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PARLIAMENTARY COMMITTEE OF INQUIRY

on the cases of death and severe illnesses affecting Italian personnel assigned to military missions abroad, firing ranges and the sites where munitions are stocked, as well as civilian populations in war zones and in areas adjacent to military bases on the national territory, with special attention to the effects of depleted uranium shells and of the dispersion in the environment of nanoparticles of heavy minerals produced by the explosion of warfare material

Established by Senate Resolution of 11 October 2006

REPORT TO THE PRESIDENT OF THE SENATE
UNDER ARTICLE 2 OF THE SENATE RESOLUTION OF 11 OCTOBER 2006

ON THE OUTCOME OF THE INQUIRY
CONDUCTED BY THE COMMITTEE

Rapporteur: Senator BRISCA MENAPACE

Approved by the Committee in the sitting of 12 February 2008

Membership of the Parliamentary Committee of Inquiry on the cases of death and severe illnesses affecting Italian personnel assigned to military missions abroad, firing ranges and the sites where munitions are stocked, as well as civilian populations in war zones and in areas adjacent to military bases on the national territory, with special attention to the effects of depleted uranium shells and of the dispersion in the environment of nanoparticles of heavy minerals produced by the explosion of warfare material

(Resolution of 11 October 2006)

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1. INTRODUCTION

1.1 *Establishment and Commencement of the Committee of Inquiry*

In its resolution of 11 October 2006¹, the Senate established a “Parliamentary Committee of Inquiry on the cases of death and severe illnesses affecting Italian personnel assigned to military missions abroad, firing ranges and the sites where munitions are stocked, as well as civilian populations in war zones and in areas adjacent to military bases on the national territory, with special attention to the effects of depleted uranium shells and of the dispersion in the environment of nanoparticles of heavy minerals produced by the explosion of warfare material”, often referred to, for sake of brevity, as the “Parliamentary Committee of Inquiry on Depleted Uranium”.

In accordance with Article 3 of its act of establishment, the Committee consists of twenty-one senators, appointed by the President of the Senate of the Republic in proportion to the members of each Parliamentary Group.

On 18 November 2006, the President of the Senate called the following senators to sit on the Committee: Paolo Amato, Roberto Antonione, Paolo Bodini, Lidia Brisca Menapace, Mauro Bulgarelli, Felice Casson, Rosario Giorgio Costa, Marcello De Angelis, Sergio Divina, Francesco Ferrante, Antonio Lorusso, Calogero Mannino, Giulio Marini, Stefano Morselli, Gianni Nieddu, Silvana Pisa, Franca Rame, Luigi Ramponi, Giorgio Tonini, Tiziana Valpiana, Valerio Zanone².

On 6 February 2007, the President appointed Lidia Brisca Menapace³ chairperson of the Committee.

The Committee commenced its work on 13 February 2007, by establishing its Bureau. At its next sitting, on 6 March 2007, it passed its Rules of Procedure. Having fulfilled these obligations the Committee started its inquiry.

1.2 *Activities performed*

The Committee held a total of thirteen plenary sittings, twenty meetings of its Bureau with the participation of the representatives of the Parliamentary Groups, it organized a mission to the province of Lecce, and through its consultants⁴, made two site visits to Sardinia and one to Lebanon⁵.

2. OUTCOME OF THE INQUIRY

As already recalled, with respect to the date of passage of the act establishing the committee⁶ (11 October 2006), the Committee started to operate with considerable delay, since it took office as late as 13 February 2007. For reasons of continuity it deemed it important to acquire the data gathered and the conclusions reached, albeit partial and provisional, by the corresponding Parliamentary and Ministerial Committees that had worked during the previous Parliament.

This policy was also justified by the much broader mandate that this Committee received. Indeed the previous inquiry was to find out whether the Italian military had used munitions containing depleted uranium⁷ in Italy or abroad and whether they had been exposed to the effects of this material in the operational theatres of international missions. During this Parliament, instead, following the Senate Resolution of 11 October 2006 and the experience acquired, the Committee was asked to examine, besides depleted uranium, also other possible risk factors that may have triggered the diseases considered, in particular, but not limited to, the effects of the dispersion in the environment of the so-called “nanoparticles”⁸ of heavy metal produced by the explosion of warfare material which, on the basis of scientific evidence, for their form and dimension, can also be traced back to the explosion of depleted uranium ordnances. Moreover, while the previous inquiries had focused on servicemen, the current inquiry has widened its attention also to the civilian populations living “in theatres of war or near military bases in Italy”.

