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[redacted]

ON THE THEORY OF RESEARCH, DEVELOPMENT AND PRODUCTION OF NUCLEAR AND NON-NUCLEAR COMPONENTS

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[redacted]

As is known, a rather complex bureaucratic system of economic and state administration exists in the Soviet Union.

The system is based on a dictatorship and distrust of higher personnel of lower personnel. Under such a complex bureaucratic system it is practically impossible to realise such complicated problems as nuclear weapons without organizing high-rank, super-government committees. The essence of the matter is that the so called national economy units of the nation, i.e., factories, plants and institutions, operate on a previously approved plan. Besides this plan, they have a multiplicity of various non-plan assignments which are executed in most cases ahead of the planned assignments if they are of a military nature.

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The development of nuclear and non-nuclear components is a rather lengthy and complicated procedure in which a large number of scientific research institutes, ministries and departments must participate.

All these institutions have government approved plan and assignments for their normal production which they must fulfill under any circumstances. In order to make various ministries fulfill other additional assignments, it is necessary to create a new supergovernment organ, which would have the highest authority, i.e., the assignments of such an organ would be of highest priority and indisputable. Generally, such organs are called State Committees and are formed for the execution of the most important state and military problems. Such a committee is formed under the Council of Ministers. The chairman of the Committee is selected from among the deputy chairmen of the Council of Ministers; he will direct the development of a certain field of industry, for instance, the development of nuclear and non-nuclear components.

The head of such a committee has authority similar to that of the chairman of the Council of Ministers in the solution of problems related to the field of industry under his direction.

He has several deputies and members of the State Committee.

The deputy chairmen of the State Committee are permanent associates of the Committee, while not all of the members are permanent associates of the Committee.

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The Committee members are selected from among the best known and qualified experts in the Ministry of Defense, Academy of Sciences USSR, scientific research institutes, the most important ministries, security organs (KGB) and the Central Committee of the Communist Party.

This organ, i.e., the members of the State Committee, does not direct the work of the Committee; there is a strictly formal link with the C.C. of the Communist Party, the latter being the main controlling organ of the Party. The majority of these members are also members of the industrial department of the C.C. of the Party, where there exists a department for the development of nuclear and non-nuclear components which is actually the head of the State Committee.

Among the responsibilities of the members of the State Committee is the examination and ratification of various plans for the development of nuclear and non-nuclear components.

Their main responsibility is supervision over the committee's work and criticism of unsatisfactory performance.

The criticism and remarks of the Committee members are carefully examined in the industrial department of the C.C. of the Party. On the basis of this criticism the professional communists in the industrial department of the C.C. of the Party are able to control the work of the State Committee.

Figuratively speaking, the members of the State Committee may be called the eyes, ears and brains of the Party.

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The deputy-chief of the State Committee plans the work on the basis of various data received from appropriate organizations.

For instance, from the General Staff, Academy of Sciences USSR, Gosplan USSR, appropriate branches of his Committee and others.

The Committee must:

1) Determine military requirements,
2) Select various systems of nuclear and non-nuclear weapons,
3) determine the volume of work and priority of scientific research work of the institutes,
4) select scientific and technical personnel,
5) determine the extent and order of financing the work,
6) determine connections and interrelationships with various ministries,
7) coordinate preparations and put various sections into operating condition.

The State Committee for the development of nuclear and non-nuclear components must include:

1) A technical administration (or technical committee),
2) an independent design bureau (i.e., a design bureau subordinate to the technical administration of the State Committee),
3) special scientific research institutes on important problems of the development of nuclear and non-nuclear components,

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4) experimental shops, laboratories, factories and plants,

5) military bases, such as military airfields, artillery proving grounds, naval bases, etc.

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a model organizational structure of a State Committee for the development of nuclear and non-nuclear components can be visualized as follows (see accompanying Table No 1).

The State Committee should have a great number of associates. Their number may exceed that of any of the ministries.

Example:

The first deputy has under his supervision a technical administration, design bureau, laboratories and experimental shops.

