	3	74	14	55	Filaree, flax-leaved fleabane, horseweed

Table 4 (Cont)

Potential[1,2] Alternatives	No. Weed Species in Table II Not Controlled	Cost per Planted Acre	% of Pre-harvest Cash Costs	Increase (Decrease) in Cost over Simazine + Diuron	Typical Weed Species Not Controlled
Pronamide + napropamide	4	35	7	16	Many
Dichlobenil + napropamide	4	75	14	56	Many
Dichlobenil + gramoxone	4	83	16	64	Many
Pronamide + dichlobenil	5	59	11	40	Many
Norflurazon + oxyfluorfen	6	43	8	24	Many
Pronamide + norflurazon	7	29	6	10	Many
Pronamide + oryzalin	7	34	7	15	Many
Norflurazon + oryzalin	7	44	8	25	Many
Dichlobenil + norflurazon	7	69	13	50	Many
Dichlobenil + oxyfluorfen	7	73	14	54	Many
French plowing		30-65	6-12	11-46	Many

1. Assume all residual herbicides are applied with gramoxone plus one quart spreader in 100 gallons mixture per treated acre.
2. For alternatives shown as residual + foliar herbicide combinations, assume the foliar is applied two times by itself following the residual application.
3. Sample calculation: [simazine ($8) + diuron ($9) + gramoxone (15) + spreader (4)] x [.33] + application ($7)= $19/acre.
4. Sample calculation: [oxyfluorfen ($51) + gramoxone ($15) + spreader ($4)] x [.33] + application ($7) +{ [glyphosate ($19) + spreader ($1)] x [.33] + [application ($7)]} x {2}.
5. Assume five applications.

Table 5. Characteristics of Residual Herbicides.

Herbicide	Crop (G-grapes O-oranges)	Activation period by rainfall or overhead irrigation	Cost	Other
Diclobenil	G O	Immediate	Very high	- Controls some perennials - Not for use on light sand soil
Oryzalin	G O	3 weeks	high	- Suppresses some perennials - Trash reduces efficacy - Can be applied through sprinklers during dormancy
Oxyfluorfen	G	Periodic wetting required	high	- Contact activity on some important weeds - Trash reduces efficacy - Cannot be applied before Oct. 1 or after Feb. 1 in Coachella, or after February 15 elsewhere
Napropamide	G O	1 week	high	- Suppresses nutsedges under sprinklers - Trash reduces efficacy - Reduces burndown of glyphosate when used in combination - Works best under sprinklers
Norflurazon	G O	Flood or sprinkler 4 weeks	Moderate	- Cannot be used south of the Monterey, Kings, and Tulare County lines - Suppresses some perennials
Pronamide	G	1 week Immediate if >85°F	Low	
Simazine	G O	1 month	Low	- Little affected by trash - Contaminates ground water - Not for use on sand or loamy sand soils - May damage less vigorous black wine varieties grown in warmer areas under drip or sprinkler irrigation - Can cause damage where soils are low in organic matter or high in calcium and pH.

Table 5 (Cont'd)

Herbicide	Crop (G-grapes O-oranges)	Activation period by rainfall or overhead irrigation	Cost	Other
Terbacil	O	1 week	High	- Contact activity on weeds less than 2" - Suppresses some perennials - Subject to leaching on sandy loams - Cannot be used in Kern County - Not for use on sands with less than 1% organic matter or poorly drained soils
EPTC	O	Applied in irrigation water	Low	- Apply in enough water to reach 3-4 inches in soil
Trifluralin	G O	Immediate soil incoporation required	Low	- Destroy all weeds with soil tillage before application - Incorporation may require specialized equipment

Table 6. Potential alternatives to simazine on oranges.

Potential[1,2] Alternatives	No. Weed Species in Table II Not Controlled	Cost per Planted Acre	% of Pre-harvest Cash Costs	Increase (Decrease) in Cost over Simazine + Diuron	Typical Weed Species Not Controlled
UC Sample Cost	-	78	8	35	-
Simazine	9	34	4	(9)	Many
Simazine + diuron[3]	2	43	5	0	Puncturevine, sprangle top
Bromacil + diuron	0	69	7	26	-
Terbacil + glyphosate[4]	0	137	14	94	-
Trifluralin + gramoxone	1	76	8	33	Cheeseweed
Trifluralin + glyphosate	1	78	8	35	Cheeseweed
Oryzalin + gramoxone	1	132	14	89	Cheeseweed
Napropamide + gramoxone	1	134	14	91	Cheeseweed
Terbacil + gramoxone	1	135	14	92	Barnyardgrass
Napropamide + glyphosate	1	136	14	93	Cheeseweed
EPTC + gramoxone	2	88	9	45	Cheeseweed, knotweed
EPTC + glyphosate	2	90	9	47	Cheesewee, filaree
Norflurazon + glyphosate	2	118	12	75	Cheeseweed, filaree
Oryzalin + glyphosate	2	134	14	91	Cheeseweed, filaree
Oryzalin + terbacil	2	137	14	94	Groundsel, puncturevine
Napropamide + terbacil	2	139	15	96	Puncturevine, sprangletop
Dichlobenil + glyphosate	2	210	22	167	Cheeseweed, filaree
Napropamide + norflurazon	3	120	13	77	Cheeseweed, flax-leaved fleabane, horseweed
Norflurazon + gramoxone	4	116	12	73	Many
Dichlobenil + trifluralin	4	156	16	113	Many
Dichlobenil + gramoxone	4	208	22	165	Many
Trifluralin + norflurazon	5	69	7	26	Many

