June 26, 2009

Director Richard P. Keigwin, Jr.
Environmental Protection Agency
Office of Pesticide Programs
Special Review and Reregistration Division

Submitted via federal rulemaking portal at http://www.regulations.gov (Docket ID Numbers EPA-HQ-OPP-2008-0615 and EPA-HQ-OPP-2002-0262).

Re: Public Comments on Endosulfan Registrations

Dear Director Keigwin,

I submit this comment letter on behalf of Pesticide Action Network North America ("PANNA"), Natural Resources Defense Council ("NRDC"), Alaska Community Action on Toxics, Environmental Health Fund, The Endocrine Disruption Exchange ("TEDX"), Californians for Pesticide Reform, Farmworker Association of Florida, Pesticide Watch, Kentucky Environmental Foundation, Oregon Toxics Alliance, Sciencecorps, Pesticide Free Zone, Jobs with Justice, No Spray Nashville, Commonweal, Institute for Agriculture and Trade Policy, The Environmental Youth Council, Defenders of Wildlife, Minnesota Center for Environmental Advocacy, Preventing Harm MN, California Rural Legal Assistance Foundation, Minnesota Pesticide Awareness, Jacobs Farm/Del Cabo, Farmworker Justice, American Association on Intellectual and Developmental Disabilities (AAIDD), Global Community Monitor, Maryland Pesticide Network, Worksafe--A California Coalition for Worker Safety and Health Protection, Physicians for Social Responsibility, GreenCAPE--Cape Alliance for Pesticide Education, Northwest Atlantic Marine Alliance, Sierra Club National Toxics Committee, and Northwest Coalition for Alternatives to Pesticides. We appreciate this opportunity to submit comments on the risks and benefits of endosulfan.

Like DDT and other organochlorine pesticides, endosulfan poses unreasonable risks to humans and the environment and is ineligible for registration under the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA"). It bioaccumulates in food chains; contaminates air, food, and drinking water; and poisons children, farmworkers, and wildlife. Exposure to endosulfan is associated with illnesses ranging from developmental and reproductive impairment to neurological damage and autism. Endosulfan is so dangerous that it has been banned in over 60 nations, but it continues to be widely used in the United States to control agricultural pests on a variety of fruit, vegetable, and field crops. In light of the severe risks posed by endosulfan and the numerous efficacious alternatives for the pesticide, we renew our call for EPA to cancel all endosulfan registrations.

This comment letter is divided into three sections. The first section responds to EPA's April 29, 2009 request for comments, 74 Fed. Reg. 19,558 (Apr. 29, 2009), with information that supplements the petition that PANNA and NRDC filed on February 19, 2008, calling for EPA to cancel endosulfan registrations. The second section responds to EPA's May 6, 2009 request for comments, 74 Fed. Reg. 20,942 (May 6, 2009), with data demonstrating that there are numerous available alternatives to endosulfan and that endosulfan provides at most minimal economic benefits to growers. The third section describes the steps that EPA must take to ensure that endosulfan does not continue to pose unreasonable risks to humans or wildlife.

I. ENDOSULFAN POSES SEVERE RISKS TO HUMANS AND THE ENVIRONMENT

A. Toxicity to Humans

In many of our previous submissions, including the petition that PANNA and NRDC filed in February 2008, we provided EPA with data demonstrating the severe risks that endosulfan poses to humans and the environment. *See* Appendices A through C. Since we submitted those data, the California Department of Pesticide Regulation ("CDPR") has designated endosulfan as a toxic air contaminant ("TAC").[1] California law defines a TAC as an "air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health."[2] For pesticides designated as TACs, CDPR is required to determine whether mitigation measures are needed and to then implement any such measures.[3] Product cancellation would relieve the State of California of this burden.

CDPR's designation of endosulfan as a TAC followed a rigorous public process. CDPR drafted a Risk Characterization Document ("RCD") for endosulfan, solicited comments from the public, EPA, and the California Office of Environmental Health Hazard Assessment ("OEHHA"), and revised the RCD accordingly. The RCD was then discussed at several meetings by the state's independent Scientific Review Panel on Toxic Air Contaminants ("California SRP") before being finalized.

---

[1] *See* 3 C.C.R. § 6860(a).

[2] Cal. Agric. Code § 14021(b).

[3] Cal. Agric. Code § 14024.

Following that process, CDPR,[4] OEHHA,[5] and the California SRP[6] all agreed that endosulfan was a TAC[7] (the CDPR, OEHHA, and California SRP conclusions are attached as Appendices D through G). Largely based on application site monitoring data showing high levels on the endosulfan in the air proximate to a field following an application of endosulfan, CDPR calculated acute, subchronic, and chronic margins of exposure ("MOEs") for bystanders. All infant MOEs were less than the critical MOE of 1000, indicating that endosulfan should be considered a TAC.[8] It should be noted that while the TAC designation rests on data from a single monitoring study, PANNA submitted additional monitoring data corroborating and supporting the TAC designation, which are attached to this letter as Appendices H and I.[9, 10]

EPA should closely examine the conclusions in CDPR's endosulfan RCD, which are more protective than EPA's hazard assessment and endpoint selection for endosulfan in several significant ways, including but not limited to the following examples:

---

[4] CDPR, "Endosulfan Risk Characterization Document Volume I," August 2008, available at http://www.cdpr.ca.gov/docs/risk/rcd/endosulfan.pdf (attached as Appendix D).

[5] OEHHA, "Office of Environmental Health Hazard Assessment's Findings on the Health Effects of Endosulfan," June 4, 2008, available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/memo_findings060408.pdf (attached as Appendix E).

[6] Scientific Review Panel on Toxic Air Contaminants, "Findings of the Scientific Review Panel on Toxic Air Contaminants on the Proposed Identification of Endosulfan as a Toxic Air Contaminant, as adopted at the Panel's May 16, 2008 meeting," available at [http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/srp_finding_end_final.pdf (attached as Appendix F).

[7] Warmerdam, M-A, "Notice of Proposed Decision Concerning the Director's Declaration of Endosulfan as a Toxic Air Contaminant," August 27, 2008, available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/final_decision082708.pdf (attached as Appendix G).

[8] CDPR, "Endosulfan Risk Characterization Document Volume I," August 2008, available at http://www.cdpr.ca.gov/docs/risk/rcd/endosulfan.pdf (attached as Appendix D).