One of the first problems concerned the difficulty in collecting full and reliable data on the diseases being investigated, affecting both servicemen and civilian populations. In addition, the work of the Committee was made cumbersome by the lack of uniformity and completeness of data that, in spite of the inquiry already carried out, had not allowed for a constant monitoring of the phenomenon. Verifying and estimating the phenomenon was anything but easy as demonstrated by the highly qualified experts and scientists who were consulted on the issue⁹ and whose studies, thus far partial and incomplete, are still in progress.¹⁰

The Committee further ran into another difficulty that seemed insurmountable: establishing, in scientific terms, a *causal relationship* (cause-effect relationship) between the disease and exposure to depleted uranium or to other risk factors. Both the consultants of the Committee and the other experts immediately expressed the need for more complete and accurate data, in addition to time enough to reach reliable and non disputable conclusions.

The Committee then started to systematically collect data from the appropriate offices of the Ministry of Defence through queries aimed at identifying the servicemen who were ill or who had died amongst those who had served in missions abroad and in firing ranges in Italy in the period 1996-2006. Responses from all Military Health Centres and Districts were collected with the help of the Criminal Police and forwarded for assessment to the Higher Institute for Health. Upon its initial evaluation, the Institute found the material thus gathered to be interesting, but once again, it too pointed out that it was heterogeneous and incomplete, and that, in any case, any serious and scientifically rigorous analysis would require much more time.

At the same time the Ministry of Defence started a more general process to gather, update and check data. The outcome of such process was disclosed at the sittings of 9 October and 6 December 2007. In particular, Defence Minister Parisi provided a list of all Italian servicemen who contracted malignant cancer in 1996-2006 in the four main operations theatres considered in this inquiry (the Balkans, Iraq, Afghanistan and Lebanon): the cases of cancer were 312 in all, of which 77 had a fatal outcome.

The Minister also specified that a full body of data for checks and cross-checks was not yet available: indeed, for the military sent abroad, a computerized set of data is available only for the last five years (2002-2006), which provides the precise number of soldiers who participated in missions in the four theatres taken into account, namely 56,600. Considering that the number of servicemen affected by cancer in this group in the same five-year period was 216, the incidence calculated for the 1996-2006 eleven-year period is equivalent to 380 cases every 100,000 individuals.

Moreover, as acknowledged by Mr Parisi himself before the Committee, since the data are incomplete, and given that epidemiologically significant statistical indications on servicemen and civilians would require a comparative evaluation by age bracket, type of cancer and periods of real exposure and matching lengths of time spent in the areas at risk, the above estimates are actually very rough and underrated. Furthermore, in order to fully appreciate the overall phenomenon, an adequate amount of latency time is necessary, and also the cases of Italian military sent abroad to war theatres in the years prior to 1996 (at least from 1990) should be taken into account.

For these very reasons, on 23 November 2007, an *ad hoc* research body was set up, called “*Ministry of Defence Committee for the Prevention and Control of Diseases*”, consisting of researchers of recognized scientific competence, selected not only by the Ministry of Defence, but also by the Ministries of Health and that of Research, on the suggestion of the Committee. It is therefore to be hoped that this *ad hoc* body may finally be able to reach a better understanding of the phenomenon and consequently pave the way to more accurate assessments¹¹.

3. THE PROBABILITY CRITERION

Given this state of affairs, the Committee changed its approach to the issue, and reversed the burden of proof, so to speak. Indeed, since the research work and data gathered were not such as to confirm, but not even exclude, a possible link between the diseases being investigated and exposure to depleted uranium or other harmful substances, the Committee replaced the relationship of cause and effect with the *probability criterion*, using statistical-probabilistic instruments in evaluating the possible causes of the diseases and decoupling, in a certain way, the effect from the cause. Since the relationship between the morbid event and the triggering cause cannot be stated – but it cannot even be ruled out – the fact that the morbid event occurred is sufficient reason for claiming damages, without the need to demonstrate a direct causal relationship between the two. In this way, access is provided to the forms of welfare and compensation envisaged by the existing legislation (including acknowledging compensation claims for death or disability resulting from disease contracted in the line of duty and recognition of special benefits) on the basis of an

objective and irrefutable fact, *i.e.* the occurrence of the morbid event whatever the scientific and medical ascertainment of the cause of the disease.