Table 6 (Cont)

Potential[1,2] Alternatives	No. Weed Species in Table II Not Controlled	Cost per Planted Acre	% of Pre-harvest Cash Costs	Increase (Decrease) in Cost over Simazine + Diuron	Typical Weed Species Not Controlled
EPTC + trifluralin	6	34	4	(9)	Many
EPTC + norflurazon	6	74	8	31	Many
EPTC + napropamide	6	92	10	49	Many
Trifluralin + napropamide	7	87	9	44	Many
Norflurazon + oryzalin	7	118	12	75	Many
Dichlobenil + terbacil	7	213	22	170	Many
EPTC + oryzalin	8	90	9	47	Many
Napropamide + oryzalin	8	136	14	93	Many
Dichlobenil + norflurazon	8	194	20	151	Many
Trifluralin + oryzalin	9	85	9		Many
EPTC + dichlobenil	9	166	17	123	Many
Discing + herbicide banding[5]		146	15	103	
Mowing + herbicide banding[6]		136	14	93	

1. Assume all residual herbicides are applied with gramoxone plus one quart spreader in 100 gallon mixture per treated acre except for combinations with trifluralin.
2. For alternatives shown as residual + foliar herbicide combinations, assume the foliar is applied two times by itself following the residual application.
3. Sample calculation: [simazine ($8) + diuron ($9) + gramoxone ($15) + spreader ($4) + application ($7)] = 43
4. Sample calculation: [terbacil (57) + gramoxone ($15) + spreader ($4) + application ($7)] + [glyphosate ($19) + spreader ($1) + application ($7)] x [2] = $137
5. (8 passes per year) x ($11/pass) + [oryzalin ($4) + gramoxone ($15) + spreader ($4)] x [.33] + [application ($7)] + {[gramoxone ($15) + spreader ($4)] x [.33] + application ($7)} x {2}
6. (6 times per year) ($13/acre) + [oryzalin ($4) + gramoxon ($15) + spreader (4)] x [.33] + [application $7)] + {[gramoxone ($15) + spreader (4)] x [.33] + application ($7)] } x {2}

ATTACHMENT 2

State of California
Department of Health Services

Memorandum

To : Donald C. Mengle, M.S.

Date : June 18, 1987

Subject: Adverse Health Effects from Simazine

From : Hazard Evaluation Section

The toxicological data on simazine available at this time are not sufficient to establish unequivocally its carcinogenicity, mutagenicity, teratogenicity or neurotoxicity, the adverse effects stated in the PREC Subcommittee Decision Tree.

According to CDFA, Medical Toxicology Branch, Summary of Toxicology Data for Simazine of August 11, 1986 (the most recent evaluation), data gaps exist on all the above types of toxicity tests except neurotoxicity studies, which, according to the current requirements, are not obligatory for pesticides other than organophosphates and carbamates (ACH inhibition for both groups and delayed neurotoxicity for organophosphates only). Carcinogenicity, mutagenicity and teratogenicity data gaps are ascertained either because of inadequacy of the available studies (oncogenicity on mice, and gene mutation and chromosomal aberrations as part of the battery of mutagenicity tests) or the absence of such studies (oncogenicity on rats). Among the acceptable studies (without adverse effects) are a teratogenicity study on rabbits and an UDS (Unscheduled DNA Synthesis) test. The latter is part of the mutagenicity testing requirements.

Adverse health effects evaluation should not be limited to carcinogenicity, mutagenicity, teratogenicity, and neurotoxicity. Any other potential adverse health effects like chronic (systemic effects; structural or functional changes in tissues, organs, systems), reproductive (current evaluation required) immunologic, and neurologic effects should not be ignored.

Jolanta Bankowska

Jolanta Bankowska, Ph.D.

JB:sr

cc: A. Fan, Ph.D.
R. Jackson, M.D.
J. Stratton, M.D.

ATTACHMENT 3

Tulare County Farm Bureau

Post Office Box 748 • 737 North Ben Maddox Way • Visalia, California 93279 • (209) 732-8301

June 5, 1987

JUN 05 1987

Lyndon S. Hawkins, Chairman
Subcommittee, Pesticide Registration
and Evaluation Committee
California Department of Food & Agriculture
1220 N Street
Sacramento, CA 95814

Re: Diuron

Dear Mr. Hawkins:

Our organization is intensely concerned with your subcommittee's plans to implement the Pesticide Contamination Prevention Act with regard to Diuron in groundwater supplies.

The first and most important point for consideration is the fact that there are no viable substitutes for Diuron. To prohibit its use, or to restrict its use in the manner applied to Atrazine, would impose a tremendous economic hardship on production agriculture in Tulare County.

Diuron is the only product available for below water weed control. Without it our ditches and waterways would again be clogged with noxious weeds and would transmit great quantities of weed seed to crop production areas.

Diuron has been used in Tulare County for more than 25 years without oversight and strict use regulations. While we recognize that some level of detection was made in the 122 Tulare County wells tested by the State, we submit that if continued Diuron use is allowed under some controls the amount found in groundwater would drop sharply, if not disappear completely.

