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Green Chemistry in California – Initial Policy Elements Proposed by the Silicon Valley Leadership Group

The Silicon Valley Leadership Group advocates a comprehensive, integrated approach to expanding Green Chemistry in California. By highlighting leaders in the corporate environmental practices and encouraging those who are further behind, we can all move ahead. We envision Green Chemistry as an interactive, evolving partnership with industry, government and consumers working together to protect human health and promote a cleaner, safer environment.

Leadership Group members involved in crafting these initial suggestions include those from the electronics, biotechnology, pharmaceutical, chemical manufacturing, and supporting sectors. For more information about the Leadership Group please visit www.svlg.net.

The Leadership Group proposes the following policy elements to further Green Chemistry in California:

- 1. Strengthen the recognition and pursuit of Green Chemistry processes and products by establishing clear criteria and voluntary certification based on *comprehensive lifecycle considerations*. Equally important, consumers need to be educated about responsible choices and practices.**
- 2. Explore models other than, or building upon, the current Materials Safety Data Sheet (MSDS) system to provide needed chemical hazard data throughout the supply chain.**
- 3. Establish a Green Chemistry Coordination Council to collect and promote the sharing of information, highlight businesses with green practices, provide assistance to businesses lacking resources, and educate consumers.**
- 4. Prioritize chemicals for screening, testing and appropriate restrictions. We suggest building upon the model of Canada's analysis and prioritization as well as the Proposition 65 review process conducted by OEHHA. Chemicals of high concern should be allowed for targeted, low-exposure uses as determined in an open process by DTSC.**
- 5. Greater investment in pollution prevention in the short term as well as extension of the current CA Pollution Prevention model to downstream chemical users as an element of the long term Green Chemistry strategy.**
- 6. Continue the Conversation with California to sustain progress in Green Chemistry. The dialogue between DTSC and stakeholders has been very helpful and will result in more well-developed, effective policy.**

In more detail:

1) Issue: Our market economy and the innovations that it engenders, environmental and otherwise, are driven by the relationship between industry and consumers. In order for industry to offer products that are environmentally-sound, and for consumers to recognize them, clear and stakeholder-driven criteria are necessary.

Proposal: The Leadership Group proposes we strengthen the recognition and pursuit of Green Chemistry processes and products by establishing clear criteria and voluntary certification based on *comprehensive lifecycle considerations*. Equally important, consumers need to be educated about responsible choices and practices.

While the focus of the Initiative has been on chemical safety, green chemistry in the broader sense should incorporate an accounting of embedded energy, CO₂ impact, water usage, packaging, recyclability and so forth. Industry on the whole is already moving toward a greater consideration of these factors in our practices. The difficulty of quantifying and ascribing relative importance to these factors points to the need for commonly-held practices or industry standards.

A voluntary certification program for green chemistry processes and products will clarify goals for industry members while empowering consumers with the information they need to make informed choices. As green chemistry practices evolve, according to the green chemistry principles we are so well aware of, so should the criteria - we should build flexibility into the system. It is important to note that a voluntary system is more pragmatic than standards at this point, given the innovative and often resource intensive approaches that will be required, the longer timeline necessary for industry transformation, and the need for consumers to have choices. As with organic food, not every consumer wants the environmentally-sensitive approach, if it costs more. The International Standards Organization (ISO) 14001 process certification and ACC's Responsible Care Management Practices are good examples to build upon.

It is also important to note that potential green chemistry certification should be a recognition of process in addition to the product. As many experts in the DTSC Symposia have remarked, we are not only trying to improve products, but the entire system that goes into making that product. And we should realize that perfection will not be immediate, but evolve over time. In order to motivate voluntary certification some type of incentive, especially market mechanism such as rebate, tax incentive, or fee refund, should be explored.

We understand very well that the consumer wants environmental accountability. As consumers gain in accountability, though, so should they gain in responsibility. This is in no way a proposal to allow industry to abdicate its responsibility for the safer use of chemicals, but rather to acknowledge that in a market-based society, corporate and consumer responsibility must closely intertwine to be successful. Beyond making informed purchases, we can best protect the environment when consumers understand Green Chemistry applies to them as well. How they collectively handle chemical products has an enormous effect (for example, nail polish remover can be easily poured down a household sink which would not be allowed in the workplace). The Green Chemistry Coordination Council described in the third point below could assist in consumer education.

2) Issue: The MSDS provides insufficient data on chemical hazards to those downstream in the supply chain.