[9] Kegley SE, *et al.* "Comments on the Risk Characterization Document developed for the evaluation of endosulfan as a potential Toxic Air Contaminant," August 24, 2007. Available online on the CDPR website on the "Draft Toxic Air Contaminant (TAC) Evaluation Reports and Determinations" page under the heading "November 2007 draft report for Scientific Review Panel comment" and the "Comments and DPR responses," available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/draft_rcd_pdfs/endo_comments.pdf (attached as Appendix H).

[10] Tupper KA, "Re: DPR 08-004: Proposed designation of endosulfan as a toxic air contaminant," January 6, 2009 (attached as Appendix I).

- **Acute oral/dietary**. EPA has selected 1.5 mg/kg/day as the critical endpoint for assessing acute dietary risk. This is a NOAEL from an acute neurotoxicity in rats.[11] In contrast, the CDPR RCD uses 0.7 mg/kg/day, 2-fold more protective, as the critical endpoint for this scenario. This is a NOEL from a developmental toxicity study in rabbits in which clinical effects were observed *on the first day of dosing*.[12] It is clear that the study used by CDPR was more sensitive, and therefore would be a more appropriate choice for a public health agency like EPA.

- **Short-term dermal.** EPA selected a LOAEL of 3.74 mg/kg/day from a developmental neurotoxicity study ("DNT") for assessing short-term dermal exposure, employing an additional 3X LOAEL to NOAEL uncertainty factor and a 45% dermal absorption factor.[13] This is equivalent to a NOAEL of 2.8 mg/kg/day with 100% absorption factor and no additional uncertainty factor.[14] By comparison, CDPR selected 0.7 mg/kg/day—its acute oral endpoint—as the critical endpoint for assessing dermal exposure, 4-fold more protective than EPA. The RCD cites a lack of suitable dermal studies as the reason for using the oral NOAEL.[15]

- **Intermediate-term dermal.** EPA relies on the same critical endpoint for intermediate-term dermal exposure as it did for short-term dermal exposure (described above).[16] CPDR, on the other hand, selected 1.18 mg/kg/day for assessing subchronic exposure. The CPDR selection is a more scientifically-defensible and appropriate selection because it is the NOAEL from a dietary,

[11] U.S. EPA, "Endosulfan. Hazard Characterization and Endpoint Selection Reflecting Receipt of a Developmental Neurotoxicity Study and Subchronic Neurotoxicity Study," Document ID No. EPA-HQ-OPP-2002-0262-0065, April 2, 2007.

[12] CDPR, "Endosulfan Risk Characterization Document Volume I," August 2008, available at http://www.cdpr.ca.gov/docs/risk/rcd/endosulfan.pdf (attached as Appendix D).

[13] U.S. EPA, "Endosulfan. Hazard Characterization and Endpoint Selection Reflecting Receipt of a Developmental Neurotoxicity Study and Subchronic Neurotoxicity Study," Document ID No. EPA-HQ-OPP-2002-0262-0065, April 2, 2007.

[14] 3.74 mg/kg/day ÷ 3-fold LOAEL-NOAEL uncertainty factor ÷ 45% dermal absorption factor = 2.8 mg/kg/day equivalent NOAEL.

[15] CDPR, "Endosulfan Risk Characterization Document Volume I," August 2008, available at http://www.cdpr.ca.gov/docs/risk/rcd/endosulfan.pdf (attached as Appendix D).

[16] U.S. EPA, "Endosulfan. Hazard Characterization and Endpoint Selection Reflecting Receipt of a Developmental Neurotoxicity Study and Subchronic Neurotoxicity Study," Document ID No. EPA-HQ-OPP-2002-0262-0065, April 2, 2007.

two-generation reproductive study in rats in which effects first appeared after 24 weeks and hence are directly representative of sub-chronic toxicity.[17]

- **Chronic Inhalation.** EPA did not define a critical endpoint for assessing the chronic inhalation scenario, proposing that long-term inhalation (more than 6 months) is not expected for endosulfan.[18] In contrast, CDPR extrapolated a NOAEL from the subchronic inhalation endpoint of 0.194 mg/kg/day (based on a 21-day inhalation toxicity study in rats) by applying a 10X uncertainty factor.[19]

In these cases, CDPR selected more sensitive (health-protective) endpoints than EPA, and in no instances did CDPR use a less sensitive endpoint than EPA. We urge EPA to adopt these more sensitive, robust, scientifically-defensible endpoints as they represent the most health protective approach, using the studies that were most closely designed to detect effects under the scenarios described in the hazard endpoint. The use of a rabbit developmental toxicity study by CDPR for assessing acute exposure is scientifically defensible and appropriate because the study identified adverse effects within the first day after dosing, i.e. acute effects. Although EPA criticized the use of this study as not originally designed with the intent of identifying acute effects, this is a moot point since the study was sound, deemed acceptable for use, and produced clear evidence of acute effects.

EPA also needs to review California OEHHA's endosulfan findings, which differ from EPA's conclusions in its risk assessments for endosulfan:

- **Cancer.** EPA concluded that there is no evidence that endosulfan is carcinogenic.[20] While OEHHA agreed that "there is insufficient evidence to suggest that endosulfan is carcinogenic," it found that "endosulfan is a potential accelerant of estrogen-dependent tumor growth (e.g. breast cancer)" and noted the need for studies addressing this possibility. OEHHA also found that "there

[17] CDPR, "Endosulfan Risk Characterization Document Volume I," August 2008, available at http://www.cdpr.ca.gov/docs/risk/rcd/endosulfan.pdf (attached as Appendix D).
[18] U.S. EPA, "Endosulfan. Hazard Characterization and Endpoint Selection Reflecting Receipt of a Developmental Neurotoxicity Study and Subchronic Neurotoxicity Study," Document ID No. EPA-HQ-OPP-2002-0262-0065, April 2, 2007.
[19] CDPR, "Endosulfan Risk Characterization Document Volume I," August 2008, available at http://www.cdpr.ca.gov/docs/risk/rcd/endosulfan.pdf (attached as Appendix D).
[20] U.S. EPA, "Revision of Occupational and Residential Exposure/Risk Assessment for the Endosulfan Reregistration Eligibility Decision Document (RED) (Revised)," Document ID No. EPA-HQ-OPP-2002-0262-0059, May 3, 2007.

is evidence that endosulfan is genotoxic."[21] The conclusions of OEHHA are biologically plausible and supported by evidence of endosulfan's endocrine disrupting activity.[22]