Therefore, it is our recommendation that certain rules be applied which might mitigate the danger but which will allow our farmers continued use of a necessary and irreplaceable production tool.

Among those mitigating standards might be:

- -closure of abandoned dry and drain wells
- -requirement that well heads be raised to meet current standards
- -requirement that all well heads be sealed to current standards
- -elimination of pump backflow from tank-fill operations through mandatory use of check valves or air gaps
- -institution of an educational program to ask voluntary compliance on all the above

It is clear the entire problem of groundwater contamination needs to be studied further with rational action levels established by state government.

Please feel free to call on Tulare County Farm Bureau for further assistance. Our farmers must be allowed to use beneficial chemicals to maintain a healthy agricultural economy, but we also recognize the responsibilities inherent in their use. We will do our part.

Yours very truly,

Shirley Kirkpatrick

Shirley Kirkpatrick, Chairman
Environmental Affairs Committee

SK:mer

cc: Clyde Churchill

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

DEPARTMENT OF FOOD AND AGRICULTURE

1220 N Street
Sacramento, CA 95814

July 28, 1987

TO: PREC Subcommittee Hearing File for Simazine

SUBJECT: The following references: (1) County of Los Angeles. 1972. Report on the Use and Control of Simazin [sic] and Other Herbicides by the County of Los Angeles. (2) County of Los Angeles. Department of Agricultural Commissioner. 1987. Request for and Report of Analysis. Numbers SGU-015, -016, -062.

The attached references, obtained on field visits by PREC Subcommittee Members to the Los Angeles area, are hereby submitted to the simazine hearing file.

Lyndon S. Hawkins
Chair
PREC Subcommittee
(916) 322-2395

Attachment

CHIEF ADMINISTRATIVE OFFICER
COUNTY OF LOS ANGELES
713 HALL OF ADMINISTRATION / LOS ANGELES, CALIFORNIA 90012

ARTHUR G. WILL
CHIEF ADMINISTRATIVE OFFICER

Agricultural Comm.

BOARD MANDATE

April 2, 1973

MEMBERS OF THE BOARD
PETER F. SCHABARUM
CHAIRMAN
KENNETH HAHN
HOYT BOWERS
JAMES A. HAYES
BAXTER WARD

Engler
Hitt W
Pet to Lathy

HONORABLE BOARD OF SUPERVISORS
County of Los Angeles
383 Hall of Administration

Gentlemen:

RESPONSIBILITY FOR COUNTY HERBICIDE PROGRAM

In March 1972, the Board established a County Hearing Committee chaired by the Health Officer to study the use of herbicides by County departments and call for public hearings to take testimony on the safe use of herbicides. Hearings were held in April 1972, and the Herbicide Hearing Committee Report was adopted by the Board on July 18, 1972. The report recommended:

-- That a permanent Herbicide Committee be established to review, authorize and establish controls for the County's use of different kinds of herbicides.

-- That the County Agricultural Commissioner provide ongoing monitoring of the County's use of herbicides, enforce restrictions on use, and train County personnel using herbicides.

-- That the County develop toxicological capability establishing baseline levels for the presence of herbicides in water, animal tissues, plants, soils, etc.

-- The use of specific brand name herbicides, posting of treated areas, and the right of individual citizens to refuse the County's use of herbicides.

To better accomplish the recommendations of the Hearing Committee Report, the Board subsequently approved the transfer of the weed abatement program from the Forester and Fire Warden to the Agricultural Commissioner effective July 1, 1973. In addition, effective January 2, 1973, the Agricultural Commissioner was made responsible for monitoring the County's use of herbicides.

ADOPTED
BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES

8 MAY 1 1973

James S. Mize

JAMES S. MIZE

New regulations of the California Department of Food and Agriculture, effective March 1, 1973, to be enforced by the Agricultural Commissioner, pertain to pest control materials -- their methods of application, and safeguards to protect persons, animals and the environment. The regulations limit pest control operations by governmental agencies to properly approved materials, dosages, and methods; and the agencies must observe all safety precautions and other limitations on use of the materials.

With these new ragulations spelling out specific responsibilities for the Agricultural Commissioner, all involved County departments agree that there is no necessity to maintain a permanent Herbicide Committee to control the County's use of herbicides as recommended by the original Herbicide Hearing Committee and approved by the Board.

For these reasons, and in line with the Board's policy to eliminate Committees and Commissions where possible,

IT IS RECOMMENDED THAT THE BOARD:

1. Reaffirm that the County Agricultural Commissioner has the authority and responsibility to administer the County's herbicide program.

2. Amend your Board Order of July 18, 1972 approving the recommendations of the County Herbicide Hearing Committee by rescinding the establishment of a permanent Herbicide Committee.

Very truly yours,

Arthur G. Will

ARTHUR G. WILL
Chief Administrative Officer

AGW:TLR
KRR:kc
cc: Each Supervisor
County Counsel
Director, Health Services (3)
Agricultural Commissioner
Farm Advisor

DOCUMENT NUMBER

AGENDA NO. 145

MINUTE ENTRY NO. 172

ROUTE TO:	
SCHABARUM	
HAHN	
DEBS	
CHACE	
DORN	
CAO	

PRIOR ORDER

BY SUPERVISOR

DOCUMENT NO.

