Chlordecone

Draft Risk Management Evalution May 2007
http://www.pops.int/documents/meetings/poprc/drprofile/drme/DraftRME_Chlordecone.pdf
Risk Profile UNEP/POPS/POPRC.2/17/Add2
http://www.pops.int/documents/meetings/poprc_2/meeting_docs/report/POPRC-2%20rep%20add2.pdf

Composition	Synthetic chlorinated organic compound also known as Kepone, GC-1189, Merex, ENT 16391, and Curlone. Chlordecone is closely related chemically to mirex, a pesticide which is already listed under the Stockholm Convention. The chemical structure of chlordecone differs from mirex in that the oxygen of the keto group in chlordecone is replaced by two chlorine atoms in mirex.
Uses	Based on the available information, Chlordecone is not anymore produced or used. Chlordecone has been used in various parts of the world for the control of a wide range of pests. In particular, Chlordecone has been used extensively in the tropics for the control of banana root borer. It has been used as a fly larvicide, as a fungicide against apple scab and powdery mildew and to control the Colorado potato beetle, rust mite on non-bearing citrus, and potato and tobacco wireworm on gladioli and other plants. Chlordecone has also been used in household products such as ant and roach traps. Chlordecone was also found to be present in technical grade mirex.
Releases	Given the specific pesticidal uses of Chlordecone, it can be expected that all amounts manufactured are ultimately released to the environment. The use of Chlordecone as a pesticide in Martinique and Guadeloupe until 1993 resulted in severe contamination of soil and surface water, which are being monitored at present. Major releases of Chlordecone occurred to the air, surface waters, and soil surrounding a major American manufacturing site in Hopewell, Virginia. Releases from this plant ultimately contaminated the water, sediment, and biota of the James River, a tributary to the Chesapeake Bay.
Fate	Chlordecone is not expected to hydrolyse or biodegrade in aquatic environments, nor in soil. Direct photodegradation is not significant. Therefore, Chlordecone is considered to be highly persistent in the environment. Chlordecone is considered to have a high potential for bioaccumulation and biomagnification. Due to lack of monitoring data on chlordecone, the assessment of the potential for long-range transport of chlordecone was based on physico-chemical properties and application of long range transport models.
Effects	Chlordecone is readily absorbed into the body and accumulates following prolonged exposure. The pesticide is both acutely and chronically toxic, producing neurotoxicity, immunotoxicity,

	reproductive, musculoskeletal and liver toxicity at doses between 1 - 10 mg/kg bw/day in experimental animal studies. Liver cancer was induced in rats at a dose of 1 mg/kg body weight per day, and reproductive effects are seen at similar dose levels. The International Agency for Research on Cancer has classified chlordecone as a possible human carcinogen (IARC group 2B). Moreover, chlordecone is very toxic to aquatic organisms, with the most sensitive group being the invertebrates.
Exposure	The available information regarding environmental concentrations of Chlordecone is very limited and includes only areas in the vicinity of production (US) or use (Martinique). Recent monitoring data from the United States demonstrate the persistence of Chlordecone, known as Kepone in the United States. In Martinique, the widespread use of Chlordecone until 1993 has resulted in contamination of soils and surface water in most of the island.
Status	Chlordecone is listed in Annex I of the Protocol to the Convention on Long-Range Transboundary Air Pollution (CLRTAP) on Persistent Organic Pollutants. The provisions of the Protocol oblige Parties to phase out all production and uses of Chlordecone. Chlordecone is also included in the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) as a substance of possible concern[1]. Under the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM Convention[2]) Chlordecone is listed as selected substances for immediate priority action (Recommendation 19/5, Attachment, Appendix 3) and is scheduled for elimination (Annex I, part 2). HELCOM aims to move towards the target of the cessation of discharges, emissions and losses of hazardous substances by the year 2020. Under the Basel Convention off-specification or out-dated pesticides, without specific mention of Chlordecone, are classified as hazardous in Annex VIII. Chlordecone is currently not listed in the Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade. Thailand has submitted a notification of Final Regulatory Actions for Banned or Severely Restricted Chemicals that has been verified to meet the requirements of Annex I of the Rotterdam Convention.

[1] The chemically related compound mirex is already included in the Stockholm convention. Both mirex and Chlordecone are included in the UNECE 1998 Aarhus Protocol on Persistent Organic Pollutants (POPs). Both are included in OSPAR as substances of possible concern.

[2] http://www.helcom.fi/environment2/hazsubs/action/en_GB/list/?u4.highlight=Chlordecone

Alternatives	A variety of chemical alternatives have been utilised including ethoprop, oxamyl, cyfluthrin, imidacloprid, azadirachtin, bifenthrin, boric acid, carbaryl, capsaicin, cypermethrin, cyfluthrin, deltamethrin, diazinon, dichlorvos, esfenvalerate, imidacloprid, lamda-cyhalothrin, malathion, permethrin, piperonyl butoxide, pyrethrins, pyriproxyfen, resmethrin, s-bioallerthrin, tetramethrin, aldicarb, isophenphos, phenamiphos, cadusaphos, terbuphos. Alternatives to chlordecone also include non-chemical agroecological methods, such as preventative pest management through appropriate fertility and field sanitation practices that reduce pest pressure; the use and habitat enhancement of natural enemies; microbial preparations such as *Bacillus thuringiensis*; cultural practices such as crop rotation, intercropping, and trap cropping; barrier methods, such as screens, and bagging of fruit; use of traps such as pheremone and light traps to attract and kill insects. These and other agroecological methods are being extensively and successfully practised in many countries, eliminating the need for Chlordecone or other chemical interventions.