- **Increased sensitivity of infants.** EPA has proposed lowering the FQPA factor from 10X to 1X,[23] a change that PANNA and NRDC have challenged in our previous comment letters. *See* Appendices A through C. In contrast to the EPA's position, OEHHA found that "there is some evidence that young rats are more sensitive to endosulfan than adults" and highlighted a number of outstanding uncertainties. OEHHA recommended that CDPR "apply an additional uncertainty factor of no more than three" when calculating infant inhalation risks.[24]

The California SRP also came to many conclusions regarding endosulfan's toxicity that differ from EPA's findings:

- **Cancer.** Unlike EPA's conclusions discussed above, the California SAP "considered the evidence for genotoxicity to be sufficient to consider endosulfan a genotoxic agent with potential for carcinogenicity." The California SAP unanimously recommended further studies on the carcinogenicity of endosulfan.[25]

---

[21] OEHHA, "Office of Environmental Health Hazard Assessment's Findings on the Health Effects of Endosulfan," June 4, 2008, available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/memo_findings060408.pdf (attached as Appendix E).

[22] Singh SK, Pandey RS. Effect of subchronic endosulfan exposures on plasma gonadotrophins, testosterone, testicular testosterone and enzymes of androgen biosynthesis in rat. Indian J Exp Biol. 1990 Oct;28(10):953-6 (attached as Appendix J); Singh SK, Pandey RS. Gonadal toxicity of short term chronic endosulfan exposure to male rats. Indian J Exp Biol. 1989 Apr;27(4):341-6 (attached as Appendix K).

[23] U.S. EPA, "Revision of Occupational and Residential Exposure/Risk Assessment for the Endosulfan Reregistration Eligibility Decision Document (RED) (Revised)," Document ID No. EPA-HQ-OPP-2002-0262-0059, May 3, 2007.

[24] OEHHA, "Office of Environmental Health Hazard Assessment's Findings on the Health Effects of Endosulfan," June 4, 2008, available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/memo_findings060408.pdf (attached as Appendix E

[25] Scientific Review Panel on Toxic Air Contaminants, "Findings of the Scientific Review Panel on Toxic Air Contaminants on the Proposed Identification of Endosulfan as a Toxic Air Contaminant, as adopted at the Panel's May 16, 2008 meeting," available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/srp_finding_end_final.pdf (attached as Appendix F).

- **Increased sensitivity of infants.** While EPA has proposed eliminating the FQPA safety factor for endosulfan, the California SAP found "evidence in young rats being more sensitive to endosulfan than adults" and accordingly recommended "that DPR apply an additional uncertainty factor of 3 to 10 in calculating the infant RfCs."[26]

- **Bystander Exposure.** In its human health risk assessment, EPA has only considered inhalation exposure for workers; it has neglected bystander inhalation exposure. Assessing this route of bystander exposure, the SRP found that "[p]ersons near pesticide application sites are subject to high exposure to endosulfan via inhalation if the chemical drifts in the air into the area immediately surrounding the field (bystander exposure)."[27]

California's review of endosulfan toxicity is consistent with the data PANNA, NRDC, and other groups have previously submitted to EPA. For example, in comments submitted on [October 20, 2008], we argued that eliminating the FQPA safety for endosulfan is improper and not supported by the available data. Appendix C. As discussed above, OEHHA and the SRP have also concluded that there is evidence that young rats are more sensitive to endosulfan than adults and that a number of toxicological uncertainties remain. EPA's decision to eliminate the FQPA factor is inconsistent with these findings and is not based on sound science.

EPA's own data indicate that endosulfan poses unreasonable risks to humans and the environment. However, were EPA to adopt the lower critical endpoints used by CDPR, the estimated exposure to this highly toxic and persistent chemical to workers and the environment would be even greater than they already are.

---

[26] Scientific Review Panel on Toxic Air Contaminants, "Findings of the Scientific Review Panel on Toxic Air Contaminants on the Proposed Identification of Endosulfan as a Toxic Air Contaminant, as adopted at the Panel's May 16, 2008 meeting," available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/srp_finding_end_final.pdf (attached as Appendix F).

[27] Scientific Review Panel on Toxic Air Contaminants, "Findings of the Scientific Review Panel on Toxic Air Contaminants on the Proposed Identification of Endosulfan as a Toxic Air Contaminant, as adopted at the Panel's May 16, 2008 meeting," available at http://www.cdpr.ca.gov/docs/emon/pubs/tac/tacpdfs/endosulfan/srp_finding_end_final.pdf (attached as Appendix F).

B. Toxicity to Wildlife

EPA first invited comments on its revised ecological risk assessment for endosulfan in 2007.[28] Since then, a number of new studies have appeared in the peer-reviewed literature assessing the toxicity of endosulfan to amphibians. The emerging picture is that endosulfan is highly toxic to certain frog species, causing significant mortality among tadpoles at the ppb level of contamination. This is especially concerning because the EPA's revised ecological risk assessment describes many instances in which endosulfan concentrations in surface water are known or estimated to be in excess of these levels.[29] We have attached these new studies as appendices L through N, and we also provide summaries of the studies below:

- Rick Relyea of the University of Pittsburgh examined the effects of endosulfan on a number of frog species. In an outdoor mesocosm experiment, leopard frog tadpoles (*Rana pipiens*) exposed to 6.4 ppb through metamorphosis experienced 84% mortality. In contrast, grey tree frog tadpoles (*Hyla versicolor*) were unaffected by exposure to this level of endosulfan. When exposed to a mixture of endosulfan and 9 other pesticides, 99% mortality was observed for leopard frog tadpoles.[30]

- In traditional, laboratory-based LC_{50} testing, Relyea and coworkers observed 96 h LC_{50}s ranging from 1.3 to 120 ppb across 7 species of tadpoles. If observations were continued for an additional 96 hour period after exposure ended, "192 h" LC_{50}s of 0.9 to 46.8 ppb could be obtained across 8 species, indicating that endosulfan exposure may have delayed effects for tadpoles.[31] Table **1**, below, summarizes these findings.