CC TO

FOR BOARD OFFICE USE ONLY

EXEC. OFF. REFER TO

EXEC. OFF. FILE

PLACE ON AGENDA TO:

APPROVE X See memo attached

DISAPPROVE

RECEIVE AND FILE

POLICY

OTHER

FOR CAO USE ONLY

CHIEF ADMINISTRATIVE OFFICER

RECOMMENDATION:

CAO OFFICE	action	info
WILL		
DURKEE		
HUFFORD		
LEONE		
SCHOEPPE		
STEELE		
McLAUGHLIN		
BLINN		
FILE		
CIRCULATE		

190 MSC

180 MSC

RECORDS INDEXING

130.5

PROCESSOR MYRA GLENN

DATE 7-20-72

CONTRACT NO.

Sponsor: Ida Honorof

	L	A	C	R	D
AUDITOR CONTROLLER	1				
CAO	1				
COUNTY COUNSEL	1				
COUNTY ENGINEER					
FLOOD CONTROL	1				
REAL ESTATE MGT.					
~~ROAD~~	1				
HOSPITALS					
PUBLIC SOC. SERV.					
~~PERSONNEL~~ Jurado	1				
747 W	1				
~~SPINDLE~~ Vet	1				
Agri Comm	1				
Health	1				

NOTICE TO BE PUBLISHED IN

RECORDED ~~PROTEST~~

DOCUMENT NUMBER

COPIES TO CCREM

DATE

JUL 18 1972

DATE OF BOARD MEETING

MOTION BY HS

SCHABARUM

HAHN approve

DEBS

CHACE

~~DORN~~

SET ____ A.M.

COUNTY OF LOS ANGELES

7/10/72

FROM THE DESK OF

ALICE STEVELY
DEPUTY TO
ERNEST E. DEBS
SUPERVISOR, THIRD DISTRICT
MAdison 5-3611, Ext. 64489

Mr. Richard Schoemi
Asst/Executive Officer

Herewith the report about which I called you this afternoon.

Per Supervisor Debs it is to be placed on the Agenda for approval.

Alice Stevely

REPORT ON THE USE AND CONTROL OF SIMAZIN AND OTHER HERBICIDES BY THE COUNTY OF LOS ANGELES

HERBICIDE HEARING COMMITTEE COUNTY OF LOS ANGELES

De
155
March 7,1972.

Ordered a moratorium on the use of Simazine in Forester-Fire Warden Homeowners Noxious Weed Abatement Program; approved the declaration list as submitted by the Forester-Fire Warden. Instructed that the Farm Advisor, Agricultural Commissioner and the Health Officer take testimony from the public and any recognized experts in the field, and report to the Board.

REPORT ON THE USE AND CONTROL OF SIMAZIN AND OTHER HERBICIDES BY THE COUNTY OF LOS ANGELES, BY HERBICIDE HEARING COMMITTEE, COUNTY OF LOS ...

Attached: Committee Report; Transcripts of Committee Hearings of 4/4 ...

(Copy of documents transmitted by Executive Officer, to CAO

REPORT ON THE USE AND CONTROL OF SIMAZIN AND OTHER HERBICIDES BY THE COUNTY OF LOS ANGELES

As directed by the Board of Supervisors
of the County of Los Angeles

Warren M. Dorn, Chairman
Supervisor, Fifth District

Peter F. Schabarum
Supervisor, First District

Ernest E. Debs
Supervisor, Third District

Kenneth Hahn
Supervisor, Second District

Burton W. Chace
Supervisor, Fourth District

And conducted by the Los Angeles County
Herbicide Hearing Committee

COUNTY OF LOS ANGELES
HEALTH DEPARTMENT
G. A. HEIDBREDER, M.D., M.P.H. • HEALTH OFFICER
313 NORTH FIGUEROA, LOS ANGELES, CALIF. 90012
TELEPHONE 625-3212

July 5, 1972

HONORABLE BOARD OF SUPERVISORS
County of Los Angeles
383 Hall of Administration

Gentlemen:

On March 7, 1972, your Board created a Herbicide Hearing Committee. You instructed the Committee to take public testimony and to report back to your Board recommendations on the use and controls of Simazin and other herbicides by the County of Los Angeles. The Herbicide Hearing Committee now transmits to your Board its report on this subject along with a copy of the transcript of the public hearings.

Based upon its public hearings and other study, the Herbicide Hearing Committee recommends that your Board:

1. Approve the recommendations presented and discussed in this report.

2. Instruct the Chief Administrative Officer, and the affected County departments, to develop a plan and timetable for implementation of the longer range recommendations and report back to your Board.

3. Terminate the Herbicide Hearing Committee as presently constructed, it having completed its work.

Very truly yours,

G. A. HEIDBREDER, M.D., M.P.H., Chairman
County Health Officer

DONALD O. ROSEDALE
County Farm Advisor

RALPH W. LICHTY
County Agricultural Commissioner

ROBERT J. SCHROEDER, D.V.M.
County Veterinarian

REPORT OF THE HERBICIDE HEARING COMMITTEE

COUNTY OF LOS ANGELES

Under Board Order of March 7, the Board of Supervisors created a Hearing Committee with instructions to hold public hearings on the use of Simazin and other herbicides by the County. These hearings were held April 4 and 5, 1972, in the Health Department Auditorium, 313 North Figueroa Street, Los Angeles.

