Scientific Review request from DTSC:
"We seek a science-based assessment of the current SB 673 regulatory framework concepts. We would like the research team to comment on the five key elements of this document (see attached regulatory concept framework and key elements matrix).

- What are the strengths of each element?
  - What citations and research can the research team offer to support these strengths?

- What are the limitations of each element? What should be fixed?
  - For instance, what are some statements that are not supported by scientific evidence?
  - What citations and research can the research team offer to address the gaps?
  - What additional information should be considered?"

Recommendations:

Introduction

1. Cushing et al. 2015 can be cited to support this statement: "Many communities in the state are burdened by a disproportionate share of environmental pollution from hazardous waste, air pollutants and other contaminants, while also facing socioeconomic and health challenges." (pg. 1)

2. We recommend citing several studies to support this statement: "The siting, location, and expansion of hazardous waste sites in communities have long been an environmental justice concern in California." (pg. 1)

Morello-Frosch RA, Pastor M, Sadd J: "Integrating Environmental Justice and the Precautionary Principle in Research and Policy-Making: The Case of Ambient Air Toxics Exposures and Health Risks among School Children in Los Angeles." *Annals of the American Academy of Political and Social Science*, 2002, 584: 47-68

Boer, T. J., Manuel Pastor, Jim L. Sadd, and L. D. Snyder. 1997. "Is There Environmental Racism? The Demographics of Hazardous Waste in Los Angeles County." *Social Science Quarterly* 78(4):793–810.

Morello-Frosch, Rachel, Manuel Pastor, Carlos Porras, and James Sadd. 2002. "Environmental Justice and Regional Inequality in Southern California: Implications for Future Research." *Environmental Health Perspectives* 110(Suppl 2):149–54.

Pastor, Manuel, Rachel Morello-Frosch, and James Sadd. 2005. "The Air Is Always Cleaner on the Other Side: Race, Space, and Ambient Air Toxics Exposures in California." *Journal of Urban Affairs* 27(2):127–48.

Pastor, Manuel, James L. Sadd, and Rachel Morello-Frosch. 2004. “Waiting to Inhale: The Demographics of Toxic Air Release Facilities in 21st-Century California*.” *Social Science Quarterly* 85(2):420–440.

Pastor, Manuel, Jim Sadd, and John Hipp. 2001. “Which Came First? Toxic Facilities, Minority Move-In, and Environmental Justice.” *Journal of Urban Affairs* 23(1):1–21.

3. “In these draft framework concepts, cumulative impact refers to the combined health and environmental effects of all sources of pollution in a community insofar as they can be assessed, including threats to air, water, and land. Community vulnerability refers to the aggregated effect of factors in the community (such as emergency room visits for asthma or cardiovascular illnesses, unemployment, and linguistic isolation) that amplify the vulnerability of residents to impacts from environmental pollution.” (pg. 1).

   We suggest editing this statement a bit to read: “Community vulnerability refers to the aggregated effect of socioeconomic factors and chronic stressors or biomarkers of stress response (poverty, unemployment, linguistic isolation, allostatic load) and high rates of underlying chronic health conditions in the community (such high prevalence of asthma or cardiovascular illnesses, poor birth outcomes) that amplify the vulnerability of residents to impacts from environmental pollution.” (pg. 1). Citations to support these statements include: (McHale et al. 2017; Solomon et al 2016; Zota et al. 2013; Morello-Frosch et al. 2011 and 2010)

<u>Element 1 Initial Recommendation of Facility Action Pathways</u>

1. We suggest past violation history be considered during the initial facility assessment (bottom of pg. 4). The degree to which a facility operator has a history of permit violations is relevant to the level of potential impact on the community. In addition if taking violation history into account, it is also important to consider extent to which regulatory scrutiny due to past violations is improving facility operations and their localized impacts.

2. We suggest clarifying that either (rather than both) of the two criteria listed for each Tier places a facility in that tier. As worded, it is currently unclear what would happen, for example, if a facility was deemed of low or moderate risk but the CES score of the neighboring census tract is > 90th percentile.