The technical administration should have a huge design staff, not less than 8 to 10 thousand first class design engineers to ensure satisfactory work in a great number of fields of engineering. The technical department [administration] should also have as many engineers-technologists. It should have numerous laboratories and experimental shops with a large staff of scientific workers, engineers, technicians, employees and laborers.

Hypothetically it may be assumed that in the technical administration there should be engaged about 40 to 50 thousand engineers and technicians and a similar number of employees and laborers, i.e., about 90 to 100 thousand persons.

According to my estimates the State Committee for the development of nuclear and non-nuclear components should have approximately 800

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to 1,200 thousand engineers, technicians, employees and laborers who are subordinate directly to the personnel administration of the State Committee.

In addition, a great number of workers from the Army and other ministries should perform some work for the Committee.

Such a huge staff of workers from numerous branches of sciences and engineering cannot be housed in Moscow or any other single city.

[redacted] central organs of administration for the State Committee are housed in Moscow and the rest in other cities depending on location and extent of development of corresponding branches of science and industry in individual economic regions.

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For example:

The departments engaged in handling electronic and electrical engineering equipment may be housed only in Moscow or Leningrad, since all the scientific, technical and manufacturing facilities of these fields are located in these cities. The chemistry departments, such as those for the development of special explosives or fuels, can be housed only in Moscow, with the testing grounds in the Urals or Siberia. The scientific work for the development of nuclear components would be conducted in Moscow, and the testing would be done in the Urals or Siberia.

Scientific work for the development of rocket motors would be conducted in Moscow, and the testing only in the Urals, etc

Moscow may house only the central organs of the administration, such as:

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1) The entire office of the chairman of the Committee and all of his deputies,
2) members of the Committee,
3) the design bureau with only the chief and leading designers and technologists. (The other auxiliary departments of the design bureau may be housed in other cities, such as Leningrad, Novosibirsk, Sverdlovsk, Chelyabinsk, Yerevan' and in the Ukraine.),
4) planning administration,
5) administration of cooperative deliveries and communications,
6) administration for supplies,
7) personnel administration.

Thus, if we agree that the structure of the State Committee for the development of nuclear and non-nuclear components looks approximately as described, then it becomes a very bulky unit and a very expensive one.

This means that under existing conditions in the Soviet Union it would be impossible to organize several similar committees since, economically, the country would not be in a position to support them.

Therefore, the assumption that there exist several similar committees in the USSR is incorrect. We should take into consideration that the said committee is nothing but a state within a state. It has wide authority over all branches of the economy, it literally demoralizes some branches of Soviet industry because its assignments

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have priority and in most cases condradict the general plans. The committee takes for its needs the best scientific and engineering-technical personnel as well as the best plants, laboratories and scientific research institutes.

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1) the investigations for the development and design of nuclear and non-nuclear components (high explosives, fusing and firing systems) are conducted in a single complex, i.e., are carried out by one State Committee which is housed in various locations in the territory of USSR.

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the Chairman of the State Committee has a deputy for scientific and research problems.

This deputy in turn has:

1) several deputies for various fields of science and engineering, for example:
   a) Physical sciences,
   b) chemical sciences,
   c) radio-electronics,
   d) metallurgy,
   e) technology and machine building, etc.

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2) A scientific council consisting of:

a) The most prominent Soviet scientists from all branches of science and engineering connected with the development of nuclear components,

b) representatives from the Army,

c) representatives from the Soviet Academy of Sciences and from leading scientific research institutes,

d) representatives from the security organs (MGB),

e) representatives from the Central Committee of the Communist Party.

The majority of the members of the Scientific Council are also members of the committee on nuclear components of the industrial department of the C.C. of the Communist Party.

Through the medium of these members the C.C. of the Party directs and controls all of the scientific workof the State Committee.

The deputy for scientific and research problems, together with his staff of scientific workers, are engaged only in scientific research in the field of nuclear components having practical application, i.e., the military. Scientific investigations of a general nature in the field of nuclear physics are conducted continuously at the Academy of Sciences USSR and by its various subsidiary scientific research institutes located primarily in Moscow, Leningrad and Novosibirsk.)