The Hearing Committee consisted of Mr. Donald O. Rosedale, County Farm Advisor; Mr. Ralph W. Lichty, County Agricultural Commissioner; Robert J. Schroeder, D.V.M., County Veterinarian; and Gerald A. Heidbreder, M.D., M.P.H., County Health Officer, Chairman.

Considerable testimony was given by those supporting and those opposing the use of herbicides. After the hearings were concluded, the Hearing Committee carefully reviewed the official transcript, received and reviewed articles, reports and other written material during a period of 60 days and submits the following recommendations:

RECOMMENDATIONS:

1. That the Board of Supervisors appoint a permanent Herbicide Committee to review, authorize and establish controls for the County's use of different kinds of herbicides.

2. That County Agricultural Commissioner's Office be appointed to provide ongoing monitoring of the County's use of herbicides; enforce any restrictions on this use; and be responsible for training County personnel using herbicides.

3. That the County should develop the toxicological capability of establishing baseline levels for the presence of herbicides in water, animal tissues, plants, soil, etc.

4. That the County's use of any member of the 2, 4, 5-T family of herbicides, including Silvex, be limited to those special in-

---

NOTE: Simazin--In commercial labels, this herbicide is commonly spelled Simazine.

stances in which other herbicides have proved ineffective and other methods of control are impractical and only upon the specific authorization of the Herbicide Committee in each instance.

5. That the Herbicide Committee establish the criteria and the conditions under which the 2, 4-D family of herbicides may be used and that the County use this particular family of herbicides only in accordance with the recommendations of the Herbicide Committee

6. That the use of Simazin be continued in accordance with Environmental Protection Agency regulations and carefully monitored and that the present moratorium on its use be terminated.

7. The County's use of herbicides be limited to persons who are adequately trained and preferably experienced in their use; that the users observe the directions carefully; that they be conversant with the regulations that are promulgated by the Environmental Protection Agency and State Department of Agriculture and that these regulations and recommendations are followed.

8. Any combination of herbicides should be only those authorized by the Environmental Protection Agency and classified according to the most harmful herbicide of the combination and used in accordance with the restrictions of that most harmful component.

9. Areas treated with herbicides, including Simazin, be posted or placarded where there is likelihood of significant human or animal contacts.

10. That the use of herbicides should be confined to ground spraying. Aerial spraying from airplanes or helicopters should be restricted to those special situations considered appropriate by the permanent Herbicide Committee.

11. Individual citizens should have the right to refuse the County's use of herbicides for weed abatement on private property owned by the individual citizen if other methods of control are available and, furthermore, that the property owner will pay

the additional cost of this alternative method of control.

12. Close study of actual costs of alternative methods of weed control should be initiated by the CAO and completed. Many opponents to the use of herbicides suggest the use of hand-labor such as welfare recipients, prison inmates, etc. The present Hearing Committee would believe that these methods of control are largely impracticable and would be too costly and, therefore, recommends that further factual data be sought.

DISCUSSION:

1. Permanent Herbicide Committee--It became quickly evident to the present Hearing Committee of the interest and the concerns of the environmentalists and other groups who both oppose and approve the use of herbicides in different situations. It is the distinct feeling of this Hearing Committee that these interests and concerns can only be answered by the appointment of a permanent Herbicide Committee to which ongoing concerns and questions can be referred for study and answer. It is suggested that the permanent Herbicide Committee be composed of department heads and assistant heads appropriately selected and by at least two members of the public. This permanent Herbicide Committee can then be a focal point for inquiries, questions and appropriate decisions and would be responsible for review, authorization and establishment of controls for the County's use of herbicides.

2 to 5 citizens

2. Appointment of County Agricultural Commissioner as Monitor --The present Hearing Committee would believe that one County department should be appointed to monitor the County's use of herbicides to enforce any restrictions and, particularly to be an informed source for training personnel using herbicides, etc. The present Hearing Committee would believe that the County Agricultural Commissioner's Office is the appropriate department in the County to be detailed this function. The County Agricultural Commissioner's Office would in effect be the enforcing and monitoring arm of the Herbicide Committee.

3. Toxicological Capability--Since recommendation No. 2 states that the County should monitor the ongoing use of herbicides, the Hearing Committee believes that the County must have

the capability of establishing toxicological baselines to effectively measure increases or decreases in the normal level of toxic components in water, animal tissues, plants, soil, etc. This recommendation in effect would mean that the County must increase its laboratory capabilities both in terms of technical personnel and equipment.

4. 2, 4, 5-T--In testimony before the Hearing Committee and in the Hearing Committee's review of literature, it was alleged that the uses of 2, 4, 5-T herbicides in a number of instances had unfortunate results to animals, wildlife, and even to humans. 2, 4, 5-T is toxic and can result in accumulation in the flesh of animals which eat vegetation sprayed with 2, 4, 5-T herbicides although no instances of toxic amounts were reported. Laboratory findings indicate that it is carcinogenic, teratogenic and mutagenic. Therefore, the use of this family of herbicides should be restricted and controlled. A highly toxic dioxin (TCDD) is a contaminant formed during the synthesize of 2, 4, 5-T. This dioxin is blamed for a number of the adverse effects reported from the use of 2, 4, 5-T. It is claimed that more recently synthesized 2, 4, 5-T contains lesser amounts of this toxin dioxin. This remains to be seen. In the meantime, the present Hearing Committee recommends that 2, 4, 5-T be used only in those situations when no other practical alternative exists.