Proposal: The Leadership Group proposes the DTSC explore models other than, or building upon, the current Materials Safety Data Sheet (MSDS) system to provide needed chemical hazard data throughout the supply chain.

Our members often find the data included on the Material Safety Data Sheet (MSDS) to be insufficient for determining chemical hazards. Many times important information is addressed in a superficial, boiler-plate fashion or missing altogether. The same raw material from different suppliers may have divergent information. This is in part due to some government regulations requiring that an MSDS be obtained directly from the manufacturer. While we recognize that confidential business information needs to be protected, best possible data on hazard and ecological effects should be made readily available to the supply chain and other stakeholders. In order to meet customer information requirements on chemicals in products, some electronics manufacturers currently must request additional information from upstream suppliers. Instead of doing this on a case by case basis, and in some cases taking the costly approach of reverse-engineering products to determine content, it would be more cost-effective to make raw materials hazard information available further upstream.

One approach that could facilitate the sharing of information could be to use the existing MSDS system as a vehicle. More uniform information availability, through approaches such as the ANSI standard for a 16-section MSDS or the IPC 1752 could be an improvement. However, since the MSDS was originally intended to provide more immediate emergency response and use information, it might be best to explore other options such as an MSDS addendum, focused on hazard data. As both REACH and industry efforts such as the Global Product Stewardship initiative make available this data over a 4-10 year timeframe, it is important to recognize that generating this hazard data will take time.

A voluntary certification process, with recognition for particularly thorough MSDS's, could also improve the quality of information while allowing chemicals manufacturers to differentiate their products. The Global Harmonization System for the Classification and Labeling of Chemicals (GHS) should be considered, as well. Any model chosen should include

the appropriate ecological as well as toxicological information. We also recommend that early stage R&D chemicals be exempted due to their limited use and limited exposures.

Worker exposure issues involving recognized hazards (mostly in small/medium enterprises) during the Conversation with California suggests that incorporating MSDS information into real-life practices may be an issue, aside from content. Technical Assistance for those less familiar with critical MSDS information is included as part of the Green Chemistry Coordination Council described below.

3) Issue: Some companies and industries have already made much progress in achieving the aims of Green Chemistry while others lag behind. Green Chemistry involves myriad innovations and the collection and processing of much information. We do not have an adequate way of sharing Green Chemistry practices nor have we made the investment to encourage and reward green efforts.

Proposal: The Leadership Group proposes the establishment of a Green Chemistry Coordination Council to collect and promote the sharing of information, highlight businesses with green practices, provide assistance to businesses lacking resources, and educate consumers.

The information presented by the speakers, panelists, and stakeholders during the past year of effort on this Initiative has been incredibly thorough, enlightening, and inspiring for all stakeholders. We suggest the DTSC catalog and make easily available information regarding best practice screening processes, green chemical design, collaborative efforts such as the ACS Green Chemistry Institute, and international efforts such as the Global Harmonization System. All stakeholders still have a lot to learn in this dynamic area, and everyone stands to gain from continued information sharing. DTSC's leadership in this area should be continued by establishing it as a central clearinghouse of information for the state and beyond.

Many medium and small companies are lacking in appropriate knowledge and resources, and will need assistance in taking advantage of Green Chemistry practices. Providing incentives for the sharing of data and best practices will help all companies. We further suggest building upon and making readily available the information provided by existing efforts: ACS Green Chemistry Institute, Cleangredients, U.S. EPA's Design for Environment Program, Performance Track, the chemical industry's HPV testing program, eChemPortal, EPEAT, and DTSC Technical Resource Center.

4) Issue: California has limited resources to evaluate chemicals for restriction. Chemical safety is a measure of exposure as well as toxicity. While we need to carefully assess and restrict the use of chemicals of concern, complete bans fail to allow for appropriate and beneficial uses.

Proposal: The Leadership Group proposes the DTSC prioritize chemicals for screening, testing and appropriate restrictions. We suggest building upon the model of Canada's analysis and prioritization as well as the Proposition 65 review process conducted by OEHHA. Chemicals of high concern should be allowed for targeted, low-exposure uses as determined in an open process by DTSC.

The DTSC, together with other relevant State agencies, needs to establish clear and consistent science-based protocols for screening and testing. These should include determination of endpoints of concern and modes of action, where scientific and methodological questions are sufficiently advanced to enable consistently sound science-based judgments of potential risk. The use of a transparent and rigorous process to evaluate risk factors as indicated by toxicological, epidemiological, and exposure data will allow us to compare the relative importance and safety of chemicals as well as determine whether any restrictions or substitutions are appropriate. A scientific panel of experts with a range of theoretical and applied chemicals experience can best establish and oversee a process acceptable to all stakeholders. The Proposition 65 review process may offer a starting point for development of a thorough, scientific process to meet these broader needs.

