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# Central Chemical Weapons Destruction Analytical Laboratory (CAL GosNIIOKhT)

04-09021  
R S M V f

Central Chemical Weapons Destruction Analytical Laboratory (CAL) was created in accordance with the Russian Government decree of 7 December 1996, #1447.

Building and instrumentation of the laboratory was financially supported by US Government. Inauguration of the Laboratory took place in April 2000.

CAL is intended for analytical providing of safety of chemical weapons destruction process starting with a stage of technology development.

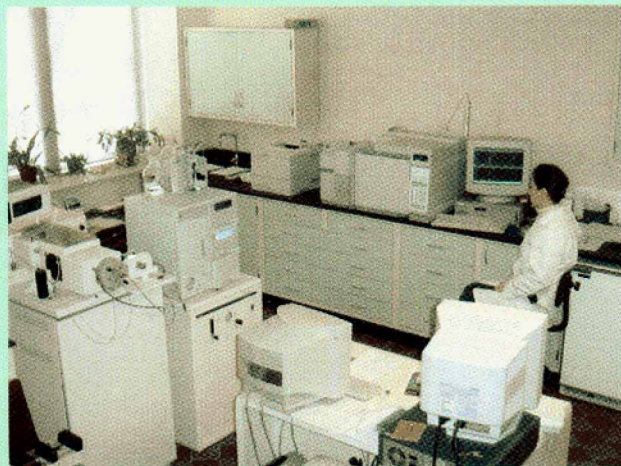


The laboratory is equipped with up-to-date analytical equipment that include:

- Gas Chromatographs HP-6890 equipped with FID, TCD, MSD, FPD, ECD, AED,
- Finnigan GC-MS High Performance Spectrometer 98000,
- ISP/MS,
- Atomic Absorption Spectrometers,
- HPLC (diode array),
- HPLC/MSD,
- Ion Chromatographs DX-500,
- Avatar 360FT-IR Spectrometers,
- CHN Elemental Analyzer System EA 1110,
- NMR Spectrometer.

The laboratory also has a set of equipment for physicochemical analysis and auxiliary equipment. 45 research workers, two of them are Professors, three are Doctors of Science and 5 PhD are work at the Laboratory.

CAL participates regularly in OPCW Professional Tests for chemicoanalytical laboratories.



## International collaboration of GosNIIOKhT

GosNIIOKhT actively takes part in international programs on chemical disarmament safety, decrease of NBC weapons proliferation risk, creation of new pharmaceuticals. These programs are being realized in collaboration with:

- Organization for Prohibition of Chemical Weapons (OPCW);
- International Science and Technology Center (ISTC);
- TACIS;
- Initiatives for Proliferation Prevention (IPP);
- CRDF.
- CTR.

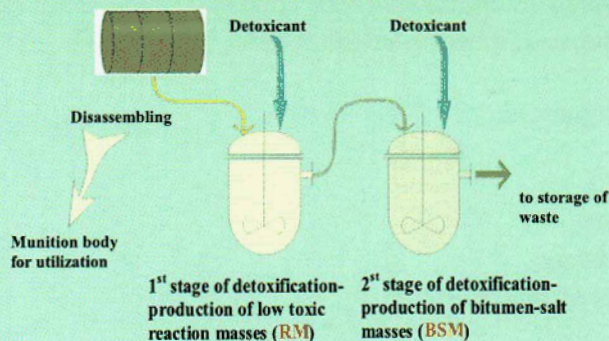
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# Development of CW Destruction Technologies

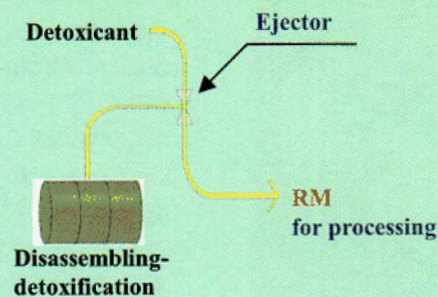
Variety of munitions and CA formulations required development of universal technology for CW destruction, universal apparatus and technological design. To solve this task, GosNIIOKhT developed technologies for destruction of Mustard, Lewisite, Sarin, Soman, and Vx that are components of various types munitions.

All the technologies are developed as a two-stage process. The first stage is CA detoxification, the second stage is utilization of the reaction mass.

## I. BASIC TECHNOLOGY



## II. TECHNOLOGY USING EJECTION TYPE REACTOR



Thus, to destruct chemical weapons based on Sarin, Soman, Vx (32 thousand ton totally), a method was taken including:

- chemical neutralization-detoxification of chemical agents with monoethanolamine (sarin, soman) or alcoholate formulation (Vx) resulting in low toxic reaction masses;
- treatment of the reaction masses with bitumen with added calcium oxide resulting in practically nontoxic reaction masses.

To destruct lewisite (7 thousand tons), treatment with alkali was taken; formed sodium arsenite is a commercial product.

Reaction with monoethanolamine is used for destruction of mustard (0.7 thousand ton).

Developed at the GosNIIOKhT technologies for destruction of mustard and lewisite were realized at a working CW destruction facility in Gorny. Later the GosNIIOKhT technologies will be realized at facilities under building in Shchuchye and Kambarka.

Technologies for safe destruction of former chemical weapons production facilities were also developed and are being introduced.

Technologies for chemical weapons destruction are provided with analytical control and environmental monitoring means.

## Creation of Software

The main task of information investigations and development of databases and software at the GosNIIOKhT is to support realization of the Convention on Chemical Disarmament by the Russian Federation and to provide safe process of CW destruction.

GosNIIOKhT developments in this field include:

1. Software for control of the Convention on Chemical Disarmament:
  - The expert system HazChem for revealing clandestine CA production in quantities more than 200 ton/year.
  - Database on CW destruction aspects and providing safety of this process.
2. Systems for preliminary assessment of potential hazard of medicines.
3. Program for calculation of toxic substance distribution at ultra low concentrations in atmosphere and biosphere after an accident at CW destruction facility and as a result of destruction and decontamination of buildings at the former CA production facilities in the Russian Federation.
4. Forecasting of CW facilities influence on health of population and animals.
5. Creation of user databases on some classes of biologically active substances in ISIS/Base format.

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