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For the solution of scientific problems relating to components and assemblies, this department should have its own Scientific research institutes, laboratories, design and technological departments, as well as manufacturing enterprises and other necessary facilities.

In its practical work, this department cooperates closely with the technical administration of the State Committee to which is transferred all of the scientific research data for the development and design of nuclear components.

This question can be answered in the quickest way as follows:

Research related to the practical (military) application of nuclear components is carried out by the department of scientific and research work of the State Committee.

Development and design is carried out by the Technical Administration of the State Committee.

b) Research, design and development

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are conducted in scientific research institutes, laboratories, enterprises and design bureaus, which are subordinate directly to the State Committee for the development of nuclear and non-nuclear components.

These institutions are located in various cities of the Soviet Union.

Their main centers may be located in the following cities: Moscow, Leningrad, Novosibirsk, Sverdlovsk, Yerevan and in the Ukraine (possibly in Kiev).

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[redacted] research on non-nuclear components is carried out also at the scientific research department of the State Committee in the same manner as it carries out research on nuclear components.

However, such research may be carried out by other scientists and possibly at other places. Design and development is carried out also at the technical administration of the State Committee which has for this purpose a sufficient number of design and technological bureaus which may be located separately from the design bureaus for nuclear components but in about the same cities as the design bureaus for nuclear components.

e) [redacted] research, development and design of non-nuclear components is carried out in various places, primarily in the above-mentioned cities of the USSR.

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[redacted]

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g) The design of hardware can be carried out only at the technical design bureau of the State Committee, which is subordinate to the technical administration. The assumed location of this bureau has been mentioned above.

h) Only the special department headed by one of the deputy-chairman of the State Committee (deputy No 4 according to the above diagram) (see Table No 1) may be engaged in the problems of testing non-nuclear components.

[redacted]

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This department should have all testing facilities, including the artillery proving ranges, airfields, marine bases and other necessary facilities.

In the majority of cases military personnel are engaged in this branch as executives. The tests may take place under the observation and control of two departments of the State Committee, such as the technical administration and scientific research department.

i) As has been mentioned above, the development and design of nuclear and non-nuclear components are conducted under the direction of the same organs, but are located in different places.

These branches are in direct contact with each other, and in case of necessity will cooperate [are amalgamated].

j) From the diagram shown (see accompanying Table No 1) of the State Committee administration it is seen that the Committee has a unified and rather streamlined system of control which permits mutual interrelations and cooperation among individual departments.

The control system of the Committee resembles a modern army structure with its various armed branches and multiple systems of armaments.

The usual (for the USSR) mechanism of "whip and cookies" is applied for closer cooperation.

It is difficult for you to understand it and it is still more difficult for me to explain. [redacted] this mechanism has been well tested in the USSR, and has produced fair returns for Communism.

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2. On the subject of producing prototype weapons, the following can be said:

Only the technical administration of the State Committee may produce prototype weapons. After receiving all the exhaustive scientific and experimental data from the scientific research department of the Committee on a certain type of weapon, the technical administration begins the design.

The central design-technological bureau, which is subordinate to the Committee's technical administration, compiles specifications for prototype equipment, makes calculations and main drawings and works out the necessary elementary production flow sheet.

After this the prototype, or more precisely speaking, the specifications for the whole prototype are broken up into its elements. These separate specifications are transferred to various departments of the central design bureau, which may be located in different cities of USSR (as mentioned above).

The design departments, which carry out the design calculations of individual parts and elements of the prototype, perform detailed calculations and design of the parts and details of the prototype and maintain constant contact with the central design bureau located in Moscow. The common (i.e., not the chiefs) design engineers in most cases do not have any idea about the construction of the whole prototype or even any idea about the element or parts which are being designed in this department.

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Each common design engineer can know only about the part he is designing. In an effort to tighten security, the designers in the same department are isolated from each other.

The central design bureau maintains constant contact and guides its numerous design departments engaged in the production of parts, details and elements of the prototype.