[28] U.S. EPA, "Endosulfan Updated Risk Assessments, Notice of Availability, and Solicitation of Usage Information," 72 FR 64626, November 16, 2007.
[29] U.S. EPA, "Appendix 1 to 2007 Addendum: Environmental Fate and Ecological Risk Assessment of Endosulfan." Document ID No. EPA-HQ-OPP-2002-0262-0063.1.
[30] Relyea, R. "A cocktail of contaminants: how mixtures of pesticides at low concentrations affect aquatic communities." *Oecologica*, 159(2): 363–376, 2008 (attached as Appendix L).
[31] Jones DK, Hammond JI, and Relyea RA. "Very highly toxic effects of endosulfan across nine species of tadpole: lag effects and family level selectivity." *Environ. Toxicol. Chem*. In press as of June 8, 2009. DOI: 10.1897/09-033.1 (attached as Appendix M).

1. *Table 1: Endosulfan toxicity to various tadpole species*

Species	96 h LC_{50} (ppb)	96 h LOEC (ppb)	192 h LC_{50} (ppb)	192 h LOEC (ppb)
Leopard frog	-	7*	4.6	2
American toad	-	-	-	60
Spring peeper	120	196	26.6	35
Gray tree frog	9.0	7	6.0	7
Pacific tree frog	21.4	7	13.9	7
Western toad	76.1	7*	46.8	7*
Green frog	3.2	6	3.0	6
Cascades frog	15.0	7	6.7	7
Bullfrog	1.3	6	0.9	2

Adapted from Jones *et al*. (footnote 31): "Lethal concentration (LC) values . . . LC_{50} . . . and lowest-observed-effect concentrations (LOEC) for nine species of tadpoles after 4 days of exposure and 4 days of clean water to the insecticide endosulfan. All units are in ppb. Values denoted by (-) were not estimable from the data due to low death rates. Species in italics have significantly different LC_{50} estimates between 4 d of endosulfan exposure versus 4 days in endosulfan + 4 days in clean water. Values for LOEC with (*) represent discontinuous trends within the results."

- Shenoy *et al*. exposed leopard frog tadpoles to "environmentally relevant concentrations" of endosulfan of 0.2, 1, and 5 μg/L.[32] Significant mortality was observed at all levels, with 100% of tadpoles dead within 12 days at the highest exposure level or within 28 days at the middle exposure level. At the lowest exposure level, more than 50% of tadpoles died by the end of the 7 week experiment. The hazard ratio for death was determined to be 4.66, 37.7, and 234.3 at the 0.2, 1, and 5 μg/L exposure levels, respectively.

- In other studies, blue mountain tree frog tadpoles (*Litoria citropa*) exposed 0.8 ppb endosulfan for 96 h experienced 11-34% mortality. LC_{50}s for *P. regilla* and *R. boylii* tadpoles were recently determined to be 15.6 μg/L and 0.23–0.55 μg/L, respectively.

[32] Shenoy K, Cunningham BT, Renfroe JW, and Crowley PH. "Growth and Survival of Northern Leopard Frog (Rana pipiens) Tadpoles Exposed to Two Common Pesticides." *Environ. Toxicol. Chem*. In press as of June 25, 2009 (attached as Appendix N).

The estimated environmental concentrations ("EECs") that EPA has calculated for endosulfan exceed many of the $LC_{50}s$ and concentrations causing significant mortality discussed above. Specifically, the Agency's revised ecological risk assessment calculated EECs of 23, 9.3, and 6.8 μg/L for peak, 21 day, and 56 day averages, respectively, following applications to Florida tomatoes. For applications to California strawberries, EECs are 12, 5.5, and 3.9 μg/L for peak, 21 day, and 56 day averages, respectively.[33] In 2002, the Agency reported peak, 21 day, and 56 day EECs of 0.87–28.9, 0.25–9.47, and 0.16–7.04 μg/L.[34] These data indicate that continued use of endosulfan near frog habitat is a threat to that species.

C. Environmental Fate

It is well established that endosulfan and its degradates are persistent and bioaccumulative chemicals. In October 2008, EPA held a meeting of its Scientific Advisory Panel ("SAP") to review selected issues associated with the risk assessment process for pesticides with persistent, bioaccumulative, and toxic characteristics. In preparation for that SAP meeting, EPA staff scientists provided a 220-page white paper titled "Methods for Assessing Ecological Risks of Pesticides with Persistent, Bioaccumulative and Toxic Characteristics."[35] The SAP issued its 111-page report on January 29, 2009, with recommendations.[36] As discussed below, the SAP recommendations provide further evidence supporting the cancellation of endosulfan.

1. Assessing exposure to parent and degradation products (persistence)

Recent data suggest that endosulfan degradates persist in the environment and pose threats to both humans and wildlife. A 2009 report, for example, recognized that although endosulfan sulfate is generally less acutely toxic than alpha- and beta-endosulfan, its long persistence results in significantly higher chronic exposure.[37]

---

[33] U.S. EPA, "Appendix 1 to 2007 Addendum: Environmental Fate and Ecological Risk Assessment of Endosulfan." Document ID No. EPA-HQ-OPP-2002-0262-0063.1.
[34] U.S. EPA, "Reregistration Eligibility Decision for Endosulfan," November 2002.
[35] U.S. EPA, "White Paper on Methods for Assessing Ecological Risks of Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," October 2008, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/sap_pbt_whitepaper_final_Oct_7_08d.pdf (attached as Appendix O).
[36] U.S. EPA, SAP, "Transmittal of Meeting Minutes of the FIFRA Scientific Advisory Panel Meeting held October 28-31, 2008 on Selected Issues Associated with the Risk Assessment Process for Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," Jan. 29, 2009, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/minutes.pdf (attached as Appendix P).
[37] AMAP, "Arctic Pollution 2009. Arctic Monitoring and Assessment Programme," Oslo, xi+83pp ISBN 978-82-7971-050-9, 2009, available at

The SAP reviewed EPA's approach for assessing potential exposure to endosulfan and its pesticide degradates. EPA normally uses a total residue approach to assessing the parent and degradate chemical when there is limited information available on the pesticide degradates. This was done for endosulfan. Although this method is relatively simple and versatile, EPA has recognized that the approach has at least two significant disadvantages—it does not address the kinetics of residue formation or decline, and it presumes the same fate for both the parent and the degradates, which may not be true.[38]

The SAP concluded that EPA's total residue approach was not realistic. Instead, the SAP recommended that EPA use a method of formation/degradation kinetics that provides separate information for each parent and degradation product.[39] SAP also recommended that any assessment associated with the toxicity and biological impacts of both parent and degradates should consider the impacts of chemicals as a mixture rather than individually.[40] We concur, and recommend that EPA re-do its assessment of endosulfan to appropriately incorporate these recommended methods.