The approach proposed by the Committee was accepted also at legislative level through *ad hoc* allocations in favour of the victims and their families under Decree Law no. 159 of 1 October 2007 (converted, as amended, into Act no. 222 of 29 November 2007), which, by extending the benefits envisaged for the victims of terrorism, allocated €175.72 million for the two-year period 2007-2008, and €3.2 million starting from 2009, plus €30 million earmarked in the 2008 Budget Law (Act no. 244 of 24 December 2007) specifically for the individuals affected by the diseases being investigated here for the three-year period 2008-2010.

This was a first, dutiful response to the victims of the diseases and their families, who had thus far felt abandoned by the institutions, since their attempts to overcome the difficulties encountered in seeking access to welfare measures and compensation benefits (that are indispensable in order to be able to face the dramatic consequences of the disease) had not been fruitful. Moreover, not only were there the bureaucratic difficulties run into by the individuals entitled to receiving compensation for damages, but in addition a proportion of the allocations approved by the 2007 and 2008 Budget Laws were found to have been left unused. For this reason, the Committee called on the Ministry of Defence to streamline administrative procedures. The Ministry conceded to the request by at first having the competent General Directorate for Military Health issue an *ad hoc* Circular (no. 0010654 of 1 June 2007), and then, at the above-mentioned hearing of 6 December 2007, the Minister confirmed that files had been opened for paying damages and, where possible, for acknowledging compensation claims for death or disability resulting from disease contracted in the line of duty and recognition of special benefits, and with priority for those included in the list drafted by the Ministry. Moreover, the Committee informed the appropriate authorities of individual cases it had come to know of (in particular on the occasion of the site visit made during the mission to Lecce), even though this was not part of the mandate it had been assigned in the act establishing the Committee.

On the other hand, during the hearing of the consultants and experts at the sitting of 4 October 2007, the genotoxic nature of depleted uranium from both chemical and radiological standpoints was clearly shown, which means that there is no biologically safe threshold for this type of agent. It must be further pointed out that, time-wise, the exposures precede the onset of the disorders being examined here. A significant increase in Hodgkin lymphomas among Italian soldiers who had served in the Balkans had already been pointed out in the survey carried out by the so-called “Mandelli Commission” (set up by the Ministry of Defence in 2000).

It is therefore believed that the requirements envisaged in the current legislation in order to have access to the various forms of welfare and payment of damages do exist (including acknowledgement of compensation claims for death or disability resulting from disease contracted in the line of duty and recognition of special benefits).

As regards the other issues of the inquiry, the Committee started a fact-finding activity aimed at determining the actual safety level and healthiness of firing ranges in Italy through a series of visits to the sites, carried out directly (the Torre Veneri firing range in Puglia) or through its consultants (firing ranges of Cape Teulada and Salto di Quirra in Sardinia). In particular, attention was focused on the Salto di Quirra joint firing range,

where the civilian and military authorities, prompted by the Committee, started an important health and environmental monitoring programme which is expected to shed light on the presence of polluting agents and other possible risk factors for human health¹².

From the organizational point of view, there are still doubts (already voiced during the previous Parliament) as to whether monitoring in firing ranges is adequate, especially in the case of ranges leased to private companies, in view of the risk (unproven but certainly not to be overlooked) that some of these activities may be heavily polluting (for instance at Salto di Quirra, where the *Ariane* and *Zefiro* missile engines, to be used to launch satellites into space, were tested). Closer monitoring inside the bases is absolutely necessary and should lead to a review of the procedures followed for leasing the management of firing ranges to private companies.

The Committee consultants then started a number of checks at the relevant military offices to understand what type of ammunitions are being used by the Italian Armed Forces, so as to ascertain the presence of depleted uranium. Currently, and on the basis of findings, there appear to be no traces of the use of this material in Italy, as always claimed by the Ministry of Defence (and as Minister Parisi himself confirmed in the hearing on 4 October 2007). It must however be pointed out that no exhaustive and convincing answer was given to the repeated requests by some Committee Members aimed at obtaining hard and unquestionable data as to the use of depleted uranium by various foreign armies operating in the same theatres and in all the locations where Italian soldiers were involved. The consultants who attended the 13 December 2007 session all recognized how fundamental and instrumental it is to receive such information. Hence, one of the most essential and primary data for evaluating exposure and the risk involved was not available because of the difficulties encountered by the Ministry in obtaining specific information on the issue.