5. 2, 4-D--While 2, 4-D herbicide compounds are closely related to the 2, 4, 5-T compounds, the highly toxic dioxin which is formed during the production of 2, 4, 5-T is not formed when the 2, 4-D compounds are synthesized. Evidence would indicate that the 2, 4-D compounds are somewhat less toxic and otherwise somewhat less detrimental. Therefore, the Hearing Committee recommends the use of the 2, 4-D with lesser restrictions on their use than the 2, 4, 5-T compounds. That is, the Herbicide Committee would establish the criteria and the general conditions under which the County may use the 2, 4-D family of herbicides, but that specific authorization need not be required each time the herbicide is to be used.

6. Simazin--All available evidence up to the present would indicate that Simazin is the least toxic and the least detrimental of the herbicides currently in use. Simazin is not a chlorinated hydrocarbon. There is no clear evidence that it is carcinogenic, teratogenic or mutagenic as in the case of other herbicides. The Hearing Committee belleves that Simazin can be used if done in accordance with instructions and the regulations of the Environmental Protection Agency. It does how-

ever, recommend that the permanent Herbicide Committee continue to carefully monitor its use and observe the literature for any evidence of adverse effects so that further controls may be instituted if and when necessary. It is further recommended that effective immediately, the Board of Supervisors terminate the present moratorium on the use of Simazin.

7. Uses by Trained Personnel, Observation of the Label, Environmental Protection Agency Restrictions--It is the opinion of the Hearing Committee that most of the ill effects that have occurred with the use of herbicides occurred when used by personnel: (1) who have been untrained or poorly trained in its use; (2) who have not completely observed the directions for the use and restrictions on the label; and (3) who are unaware of the regulations of the Environmental Protection Agency and State Department of Agriculture on the use of herbicides. It is recommended that no County employees or employees of licensed pesticide operators who have contracts with the County use herbicides until they have been trained and certified so trained by the County Agricultural Commissioner.

8. Combinations--The Hearing Committee believes that herbicides should be used in combination only in compliance with Environmental Protection Agency approved recommendations and that when these are used in combination, the restrictions observed be that of the most toxic of its components.

9. Posting of Area--As a precaution, areas should be posted after use of herbicides where there is likelihood of significant human and animal contact. Herbicides decompose relatively rapid dependent upon moisture, the spray conditions and the conditions of the soil. Posting would prevent, or at least tend to prevent, human contacts and the grazing of animals in areas recently treated. This restriction is considered to be precautionary only.

10. Aerial Uses--Some adverse effects in the use of herbicides have been reported from aerial uses by airplanes or helicopters. These are occasioned by improper location of aerial spraying and particularly by drift. Ground spraying of herbicides would prevent any of these unfortunate occurrences. Again, the decision as to when and if aerial spray should be employed should rest with the County Herbicide Committee.

11. Individual Citizen Refusal--The Hearing Committee would

believe that the individual private citizen should have the right to refuse the County's use of herbicides on his private property provided there is an alternate method of weed control available and that the property owner will pay the cost of this alternative method. Should there not be alternative methods available or should the property owner not be willing to bear the cost, then it is the opinion of this Hearing Committee that the County would have the right to use herbicides on the private property.

12. Cost Study--Many of the opponents to the use of herbicides for weed control have advocated the use of hand-labor of some kind in its stead, using welfare workers, persons in custody for various offenses, etc. The present Hearing Committee considers this impractical from the standpoint of program administration and the resultant higher cost and recommends that the CAO conduct a study and make a recommendation. For instance, the Road Department indicates that one application of herbicide per year normally provides adequate control. In their experience, hand-labor must be performed 4 to 6 times annually, depending upon climatic and soil conditions to provide adequate level of control. The Road Department feels that hand-labor would be far less effective; would create problems of disposal from the enormous amounts of weeds and vegetation that would be generated in the process; would increase hazards to the workers from traffic, poisonous plants, and reptiles; would increase the annual cost from approximately $170,000 to an estimated $2,000,000. This estimated cost figure does not cover salaries of welfare workers but includes supervision, operation and maintenance of equipment, dumping fees, and contingencies.

SPEAKERS AT HERBICIDE HEARING

April 4, 1972

Betty Lee Morales, Cancer Victims and Friends

Ruth Harmer, Author of Unfit for Human Consumption, Teacher

Dr. Charlotte Taylor, Teacher, Malibu Resident

Cecile Rosenthal, Sierra Club, Angeles Chapter

Laura Tallion, People's Lobby

April 5, 1972

William A. Harvey, Extension Environmentalist, University of California, Davis

Dr. Homer M. LeBaron, Research Specialist, Geigy Agricultural Chemicals

Granville F. Knight, M.D., Member, Los Angeles County Milk Commission

Gardner C. McFarland, California Mosquito Control Association

Boysie E. Day, Director, California Agricultural Experiment Station

Delvan W. Dean, State Department of Agriculture

Billie Shoecraft, Private Citizen

Battalion Chief Nino F. Polito, County Fire Department

Jessie Lloyd, Private Citizen

Ida Honorof, KPFK-FM

Frank L. Lyman, M.D., Director of Industrial Medicine, Ciba-Geigy Corporation

SPECIAL REFERENCES

Report of the Secretary's Commission on Pesticides and their Relationship to Environmental Health - Parts I & II, U.S. Department of Health, Education and Welfare, December 1969

