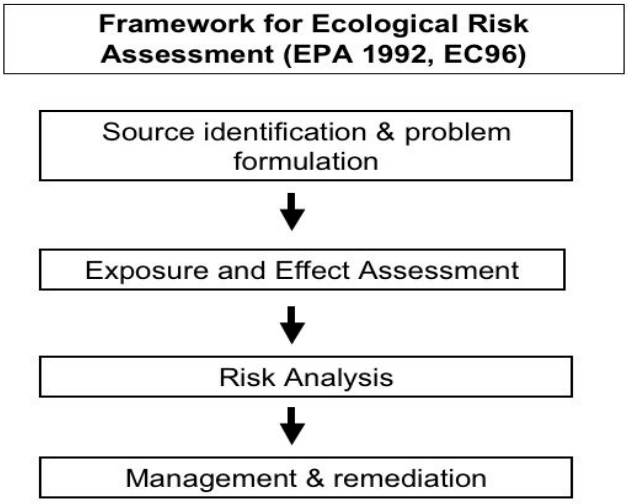
ECOLOGICAL RISK ASSESSMENT

Ecological (Environmental) Risk assessment (ERA) is, at its core, a series of mathematical equations, which are used to estimate the emissions of a chemical, human exposure to the chemical and finally the health effects from such exposure. For example, in a risk assessment of the dioxin emitted from an incinerator stack, the equations are supposed to describe the fate of the dioxin from the time it is emitted from the stack to the time that it disrupts some critical process in some particular cells in the bodies of its human receptors with sufficient accuracy to predict the number of these people who will develop, some 20 to 30 years later, a disease, typically a fatal cancer caused by the quantity of dioxin that was estimated to have escaped from the incinerator stack.

After all the relevant available factors are inserted in the array of mathematical equations and their solutions calculated, the final number of cancer deaths associated with the estimated quantity of dioxin emitted is then used to establish allowable dioxin emissions, as determined by the rate of deaths or disease incidence that is deemed socially and politically acceptable.

The factors that must be reduced to a mathematical expression are both quite numerous and extremely complex. They include, for example, the weather (wind, rain, snow, light, heat, cold, etc.) and its effects on the dioxin; the movement of the dioxin through the environment toward its human receptors, including its passage through the food web (uptake by fish, deposition on forage and subsequent uptake in beef and dairy cattle, etc.; its inhalation, ingestion and absorption by the human receptors; and its subsequent interactions within bodies the systems, organs and cells of these people.

The following schematic flow diagram represents the steps of an ecological risk assessment (ERA).



A thorough 49 slide Power Point presentation detailing the protocol of ERA is given at the URL : http://www.ce.utexas.edu/prof/maidment/risk/rskchar3/sld001.htm