

The same chemical warfare agent might also be produced from the same or other chemicals by means of other techniques, e.g. on a laboratory scale or in a large scale production of the warfare agent aimed at stockpiling the warfare agent in "bulk" stocks, or for charging "classical" chemical warheads.

#### Reactants, precursors and "key (CW) precursors"

In the science of chemistry the starting chemicals in a chemical reaction forming a particular chemical compound are usually called "reactants". In the case of production of chemical warfare agents the starting chemicals or "reactants" are sometimes called "precursors". Any unequivocal definition of this expression seems not to have been established. Sometimes both the reactants in a chemical reaction, forming the chemical warfare agent, are called precursors, but often only one of them. In the latter case, one usually chooses to denote the reactant "precursor" which in some respects is more unique than the others, i.e. it may be more difficult to produce, or it may not be readily available from commercial sources (usually because there is no peaceful use for the compound), or, in some cases e.g. regarding nerve agents, it mainly determines which class of compounds the final product will belong to.

In the case of the nerve agents, it is natural to denote the organophosphorus reactants "precursors". The other component in a reaction, which usually is a common commercial chemical, which need not concern us here, is then called "reactant". There can also be more than one such "other reactant".

It is suggested that this latter approach is followed when defining "precursor" for the purpose of a chemical weapons convention. The term "precursor" could also be made still more specialized for the purpose of a CW-convention by additional words, e.g. "key CW precursor", which has been proposed in the discussions during the consultations.

This approach could apply not only to the "binary technique" for production of chemical warfare agents, but also to other production processes. It would then refer to the "key CW precursor", which is used in the final step, or in starting the final consecutive steps in a "one pot synthesis" for the production of the chemical warfare agent, irrespective of the possibility that intermediate products may still be formed during the reaction process.

Obviously, there must exist "precursors" to the "key CW precursor". Even if it would be desirable to "catch" such "pre"-key CW precursors, with no peaceful uses, in an early part of the production chain, this seems to be impossible from a practical point of view.

Further, it is clear that in different types of production processes, different "key CW precursors" (as well as different "reactants") may be used to form the same chemical warfare agent. The method of definition suggested here would imply that they would be defined as "key CW precursors" irrespective of the method of production, i.e. irrespective of whether different precursors were used to obtain the same