While the formation/degradation approach recommended by the SAP is more data intensive because it requires almost complete chemical property data on degradates, it is significantly more reliable because it incorporates residue formation and degradation kinetics data and provides a measurement of the half-life of the parent and degradates. EPA has the authority to require the chemical registrant to provide the data on endosulfan and its degradates that is necessary to perform the SAP-recommended assessments.

---

http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=SOAER%5F2009.pdf&sort=default (attached as Appendix Q1 through Q5).

38 U.S. EPA, "White Paper on Methods for Assessing Ecological Risks of Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 12-13, October 2008, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/sap_pbt_whitepaper_final_Oct_7_08d.pdf (attached as Appendix O).

39 U.S. EPA, SAP, "Transmittal of Meeting Minutes of the FIFRA Scientific Advisory Panel Meeting held October 28-31, 2008 on Selected Issues Associated with the Risk Assessment Process for Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 8, Jan. 29, 2009, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/minutes.pdf (attached as Appendix P).

40 U.S. EPA, SAP, "Transmittal of Meeting Minutes of the FIFRA Scientific Advisory Panel Meeting held October 28-31, 2008 on Selected Issues Associated with the Risk Assessment Process for Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 8, Jan. 29, 2009, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/minutes.pdf (attached as Appendix P).

We recommend that EPA revise its endosulfan assessment to use the formation/degradation approach recommended by SAP, and to consider the impacts of parent/degradate mixtures. This will provide a more accurate assessment of the persistence of the endosulfan degradates. We believe that if EPA does this and the other approaches as recommended by its SAP, the data will provide further support for our petition to ban endosulfan.

2. *Aquatic degradation rates for persistent pesticides with high sediment sorption coefficients (half-life)*

When assessing persistent pesticides with high sediment sorption coefficients, EPA normally relies on a total system half-life approach for assessing pesticides that persist in aquatic media; this was the method EPA used in its endosulfan assessment. SAP generally supported the approach. The main strength of EPA's current approach is that it considers both sediment and water when calculating the half-life of a chemical such as endosulfan, which will quickly partition from the water to the sediment, but then persist in the sediment. If only the half-life in water is used, failure to consider the portion of the chemical that resides in sediment (such as in the dissipation method) will erroneously give an artificially short half-life, making the chemical seem to "disappear" from the water, when it is really going into the sediment and persisting there. EPA continues to use a whole-system half-life, from both sediment and water for endosulfan, which leads to the calculation of a longer half-life value. SAP was generally supportive of this approach, and we concur.

3. *Sediment Dynamics*

As part of its baseline ecological risk assessment, EPA uses models to generate estimates of environmental concentrations of a pesticide in surface water, pore water, and sediment. The current model EPA uses does not consider pesticides that are removed, or buried, in sediment to such a permanent degree that they are no longer available for biological interactions.[41] The SAP disagreed, instead suggesting that burial by sediment is a major removal mechanism and must be included.[42] However, the SAP

---

[41] U.S. EPA, "White Paper on Methods for Assessing Ecological Risks of Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 14, October 2008, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/sap_pbt_whitepaper_final_Oct_7_08d.pdf (attached as Appendix O).

[42] U.S. EPA, SAP, "Transmittal of Meeting Minutes of the FIFRA Scientific Advisory Panel Meeting held October 28-31, 2008 on Selected Issues Associated with the Risk Assessment Process for Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 9, Jan. 29, 2009, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/minutes.pdf (attached as Appendix P).

recognized that a buried chemical can be a "major and long-lasting source of the chemical to the overlying water."[43] That is, burying a toxic chemical in a pond by erosion does not make it go away forever. Instead, when a chemical is buried in sediment through natural processes such as erosion, that chemical is removed from circulation for a time, but persistent chemicals like endosulfan can also move back from buried sediment into circulation over long periods of time. This means that buried endosulfan becomes a sink, and then becomes a source of endosulfan that leads to continuing and future contamination.

4. Bioaccumulation

EPA has traditionally evaluated the bioaccumulation potential of pesticides using laboratory-measured bioconcentration factor ("BCF") values. These BCF studies fail to account for chemical exposure via trophic transfer (i.e. through the food chain).[44] This limitation may underestimate pesticide bioaccumulation and therefore exposure and risk to both aquatic organisms and their predators.[45]

The SAP supported the use of multiple tools for assessing bioaccumulation in the food web, including lab and field studies, and modeling. Although the SAP supported EPA's use of the laboratory-measured BCF values, the SAP recommended going beyond BCF values to include assessment of accumulation from the diet, from trophic transfer, and in aquatic food webs. This assessment would include terrestrial animals that eat fish, would model bioaccumulation in fish, and then assess the transfer from fish to the birds that eat fish. The SAP also recommended modeling or monitoring individual tissue compartments in some organisms to more fully assess bioaccumulation of pesticides.[46]

---

[43] U.S. EPA, SAP, "Transmittal of Meeting Minutes of the FIFRA Scientific Advisory Panel Meeting held October 28-31, 2008 on Selected Issues Associated with the Risk Assessment Process for Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 10, Jan. 29, 2009, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/minutes.pdf (attached as Appendix P).
[44] U.S. EPA, "White Paper on Methods for Assessing Ecological Risks of Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 15, October 2008, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/sap_pbt_whitepaper_final_Oct_7_08d.pdf (attached as Appendix O).
[45] U.S. EPA, "White Paper on Methods for Assessing Ecological Risks of Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 15, October 2008, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/sap_pbt_whitepaper_final_Oct_7_08d.pdf (attached as Appendix O).
[46] U.S. EPA, SAP, "Transmittal of Meeting Minutes of the FIFRA Scientific Advisory Panel Meeting held October 28-31, 2008 on Selected Issues Associated with the Risk Assessment Process for Pesticides with Persistent, Bioaccumulative and Toxic Characteristics," at 10, Jan. 29, 2009, available at http://www.epa.gov/scipoly/sap/meetings/2008/october/minutes.pdf (attached as Appendix P),.

EPA appears to have improved its methods for assessing bioaccumulation since it completed its endosulfan assessments. EPA now appears to be using a model called KABAM, which EPA indicates includes both the aquatic and terrestrial food webs and improves assessment of bioaccumulation in birds and mammals. We call on EPA to re-assess the bioaccumulation potential for endosulfan under this steady-state KABAM model. We also call on EPA to follow the SAP's recommendation and use multiple trophic methods for assessing bioaccumulation and biomagnification.