Report on 2, 4, 5-T, President's Science Advisory Committee, 1971

A Review of Pesticide Monitoring Programs in California, Ad Hoc Working Group of the Pesticide Advisory Committee to the State Department of Agriculture, State Water Resources Control Board, February 1971

USDA Forest Service Environmental Statement, Brushland Management, April 1972

COUNTY OF LOS ANGELES
DEPARTMENT OF AGRICULTURAL COMMISSIONER/WEIGHTS AND MEASURES
ENVIRONMENTAL TOXICOLOGY LABORATORY
7311 Descanso St., Bldg. 212, Downey, CA 90242 (213) 922-7059

BRABSON

REQUEST FOR AND REPORT OF ANALYSIS

Please fill out form as completely as possible. Check appropriate boxes.

I. ANALYSIS REQUESTED BY:

Name AGRICULTURAL COMMISSIONER
Department 3400 LA MADERA AVENUE
Address EL MONTE, CA 91732
Telephone (818) 575-5465

Chain of Custody:

Collected by: [illegible] MCP	Date 12/10/86	Time
Received by:	Date	Time
Received by:	Date	Time
Relinquished to Lab by:	Date	Time
Received at Lab by:	Date 12-12	Time

II. PURPOSE OF ANALYSIS:

☒ General Monitoring ☐ Info. Sample
☐ Project Monitoring ☐ Investigation of Illness
☐ Complaint
Complainant Name SGV-015
Address
Telephone ( )
Property Sampled North Lago Lake
Site Number (Mapbook Coordinates)

III. ANALYSIS REQUESTED FOR:

AG. ID NO.	PESTICIDE*		LAB. NO.
27366	Chlorinated H.C.	(CH-1)	6144
27367	Triazine	(TZ-1)	6145
27368	Chlorophenoxy	(CP-1)	6146
27369	Carbamate	(CB-3)	6147
27370	Organophosphate	(OP-1)	6148
	Pyrethroid	(PY-)	
27371	~~Heavy Metal~~ CASORON	(~~HM-6~~)	6149
27372	Other DICAMBA	(OH-8)	6150
27373	SURFLAN	(OH-12)	6151

Chem. Name:

PRECAUTIONS:
*For list of pesticides, see back Note 2.

IV. INFORMATION REGARDING SAMPLE:

KIND OF SAMPLE: ☐ Air ☒ Water ☐ Soil
☐ Plant ☐ Produce ☐ Blood ☐ Wipe
☐ Animal (Species:) ☐ Other ( )
PRIORITY: ☐ One ☐ Two ☒ Three
(See Back Note 1)
Problem Involved:

V. RESULTS OF LABORATORY ANALYSES:

CARBARYL Not Detected
SURFLAN ~~Not Detected~~

CHLORINATED HYDROCARBONS

LINDANE	Not Detected
HEPTACHLOR	Not Detected
HEPTACHLOR EPOXIDE	Not Detected
p.p. DDE	Not Detected
DIELDRIN	Not Detected
TDE	Not Detected
p.p. DDT	Not Detected

TRIAZINES

ATRAZINE Not Detected
SIMAZINE = .003 ppm

CASORON Not Detected

ORGANOPHOSPHORUS

THIMET	Not Detected
DIAZINON	Not Detected
METHYL PARATHION	Not Detected
MALATHION	Not Detected
PARATHION	Not Detected

Chlorophenoxy DICAMBA Not Detected

2,4-DP	Not Detected	ppm
2,4-D	Not Detected	ppm
2,4,5-TP	Not Detected	ppm
2,4,5-T	Not Detected	ppm

Reported by: [signature]
Date: 2/4/87 W. W. Sandy
Chief

COUNTY OF LOS ANGELES
DEPARTMENT OF AGRICULTURAL COMMISSIONER/WEIGHTS AND MEASURES
ENVIRONMENTAL TOXICOLOGY LABORATORY
7311 Descanso St., Bldg. 212, Downey, CA 90242 (213) 922-7059

BRAESON

REQUEST FOR AND REPORT OF ANALYSIS

Please fill out form as completely as possible. Check appropriate boxes.

I. ANALYSIS REQUESTED BY:

Name AGRICULTURAL COMMISSIONER
Department 3400 LA MADERA AVENUE
Address EL MONTE, CA 91732
Telephone (818) 575-5465

Chain of Custody:

	Date	Time
Collected by: CMB/MCP	12/10/86	
Received by:	Date	Time
Received by:	Date	Time
Relinquished to Lab by:	Date	Time
Received at Lab by:	Date 12-12	Time

II. PURPOSE OF ANALYSIS:

☒ General Monitoring ☐ Info. Sample
☐ Project Monitoring ☐ Investigation of Illness
☐ Complaint
Complainant Name SGV-016
Address South Pigg Lane
Telephone ( )
Property Sampled
Site Number (Mapbook Coordinates)

III. ANALYSIS REQUESTED FOR:

AG. ID NO.	PESTICIDE*		LAB. NO.
27374	Chlorinated H.C.	(CH-1)	6152
27375	Triazine	(TZ-1)	6153
27376	Chlorophenoxy	(CP-1)	6154
27377	Carbamate	(CB-3)	6155
27378	Organophosphate	(OP-1)	6156
	Pyrethroid	(PY-)	
27379	~~Heavy Metal~~ CASORON	(HM-6)	6157
27380	Other DICAMBA	(OH-8)	6158
27381	SURFLAN	(OH-12)	6159

Chem. Name:

PRECAUTIONS:
*For list of pesticides, see back Note 2.