Under the direction of chief designers of the central design bureau, the peripheral design departments produce experimental models or prototypes of individual parts, elements or sub-assemblies.

When all the parts and sub-assemblies of the prototype are made and checked, they are transported to some specified destination as designated by deputy-chairman No 4 of the State Committee.

From this moment the control of the prototype is transferred to deputy No 4.

The checking and testing of the prototype may be carried out under the observation of the chief designers and technologists of the central design bureau and the chief scientific associates from the scientific research department of the Committee

The representatives from the peripheral design departments, laboratories and scientific research institutes participate in assembly and testing only in exceptional cases and to a limited degree.

3. The serial production of such prototype weapons in one particular locality is impossible under existing conditions in the USSR.

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In the first place the USSR does not possess sufficient technical facilities for their production in one locality, and in the second place Soviet economic policy has provided and still provides for the greatest possible decentralization of the military industry.

At this stage of development of nuclear and non-nuclear components the USSR will not build special plants or special machine equipment.

The existing plants at which the labor force has undergone a security check (i.e., removal of security risks) and at which regular production has been discontinued will be used for this type of production.

Knowing well the status of Soviet industry and its "advanced" technology,

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such production is carried out now by the most primitive Soviet methods, with the aid of hammer and chisel. As always, the government is rescued by the enterprise and natural keenness of the Russian worker, who is capable of working under any adverse conditions and with the most elementary mechanical tools.

a) The hardware for nuclear components, in my opinion, is produced partly at conventional plants, i.e., at the plants of non-military profile, and in part at plants and experimental shops of the State Committee.

The cast parts (i.e., castings) and forgings are manufactured at the plants of the Ministry for the Defense Industry and at civilian machine building and metallurgical plants.

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The machining of particularly complicated parts as well as special heat treatment may be carried out also at the same plants. The plants of the State Committee are capable of performing mainly the machining of not very bulky parts, the manufacture of special mountings, special attachments, and various small steel, cast iron and non-ferrous castings.

The plants which manufacture individual parts of nuclear weapons never know what these parts are intended for because all the parts in such cases are not named but are designated only by a number.

It is difficult to indicate where the components of nuclear weapons are manufactured, since their production is distributed over hundreds of Soviet military and non-military enterprises.

It is possible only to establish somewhat the basis of the degree of development of one or another technical industry in various economic regions of USSR.

As was said above, for example, electronic equipment may be manufactured only in two cities of the USSR--Moscow and Leningrad, since these are the main technical and manufacturing centers of radio electronic equipment in the USSR.

By applying such a method it would be possible to determine also the other production centers. If we carry out a detailed analysis of the production nomenclature of principal plants for various branches of industry, it would be possible to determine the plants engaged in production of nuclear weapons; with a further and more detailed analysis it would be possible to determine what they actually produce.

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Production of nuclear weapons is carried out under the direct control and direction of the State Committee. By a similar method it is possible to determine the production locales of purely nuclear components.

b) The assembly of nuclear and non-nuclear components may take place only at the enterprises of the State Committee and with the help of laborers, engineers and technicians of the State Committee under the general control and supervision of representatives from the Committee's technical administration.

c) Non-nuclear components, in my opinion, as well as nuclear components are under the control of the State Committee.

d) [redacted] non-nuclear components are produced in a similar manner and through similar channels as the nuclear components.

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e) Non-nuclear components may be assembled at enterprises subordinate to the State Committee.

f) At the enterprises of the State Committee.

g) By the State Committee.

4 a) [redacted] the army and the C.C. of the Communist Party.

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[redacted]

c) [redacted] the Soviet Academy of Sciences does not have any direct connection with the development of nuclear and non-nuclear components.

The Soviet Academy of Sciences is engaged in the general investigation of nuclear physics and general theoretical problems of nuclear physics. However, the Academy of Sciences may receive individual

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specific problems from the State Committee; also, individual scientists of the Academy of Sciences may be called upon to work directly in the State Committee or for appropriate consultations. The Soviet government cannot entrust the Academy of Sciences with work related to the "practical" application of nuclear components because the Academy of Sciences is composed of old intelligentsia.