5. Long-Range Transport

Endosulfan is found in the Arctic regions and other remote areas far from where it is applied. Recently, the 2009 Arctic Monitoring and Assessment Programme ("AMAP") Report, attached as Appendix Q1 through Q5, found that endosulfan is the most abundant organochlorine pesticide in the global atmosphere.[47] That AMAP report indicates that that alpha-endosulfan levels in the Arctic are approximately ten times higher than beta-endosulfan.[48] Other recent international studies have confirmed that endosulfan is the most abundant organochlorine pesticide in the global atmosphere.[49] With direct deposition as a major pathway to the marine environment for endosulfan, the AMAP Report warns that fluctuations in sea ice cover have profound implications for the fate of endosulfan in the Arctic marine environment, and, with Arctic warming trends, there could be increased loading of endosulfan from the atmosphere to ice-free marine surface waters.[50]

Long-range transport of pesticides to the Arctic and other remote regions is very hard to predict—establishing the relationship between near-field pesticide loadings and far-field pesticide concentrations is difficult to determine from monitoring alone.

---

[47] AMAP, "Arctic Pollution 2009. Arctic Monitoring and Assessment Programme," Oslo, xi+83pp ISBN 978-82-7971-050-9, 2009, available at http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=SOAER%5F2009.pdf&sort=default (attached as Appendix Q1 through Q5).

[48] AMAP, "Arctic Pollution 2009. Arctic Monitoring and Assessment Programme," Oslo, xi+83pp ISBN 978-82-7971-050-9, 2009, available at http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=SOAER%5F2009.pdf&sort=default (attached as Appendix Q1 through Q5).

[49] Pozo, K. et al., "Seasonally resolved concentrations of POPs in the global atmosphere from the first year of the GAPS study," Environ. Sci. Technol. 43:796-803, 2009 (attached as Appendix S).

[50] AMAP, "Arctic Pollution 2009. Arctic Monitoring and Assessment Programme," Oslo, xi+83pp ISBN 978-82-7971-050-9, 2009, available at http://amap.no/documents/index.cfm?action=getfile&dirsub=&filename=SOAER%5F2009.pdf&sort=default (attached as Appendix Q1 through Q5).

Currently, EPA's approach for predicting the long-range transport of pesticides relies heavily on monitoring data. The SAP recommended a tiered approach to long-range transport screening, and recommended that EPA include direct linkage of near-field to far-field transport and effects when possible. So far, EPA has not used modeling approaches to predict such contamination—we call on EPA to follow the SAP recommendation and start using a tiered approach to assessing the long-range transport of endosulfan, including where possible estimates of near-field to far-field transport.

II. THE ECONOMIC IMPACTS OF ENDOSULFAN CANCELLATION WOULD BE MINIMAL

While endosulfan poses severe risks to humans and the environment, EPA's own analysis, as well as data from other sources, demonstrate that there are numerous effective alternatives to endosulfan and that cancellation of endosulfan registrations would have a minimal economic impact on growers in the United States. The Agency's recently released endosulfan impact assessments confirm that affordable and effective alternatives already exist for the important uses of the endosulfan in the United States:

- EPA determined that switching to alternatives would have "little impact" on potato production costs.[51]

- EPA concluded that banning would result in "minimal impacts . . . not likely to exceed 1% of operating revenue" for cotton growers.[52]

- For apple growers in the Pacific Northwest, EPA concluded that "use of alternatives should not increase costs although there may be regulatory issues that make the alternative less desirable." For other apple growers, EPA acknowledged that "[e]ffective chemical alternatives are available" but noted that those alternatives "are somewhat more costly and managerially complex."[53]

---

[51] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry Intervals for Endosulfan on Potato (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0111, March 16, 2009.

[52] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry Intervals and Eliminating Aerial Spraying for Endosulfan on Cotton (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0112, April 16, 2009.

[53] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry for the Use of Endosulfan on Apples (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0113, April 17, 2009.

- For cucumbers growers, EPA determined that the impacts of moving to alternatives would be "generally minor," and that "[equally e]fficacious and affordable alternatives exist" for niche use in Florida against whiteflies.[54]

- For watermelons and cantaloupe producers, EPA found that "[t]here are alternatives to endosulfan, which according to published efficacy data, can control the pest spectrum as well as endosulfan."[55]

- For pumpkin growers, EPA concluded that "[t]here are at least two alternatives which control the same pest spectrum as endosulfan but have slightly higher costs per acre."[56]

- EPA concluded that "the overall benefits of endosulfan on squash are generally minor," and "available data indicates that efficacious and affordable alternatives exist" for the niche use on squash in Florida against whiteflies.[57]

- According to EPA, "[e]ffective chemical alternatives are available, although some are more expensive[,]" for fresh tomato producers.[58]

EPA's quantitative estimates of economic impacts on growers from cancellation of endosulfan indicate that, in most cases, impacts on net operating revenue are less than 5%. For the three crops with the highest use of endosulfan in term of total pounds

---

[54] U.S. EPA, "Assessment of the Impact on Producers of Extending the Restricted Entry Intervals for Endosulfan on Cucumber (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0114, April 17, 2009.
[55] U.S. EPA, "Assessment of the Impact on Producers of Melons of Extending the REI for Endosulfan (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0115, April 17, 2009.
[56] U.S. EPA, "Assessment of Benefits of Endosulfan to Producers of Pumpkins (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0116, April 17, 2009.
[57] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry for Endosulfan on Squash (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0117, April 17, 2009.
[58] U.S. EPA, "Quantitative Impact Assessment for the use of Endosulfan on Fresh and Processed Tomatoes (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0119, April 17, 2009.

active ingredient— tomatoes,[59] potatoes,[60] and cotton[61]—EPA's 2007 analysis concludes that the impacts would be less than 1% of net operating revenue.[62]

Indeed, very few crops appear to depend on endosulfan for pest control. According to EPA's analysis, the highest estimated burden stemming from an endosulfan cancellation would be felt by watermelon producers in Texas—EPA estimates that impacts on net revenue for such growers would range from 5.5% to 12.3% for the three alternative chemicals examined. While this impact may be significant to a small subset of individual growers, only 19% of watermelon acreage is in Texas, and only 29% of those acres are treated with endosulfan. Accordingly, overall impacts on watermelon growers would be small. In addition, the Agency has noted that "many growers [in Texas] are already treated [sic] the key target pests with other chemicals,"[63] which indicates that endosulfan is not necessary even for watermelon growers in Texas.