3. We recommend increasing the 0.5 mile buffer distance from hazardous waste sites when assessing cumulative impacts and community vulnerability. Several studies have found evidence of adverse health effects associated with residence within a larger distance of hazardous waste sites. For example, two of the citations in the framework document (Kouznetsova 2007 and Sergeev 2007), and several additional studies (Lu 2014, Boberg 2011, Carpenter 2008, Huang 2006) found evidence of adverse health effects associated with residence within a ZIP code containing a hazardous waste site. ZIP codes vary widely in size but on average cover about 90 square miles, equivalent to a roughly 5 mile radius. Other studies have found evidence of elevated risks of birth

defects within 2km (Elliott et al. 2001, Elliott et al. 2009) and 5 miles (Kuehn et al. 2007) of hazardous waste sites. In California, DTSC data show evidence of soil contamination with lead more than 1.7 miles from the Exide site in Los Angeles (https://www.dtsc.ca.gov/HazardousWaste/Projects/pia-sampling-data.cfm). In addition, recent studies of the health benefits associated with power plant retirements in California showed reductions in preterm birth rates and increases in fertility rates at a radius of 5-10 km (Casey et al 2018a, 2018b)

We also suggest that the number and type of sensitive uses within the distance buffer be included as a criterion for classifying an existing or proposed hazardous waste site. Sensitive uses are defined by the California Air Resources Board as uses where pollution sensitive individuals and populations are concentrated and spend significant time. CARB uses these in its suggestions on reducing air pollution exposure by both high volume roadways, and facilities emitting air toxics (CARB 2005, 2017). In addition, it has become standard in environmental justice assessments to apply different buffer distances to assess the sensitivity of results. See, for example,
Pastor, Manuel, James L. Sadd, and Rachel Morello-Frosch. 2004. "Waiting to Inhale: The Demographics of Toxic Air Release Facilities in 21st-Century California*." *Social Science Quarterly* 85(2):420–440.

4. We suggest consideration of a lower cutoff of the 75th percentile of CES 3.0 score near facilities, rather than the 90th percentile. Relative rankings are based on statewide comparisons and all indicators in CES 3.0 may not be relevant for all areas of California, leading some regions to score lower on CES despite significant presence of environmental and social stressors to health. Moreover, OEHHA has designated all census tracts >75th percentile as disadvantaged under SB 535. Lowering the cutoff would ensure consistency across regulatory agencies and departments.

<u>Element 2 Public Review and Draft List of Facility Action Pathways</u>
No comments

<u>Element 3 Permit Application Review</u>

1. Consider requiring additional actions related to existing Tier 1 and Tier 2 facilities. Since permits are generally issued for 10 years, it may be a decade before a renewal application is filed. If DTSC can require additional actions of Tier 1 and Tier 2 facilities, or modify its own activities (e.g. increase inspections or compliance review), this could lessen impacts near these facilities sooner.

<u>Element 4 Community Engagement and Outreach</u>
No comments

<u>Element 5 Mitigation and Monitoring</u>

1. Clarify how the mitigation and monitoring measures will be determined, and what role impacted community residents and community-based organizations will play in deciding on mitigation and monitoring measures.

Element 6 Data and Tools
No comments

Citations:

Boberg E, L Lessner, DO Carpenter (2011) The role of residence near hazardous waste sites containing benzene in the development of hematologic cancers in upstate New York. Int J Occup Med Environ Health 2011;24(4):327–338

Boer, T. J., Manuel Pastor, Jim L. Sadd, and L. D. Snyder. 1997. "Is There Environmental Racism? The Demographics of Hazardous Waste in Los Angeles County." *Social Science Quarterly* 78(4):793–810.

California Air Resources Board (2005) Air quality and land use handbook: a community health perspective (https://www.arb.ca.gov/ch/handbook.pdf)

California Air Resources Board (2017) Technical Advisory: Strategies to reduce air pollution exposure near high-volume roadways (https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF)

Carpenter DO1, Ma J, Lessner L.(2008) Asthma and infectious respiratory disease in relation to residence near hazardous waste sites. Ann N Y Acad Sci. 1140:201-8. doi: 10.1196/annals.1454.000.

Casey JA, Karasek, D, Ogburn, EK, Goin D, Dang K, Braveman, PA, Morello-Frosch R (2018a) Coal and oil power plant retirements in California associated with reduced preterm birth among populations nearby. *American Journal of Epidemiology*, doi: 10.1093/aje/kwy110

Casey JA, Karasek, D, Gemmill A, Ogburn, EK, Goin D, Morello-Frosch R (2018b) Increase in fertility following coal and oil power plant retirements in California. *Environmental Health*. 2018; 17: 44. doi: 10.1186/s12940-018-0388-8

Cushing LJ, J Faust, LM August, R Cendak, W Wieland, G Alexeeff (2015) "Racial/ethnic disparities in cumulative environmental health impacts in California: evidence from a statewide environmental justice screening tool (CalEnviroScreen 1.1)"American Journal of Public Health 105 (11), 2341-2348

Elliott P, Briggs D, Morris S, de Hoogh C, Hurt C, Jensen TK, Maitland I, Richardson S, Wakefield J, Jarup L (2001), Risk of adverse birth outcomes in populations living near landfill sites. BMJ. 323(7309): 363–368.