Government entities around the world have been or are in the process of revamping their chemicals use policies. Although the DTSC will need to analyze the individual needs of our state through such means as chemical mapping, we should coordinate with the chemicals policies of other countries to minimize confusion, cost and competitive impacts. Starting with the thorough screening done by Canada's Environmental Policy Act (CEPA) would allow us to build upon their scientific knowledge base and mitigate the burden of data gathering.

Any proposed restrictions or mandates should be targeted and include careful evaluation of alternatives. This targeted approach will allow us to concentrate our resources where most needed. Furthermore, any mandates should be harmonized with systems in other countries as much as possible. While we wish it were not necessary to use chemicals determined by such scientific protocols to be of high concern, many times they are needed to promote human health or advance ground-breaking research. This is the uncomfortable irony with which we will have to live until we find better

alternatives. In the meantime, targeted use of these chemicals under highly controlled and low-exposure scenarios should be allowed by DTSC, after an open, scientifically based stakeholder process. In the absence of safer alternatives, which should be technically feasible, improve health/safety/environmental profile, be of comparable or superior performance, cost-effective, and be capable of persistence, banning should be avoided. In that case, resources should be devoted to R&D or incentives should be provided to develop cost-effective alternatives.

Our goal should be a marketplace where informed decision making at both the manufacturing and consumer levels is consistently delivering changes/substitutions that advance our collective interests along the dimensions outlined above.

We recommend that novel R&D chemicals, used in relatively tiny amounts in highly controlled settings, be excluded from any consideration of a restriction or mandate. There are rarely, if ever, exposures outside of the laboratory. Government oversight of these chemicals would not be cost-effective and would be counterproductive to the aims of Green Chemistry. Flexibility in this type of research chemical use promotes the innovation of safer chemicals and processes. Both CEPA and REACH exempt these chemical uses. Exemptions should also be allowed for select pilot demonstrations and testing.

5) Issue: It will take a significant amount of time for industry and consumers to move to Greener Chemistry and we need to address pollution concerns in the meantime. Existing efforts at pollution prevention in the state utilize a collaborative model that has proven effective, but has been limited by its modest resource commitment and its narrow manufacturing focus.

Proposal: The Leadership Group proposes greater investment in pollution prevention in the short term as well as extension of the current CA Pollution Prevention model to downstream chemical users as an element of the long term Green Chemistry strategy.

Pollution prevention programs and policies such as SB 14 have been promoted for quite some time, yet they never receive anywhere near adequate funding and attention. We need to increase our investment in pollution prevention assistance, especially for medium and small businesses that either lack the resources or motivation to tackle the problem on their own. Since pollution prevention has led to demonstrated improvements and optimization of chemical processes, it is a critical, complementary approach to Green Chemistry's goals of better chemical design.

The model of collaboration between companies, the DTSC and third party experts (in the case of the SB 14 program, from the University of California), may also offer a model applicable to a broader Green Chemistry strategy. The impressive accomplishments of the Institute for Research and Technical Assistance in enabling development of substitutes for problem solvents in various applications suggest that such targeted 3rd party collaboration may pay dividends in products/product use as well as in manufacturing. This suggests the possibility of 1) taking chemicals of top priority concern, 2) identifying the specific applications or industry uses posing the greatest risk from those chemicals, and 3) applying a collaborative process of agency, industry and third-party experts to identify or develop viable alternatives that can maintain efficacy, but reduce risk in those targeted applications.

6) Issue: The stakeholder process for developing Green Chemistry has provided much more comprehensive progress than could have been achieved otherwise.

Proposal: The Leadership Group proposes we continue the Conversation with California to sustain Green Chemistry progress. The dialogue between DTSC and stakeholders has been very helpful and will result in more well-developed, effective policy.

We commend the DTSC for encouraging creativity in finding safer alternatives and providing opportunities for open-ended discussion. There remains, though, a very real need for extensive further discussion by the stakeholders in this Green Chemistry Initiative. We hope that the inclusive nature of this process is not at an end. There are so many pieces to Green Chemistry and as the focus narrows to various subtopics, meaningful stakeholder participation will be essential. We have all built personal relationships and broadened our understanding of the various points of view. It would be a shame to toss this hard-won experience aside.

Submitted: November 16, 2007