EPA has peppered its endosulfan economic impact assessments with various caveats and cautionary notes about uncertainties, implying that the meager changes in net revenues calculated by the Agency might underestimate losses in some cases. As a whole, however, we believe that EPA's economic assessments likely overestimate impacts from endosulfan cancellation because those assessments do not consider all possible alternatives that may work as cost-effective substitutions for endosulfan. For example, only one to three alternative chemicals were considered for each crop, when in most cases 20 or more chemicals are available. Furthermore, EPA noted that there are possible non-chemical alternatives to endosulfan for apples,[64] cucumbers,[65] pumpkins,[66]

---

[59] U.S. EPA, "Quantitative Impact Assessment for the use of Endosulfan on Fresh and Processed Tomatoes (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0119, April 17, 2009.

[60] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry Intervals for Endosulfan on Potato (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0111, March 16, 2009.

[61] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry Intervals and Eliminating Aerial Spraying for Endosulfan on Cotton (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0112, April 16, 2009.

[62] U.S. EPA, "Benefits of Endosulfan in Agricultural Production: Analysis of Usage Information (DP#345930)," Document ID No. EPA-HQ-OPP-2002-0262-0062, October 30, 2007.

[63] U.S. EPA, "Assessment of the Impact on Producers of Melons of Extending the REI for Endosulfan (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0115, April 17, 2009.

[64] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry for the Use of Endosulfan on Apples (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0113, April 17, 2009.

[65] U.S. EPA, "Assessment of the Impact on Producers of Extending the Restricted Entry Intervals for Endosulfan on Cucumber (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0114, April 17, 2009.

[66] U.S. EPA, "Assessment of Benefits of Endosulfan to Producers of Pumpkins (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0116, April 17, 2009.

and tomatoes;[67] however, the Agency failed to factor non-chemical alternatives into its impact assessments for those crops, and completely failed to analyze potential non-chemical alternatives for other crops.

The existence of efficacious endosulfan alternatives is demonstrated by the global movement away from reliance on endosulfan in agriculture. To date, over 60 countries around the world have banned endosulfan.[68] The fact such a diverse array of countries—on different continents and with vastly different environments, economic resources, pest pressures, and cropping patterns—can successfully do without endosulfan indicates that there are effective alternatives to endosulfan. There is no reason to believe that American growers are any less capable or ingenious than their contemporaries in Africa, Europe, and Asia.

The following materials, attached as appendices to this letter, describe how growers in other nations have been successful in eliminating or reducing their reliance on endosulfan:

- *Alternatives to Endosulfan in Latin America (Summary)*,[69] attached as Appendix T, describes some of the alternatives employed by farmers in Latin America who have voluntarily given up endosulfan, usually in transitioning to organic production. The booklet focuses mostly on soy and coffee production, but also notes, *inter alia*, that biological control practices are spreading in Brazilian cotton production; that *Trichogramma* spp., *Telenomos* spp. and *Euplectrus plathypenae* parasitoids are being used in Cuban tomato production; and that herbal

---

[67] U.S. EPA, "Quantitative Impact Assessment for the use of Endosulfan on Fresh and Processed Tomatoes (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0119, April 17, 2009.

[68] Countries that have banned endosulfan include Austria, Bahrain, Belgium, Belize, Benin, Bulgaria, Burkina Faso, Cambodia, Cap-Vert, Colombia, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Gambia, Germany, Greece, Guinea Bissau, Hungary, Indonesia, Ireland, Italy, Jordan, Kuwait, Latvia, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Mauritius, Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Poland, Portugal, Qatar, Romania, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, Spain, Sri Lanka, St Lucia, Sweden, Syria, Tchad, the United Arab Emirates, and the United Kingdom. *See* PIC Circular 29 at 399, available at http://www.pic.int/en/Circular/circ-29-EN.pdf (attached as Appendix R); *see also* Endosulfan Draft Risk Profile, Prepared by the Persistent Organic Pollutants Review Committee ("POPRC") of the Stockholm Convention, April 2009.

[69] Bejarano González F, *et al.*, "Alternatives to Endosulfan in Latin America (Summary)," Red de Acción sobre Plaguicidas y sus Alternativas en México, International POPs Elimination Network, and Red de Acción sobre Plaguicidas y sus Alternativas en Latina America, April 2009, available at http://www.panna.org/files/Folleto%20resumen%20Endosulfan%20ing.pdf (attached as Appendix T).

preparations derived from *Petiveria alliacea* are very efficient in controlling whiteflies in Paraguayan vegetable production.

- *How to Grow Crops Without Endosulfan: Field Guide to Non-Chemical Pest Management*,[70] attached as Appendix U, describes several physical, cultural, and biological pest management methods are available for use against pests that Endosulfan is used against. Alternatives to endosulfan have been detailed for the eight crops which the EPA has produced assessments for.

- *Phasing in Alternatives to Endosulfan*,[71] attached as Appendix V, highlights case examples from Asia (cotton in India, vegetables and rice in Sri Lanka), Africa (cotton in Benin), Latin America (coffee in Mexico and soy in Brazil) and Europe (fruits in Germany and United Kingdom) where organic production using non-chemical pest management techniques such have been used by farmers with great success.

These documents describe cultural, physical, and biological (use of beneficial insects and plant extracts and other homemade solutions) practices that can serve as effective alternatives to endosulfan. For example, effective cultural methods that aid in the prevention, suppression, or eradication of pests include field sanitation, proper seed and variety selection, proper seedbed preparation, planting date, row spacing, seeding rate, fertilization, water management, crop rotation, planting of trap crops and hedge rows, companion planting, and intercropping.[72] Physical controls include sticky board traps, which are square pieces of cardboard or hard plastic coated with sticky substances placed throughout the growing area among the plants that attract flying pests.[73] In addition, the use of beneficial insects to control pests has been shown to be an effective alternative to endosulfan.[74] Further details on these non-chemical

---

[70] PAN Germany, "How to Grow Crops Without Endosulfan: Field Guide to Non-Chemical Pest Management," 2008, available at http://www.panna.org/files/field_guide_without_endosulfan.pdf (attached as Appendix U).