IV. INFORMATION REGARDING SAMPLE:

KIND OF SAMPLE: ☐ Air ☒ Water ☐ Soil
☐ Plant ☐ Produce ☐ Blood ☐ Wipe
☐ Animal (Species:) ☐ Other ( )
PRIORITY: ☐ One ☐ Two ☒ Three
(See Back Note 1)
Problem Involved:

V. RESULTS OF LABORATORY ANALYSES:

CARBARYL Not Detected
SURFLAN Not Detected

CHLORINATED HYDROCARBONS

LINDANE	Not Detected
HEPTACHLOR	Not Detected
HEPTACHLOR EPOXIDE	Not Detected
p.p. DDE	Not Detected
DIELDRIN	Not Detected
TDE	Not Detected
p.p. DDT	Not Detected

TRIAZINES

ATRAZINE	Not Detected
SIMAZINE	=.001 ppm

CASORON Not Detected

ORGANOPHOSPHORUS

THIMET	Not Detected
DIAZINON	Not Detected
METHYL PARATHION	Not Detected
MALATHION	Not Detected
PARATHION	Not Detected

Chlorophenoxy

DICAMBA Not Detected

2,4-DP	Not Detected	ppm
2,4-D	Not Detected	ppm
2,4,5-TP	Not Detected	ppm
2,4,5-T	Not Detected	ppm

Reported by:
Date: 2/4/87
Chief

COUNTY OF LOS ANGELES
DEPARTMENT OF AGRICULTURAL COMMISSIONER/WEIGHTS AND MEASURES
ENVIRONMENTAL TOXICOLOGY LABORATORY
7311 Descanso St., Bldg. 212, Downey, CA 90242 (213) 922-7059

BRAESON

REQUEST FOR AND REPORT OF ANALYSIS

Please fill out form as completely as possible. Check appropriate boxes.

I. ANALYSIS REQUESTED BY:

Name AGRICULTURAL COMMISSIONER
Department 3400 LA MADERA AVENUE
Address EL MONTE, CA 91732
Telephone (818) 575-5465

Chain of Custody:

Collected by: [illegible]	Date 12/10/86	Time
Received by:	Date	Time
Received by:	Date	Time
Relinquished to Lab by:	Date	Time
Received at Lab by:	Date 12-12	Time

II. PURPOSE OF ANALYSIS:

☒ General Monitoring ☐ Info. Sample
☐ Project Monitoring ☐ Investigation of Illness
☐ Complaint
Complainant Name SGH-062
Address
Telephone ( ) Live Oak Reservoir
Property Sampled
Site Number (Mapbook Coordinates)

III. ANALYSIS REQUESTED FOR:

AG. ID NO.	PESTICIDE*		LAB. NO.
27406	Chlorinated H.C.	(CH-1)	6184
27407	Triazine	(TZ-1)	6185
27408	Chlorophenoxy	(CP-1)	6186
27409	Carbamate	(CB-3)	6187
27410	Organophosphate	(OP-1)	6188
	Pyrethroid	(PY-)	
27411	~~Heavy Metal~~ Copper	(HM-6)	6189
27412	Other Dicamba	(OT-8)	6190
27413	Surflan	(OT-12)	6191

Chem. Name:

PRECAUTIONS:
*For list of pesticides, see back Note 2.

IV. INFORMATION REGARDING SAMPLE:

KIND OF SAMPLE: ☐ Air ☒ Water ☐ Soil
☐ Plant ☐ Produce ☐ Blood ☐ Wipe
☐ Animal (Species:) ☐ Other ( )
PRIORITY: ☐ One ☐ Two ☒ Three
(See Back Note 1)
Problem Involved:

V. RESULTS OF LABORATORY ANALYSES:

CASORON Not Detected
SURFLAN Not Detected
CARBARYL Not Detected

CHLORINATED HYDROCARBONS
LINDANE Not Detected
HEPTACHLOR Not Detected
HEPTACHLOR EPOXIDE Not Detected
p.p. DDE Not Detected
DIELDRIN Not Detected
TDE Not Detected
p.p. DDT Not Detected

TRIAZINES
ATRAZINE Not Detected
SIMAZINE = .002 ppm

ORGANOPHOSPHORUS
THIMET Not Detected
DIAZINON Not Detected
METHYL PARATHION Not Detected
MALATHION Not Detected
PARATHION Not Detected

Chlorophenoxy
DICAMBA Not Detected

2,4-DP	Not Detected	ppm
2,4-D	Not Detected	ppm
2,4,5-TP	Not Detected	ppm
2,4,5-T	Not Detected	ppm

Reported by:
Date: 2/4/87
Chief