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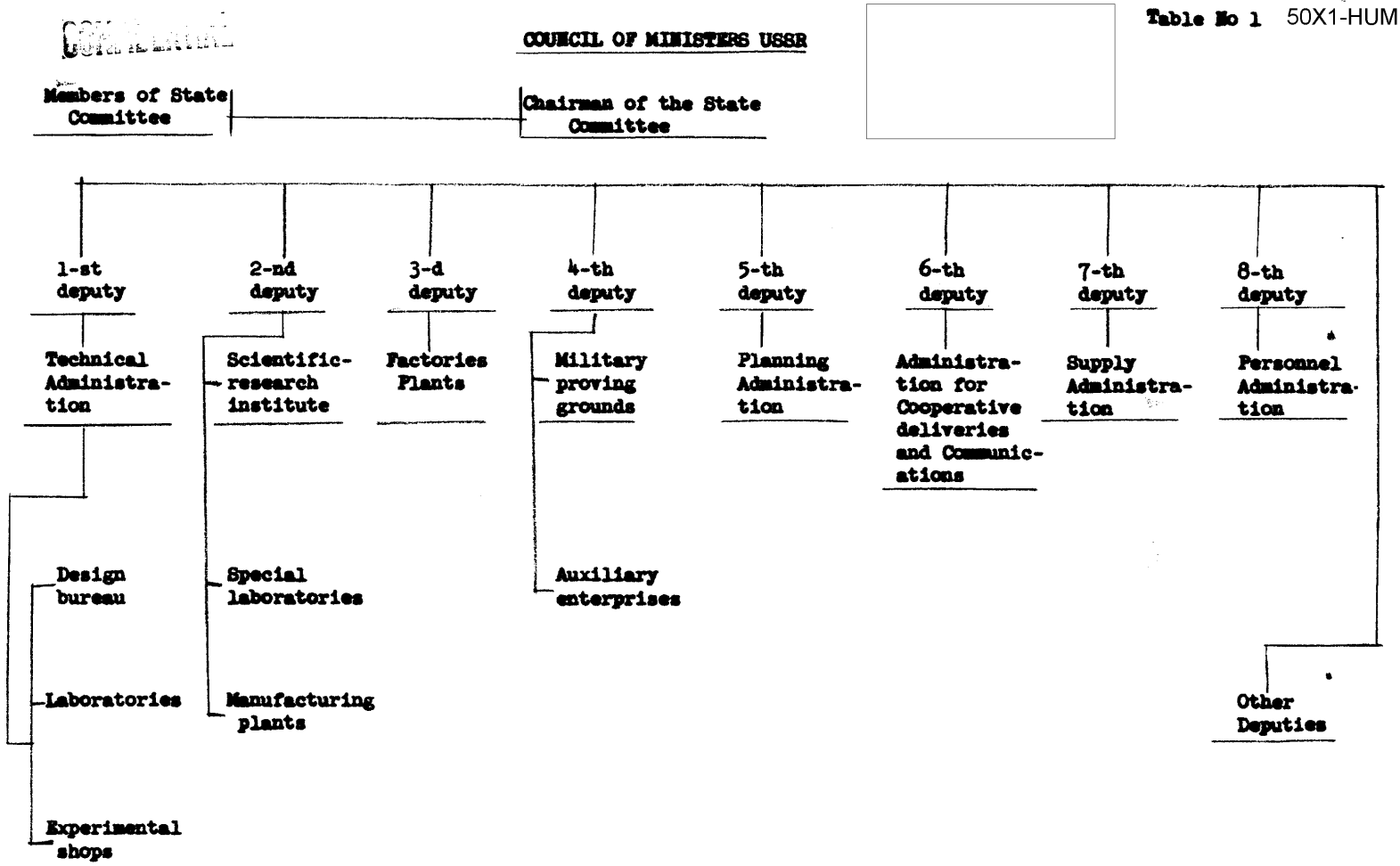

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