[71] Haffmans, S. et.al., PAN Germany, Hamburg "Phasing in Alternatives to Endosulfan," October 2008 (attached as Appendix V).

[72] PAN Germany, "How to Grow Crops Without Endosulfan: Field Guide to Non-Chemical Pest Management," 2008, available at http://www.panna.org/files/field_guide_without_endosulfan.pdf (attached as Appendix U).

[73] PAN Germany, "How to Grow Crops Without Endosulfan: Field Guide to Non-Chemical Pest Management," 2008, available at http://www.panna.org/files/field_guide_without_endosulfan.pdf (attached as Appendix U).

[74] PAN Germany, "How to Grow Crops Without Endosulfan: Field Guide to Non-Chemical Pest Management," 2008, available at http://www.panna.org/files/field_guide_without_endosulfan.pdf (attached as Appendix U).

alternatives to endosulfan are available in the PAN Germany manual attached to this letter as Appendix U.

In addition to non-chemical alternatives to endosulfan, various plants can be used to prepare formulations which act as biological pesticides with minimal effect on non-target organisms and on humans. For example, *Andrographis paniculata* (king of bitters) can be used to control aphids, melon worms, thrips, and whiteflies. *Buddleia lindleyana* (chili) is effective against aphids, whiteflies, caterpillars, and armyworms. *Zingiber officinale* (ginger) can be used to control aphids, thrips, nematodes, bollworms, whiteflies, plant hoppers, and leaf miners. Further details on plant-based biological pesticide alternatives to endosulfan are available in the PAN Germany manual attached to this letter as Appendix U.

In sum, the available evidence indicates that there are ample effective and affordable alternatives to endosulfan. While a small subset of growers of certain crops in certain regions may experience a measurable reduction in net revenue, the impacts for the vast majority of endosulfan users would be extremely minor. Accordingly, in light of the extreme risks that endosulfan poses to humans and the environment, *see supra* at pages 2 through 15, FIFRA requires EPA to cancel endosulfan registrations immediately.

III. REQUESTED ACTIONS

In order to adequately protect humans and the environment from dangerous endosulfan exposures, EPA must immediately begin proceedings to cancel all endosulfan registrations.

EPA appears to be considering an extension of re-entry intervals ("REIs") as an alternative to cancellation of endosulfan registrations. We feel that this would not be an acceptable alternative. For all crops examined, EPA has already determined that extended REIs (15 or more days) would be impractical for growers and that they would most likely use alternative products. For example, as EPA noted in the impact assessment for potatoes, "the proposed REI extension would essentially amount to a *de facto* cancellation of this chemical's use on potato."[75]

While a small minority of growers may be able to manage longer REIs, we are concerned that the state agencies charged with ensuring compliance with pesticide label

---

[75] U.S. EPA, "Assessment of the Impacts of Extending the Restricted Entry Intervals for Endosulfan on Potato (DP# 358333)," Document ID No. EPA-HQ-OPP-2002-0262-0111, March 16, 2009.

requirements would be not be able to adequately enforce the longer REIs and adequately protect farmworkers. Furthermore, longer REIs would do nothing to protect bystanders from exposure to endosulfan drift and runoff, or protect wildlife from harmful endosulfan exposures. The risks posed by endosulfan, even with extended REIs, clearly outweigh the infinitesimal benefits potentially accrued by those few growers with the capacity to use endosulfan legitimately with the extended REI period.

* * *

Thank you for taking the time to review this comment letter and its supporting appendices. Do not hesitate to contact us if you have any questions or would like to discuss this letter in more depth.

Sincerely,

Joshua Osborne-Klein
Earthjustice
705 Second Avenue, Suite 203
Seattle, WA 98104
(206) 343-7340

On Behalf of:

Karl Tupper
Pesticide Action Network North America
San Francisco, CA

Jennifer Sass, Ph.D.
Natural Resources Defense Council
Washington, DC

Pam Miller
Alaska Community Action on Toxics
Anchorage, AK

Joe DiGangi
Environmental Health Fund
Boston, MA

Samuel C. Yamin
Minnesota Center for Environmental Advocacy
St. Paul, MN

David Chatfield
Californians for Pesticide Reform
San Francisco, CA

Jeannie Economos
Farmworker Association of Florida
Apopka, FL

Paul S. Towers
Pesticide Watch
Sacramento, CA

Elizabeth Crowe
Kentucky Environmental Foundation
Berea, KY

Lisa Arkin
Oregon Toxics Alliance
Eugene, OR

Kathleen Burns, Ph.D.
Sciencecorps
Lexington, MA

Ginger Souders-Mason
Pesticide Free Zone, Inc.
Kentfield, CA

Denise Diaz
Jobs with Justice
Orlando, FL

Lynn E. Carroll, Ph.D.
The Endocrine Disruption Exchange (TEDX)
Paonia, CO

Rachel Sumner
No Spray Nashville
Nashville, TN

Sharyle Patton
Commonweal
Bolinas, CA

David Wallinga, MD
Institute for Agriculture and Trade Policy
Minneapolis, MN

Bill Hamilton
The Environmental Youth Council
St. Augustine, FL

Caroline Kennedy
Defenders of Wildlife
Washington, DC

Julia Earl
Preventing Harm MN
St. Paul, MN

Anne Katten
California Rural Legal Assistance Foundation
Sacramento, CA

Becky Sheets
Minnesota Pesticide Awareness
Staples, MN

Larry Jacobs
Jacobs Farm/Del Cabo
Pescadero, CA

Virginia Ruiz
Farmworker Justice
Washington, DC

Kim Leval
Northwest Coalition for Alternatives to Pesticides
Eugene, OR

Laura Abulafia
American Association on Intellectual
and Developmental Disabilities
(AAIDD)
Washington, D.C.

Denny Larson
Global Community Monitor
El Cerrito, CA

Ruth Berlin
Maryland Pesticide Network
Annapolis, MD

Suzanne Murphy
Worksafe--A California Coalition for
Worker Safety and health Protection
Oakland, CA

Kristen Welker-Hood
Physicians for Social Responsibility
Washington, D.C.

Sue Phelan
GreenCAPE--Cape Alliance for Pesticide Education
West Barnstable, MA

Niaz Dorry
Northwest Atlantic Marine Alliance
Gloucester, MA

Jackie Lombardo
Sierra Club National Toxics Committee
Albermarle County, VA