Elliott P, S, S Richardson, J J Abellan, A Thomson, C de Hoogh, L Jarup, D J Briggs (2009) Geographic density of landfill sites and risk of congenital anomalies in England. Occup Environ Med 66:81–89. doi:10.1136/oem.2007.038497

Huang, H, Wang A, Morello-Frosch R, Lam J, Sirota M, Padula A, Woodruff T (2018) Cumulative Risk and Impacts Modeling on Environmental Chemical and Social Stressors. *Curr Environ Health Rep*. 2018 Feb 13. doi: 10.1007/s40572-018-0180-5

Huanga, L Lessner, DO Carpenter (2006) Exposure to persistent organic pollutants and hypertensive disease. Environmental Research 102:1, 101-106

Lu X, L Lessner, DO Carpenter (2014) Association between hospital discharge rate for female breast cancer and residence in a zip code containing hazardous waste sites Environmental Research 134: 375-381

Kouznetsova M, Huang X, Ma J, Lessner L, Carpenter DO (2007). Increased rate of hospitalization for diabetes and residential proximity of hazardous waste sites. Environ Health Perspect 115(1):75-9.

Kuehn CM, BA Mueller, H Checkoway, M Williams (2007) Risk of malformations associated with residential proximity to hazardous waste sites in Washington State, Environmental Research 103:3, 405-412

McHale CM, Osborne G, Morello-Frosch R, Salmon AG, Sandy MS, Solomon G, Zhang L, Smith MT, Zeise L (2017) Assessing Health Risks from Multiple Environmental Stressors: Moving from G×E to I×E, *Mutation Research/Reviews in Mutation Research* https://doi.org/10.1016/j.mrrev.2017.11.003

Morello-Frosch R**,** Jesdale B, Sadd J, Pastor M (2010) "Ambient Air Pollution Exposure and Risk of Low Birth Weight in California." *Environmental Health.* 9: 44 doi:10.1186/1476-069X-9-44.

Morello-Frosch R and Jesdale, B: "Separate and Unequal: Residential Segregation and Air Quality in the Metropolitan U.S." *Environmental Health Perspectives* 2006, 113: 386-393.

Morello-Frosch RA, Pastor M, Sadd J: "Integrating Environmental Justice and the Precautionary Principle in Research and Policy-Making: The Case of Ambient Air Toxics Exposures and Health Risks among School Children in Los Angeles." *Annals of the American Academy of Political and Social Science*, 2002, 584: 47-68

Morello-Frosch R, Zuk M, Jerrett M, Shamasunder B, Kyle AD. (2011) "Understanding the cumulative impacts of inequalities in environmental health." *Health Affair*s, 30(5):879-887

Pastor, Manuel, Rachel Morello-Frosch, and James Sadd. 2005. “The Air Is Always Cleaner on the Other Side: Race, Space, and Ambient Air Toxics Exposures in California.” *Journal of Urban Affairs* 27(2):127–48.

Pastor, Manuel, James L. Sadd, and Rachel Morello-Frosch. 2004. “Waiting to Inhale: The Demographics of Toxic Air Release Facilities in 21st-Century California*.” *Social Science Quarterly* 85(2):420–440.

Pastor, Manuel, Jim Sadd, and John Hipp. 2001. “Which Came First? Toxic Facilities, Minority Move-In, and Environmental Justice.” *Journal of Urban Affairs* 23(1):1–21.

Pastor, Manuel, James L. Sadd, and Rachel Morello-Frosch. 2004. “Waiting to Inhale: The Demographics of Toxic Air Release Facilities in 21st-Century California*.” *Social Science Quarterly* 85(2):420–440.

Sergeev AV, Carpenter DO (2005). Hospitalization rates for coronary heart disease in relation to residence near areas contaminated with persistent organic pollutants and other pollutants. Environ Health Perspect 113(6):756-61

Solomon GM, Morello-Frosch R, Zeise L, Faust J (2016) Cumulative Environmental Impacts: Science and Policy to Protect Communities. *Annual Review of Public Health*. 37:83–96.

Zota A**,** Shenassa E, Morello-Frosch R. (2013) Does allostatic load modify the association between lead exposure and risk of hypertension? *Environmental Health* 2(1):64 doi:10.1186/1476-069X-12-64.