It was deemed appropriate to check the adequacy of the precautionary measures and individual protection gear adopted by the Italian troops in operational theatres abroad, also considering the sanitation and environmental conditions, an exercise that produced important food for thought. Even though there is no certainty yet as to the direct link between the causes and the diseases or deaths among the military personnel, it is however evident that the soldiers who participated in international missions have always operated in post-war contexts that were greatly degraded in terms of environment, hygiene and health, and that, in some cases and in predisposed individuals, this could contribute to determining the onset of severe diseases, including cancers. It is therefore of crucial importance to make sure that the soldiers sent to these places be adequately protected both in terms of individual equipment and in terms of general health and prevention treatment measures¹³.

During the inquiry the need was felt to gain a deeper understanding of the possible causes of the diseases. Though continuing to do research into depleted uranium, attention was focused on other risk factors, *first and foremost*, the dispersion of nanoparticles of heavy metals produced by the explosion of war materials and by other forms of combustion¹⁴.

Another problem taken into account was the *vaccination* to which servicemen are subjected whenever they are about to leave on missions abroad without a check of antibody levels being performed. Indeed the need was pointed out from several quarters¹⁵ to verify the type and amount of vaccines administered, their relevant protocols and the extent to

which they are complied with, so as to avoid that, in individuals who are predisposed or who are immune-depressed, whatever the cause, imbalances be produced in their immune systems such as to cause the paradoxical effect of increasing their vulnerability to the pathogenic agents.

On the other hand, the mode of preparation of the vaccines and administration protocols, and more in general the hygiene and health prevention measures adopted by the Italian Armed Forces were all stated once again to be correct¹⁶. Even though there are no specific elements for assuming possible harmful effects, there are doubts that would have deserved being clarified, also in the light of the various scientific papers published in the literature on the adverse effects of vaccination and the effects of the application of Act no. 210 of 25 February 1992, but this could not be done for lack of time.

As regards the victims of the diseases among servicemen, since there are no precise data on those who operated inside the military firing ranges in Italy, it was not possible to make an exhaustive evaluation of the issue. Instead, new attention has concentrated on the civilian staff of non-governmental organizations (NGOs) which, in recent years, did volunteer work in theatres of war and for which anomalous cases of diseases have been reported, which should be matter for close examination. In this regard the Committee started a specific research project in January 2008 which, however, could not be completed given the imminent termination of the Committee's mandate.

It is extremely difficult to gather information in the area of international cooperation given the high degree of fragmentation and lack of uniformity, where there is no centralized management of the various initiatives and, consequently, there are no official records of those who participated, in whatever capacity. This is confirmed by the poor results obtained, in this field, by the already mentioned monitoring programme performed by the Ministry of Defence and by the Ministry of Health, under Decree Law no. 393 of 29 December 2000, converted, as amended, into Act no. 27 of 28 February 2001: the list of civilian staff that operated in the Balkans is indeed still being drafted, and the data gathered thus far are not sufficient to draw conclusions. On the other hand, during its brief research, the Committee received very few responses from the NGOs that were contacted, and this is why the issue is still open.

Another issue that still remains open, for the great difficulties in finding adequate data and for the huge financial resources required as well as specific skills and professional competences, is the degree of exposure of civilian populations, and not only of those living in areas adjacent to military bases in Italy, but also, and above all, of those living in the war zones abroad¹⁷.

And finally, it is worth recalling that, while quite a large amount of work was done, the Committee actually spent less than one-third of its budget (€100,000 for 2007), thanks to the cooperation provided at no cost by its consultants, who essentially only received a reimbursement for the expenses incurred in carrying out their assignments (travelling expenses, room and board, cost of analyses and specialized tests performed in private laboratories).

The complexity, breadth and even social importance of the issues dealt with, of which we have tried to provide a concise overview, would have required more time to complete the activities of the Committee in the various directions suggested. For this reason, a proposal was submitted to the Senate to extend the Committee's life by one year,

signed by the representatives of all the political forces (Doc. XXII, no. 3-*bis*) and assigned to the Defence Committee in a legislative capacity, the discussion of which was started at the afternoon sitting of 16 January 2008, but was interrupted because of the government crisis. A broad consensus on the proposal however emerged from the debate and general appreciation was expressed for the work done in the inquiry, confirmed also by the favourable opinions issued by other Committees sitting in an advisory capacity¹⁸.

4. CONCLUSIONS AND PROPOSALS

On the basis of current scientific evidence, the Committee acknowledged that it is impossible to establish a direct *causal relationship* between the diseases being investigated and the risk factors identified during the inquiry, with special reference to the effects deriving from depleted uranium and the dispersion of nanoparticles of heavy metals into the atmosphere. At the same time, given the objective existence of morbid phenomena, due also to other concomitant causes related wholly or partially to the strong degradation and pollution of the areas where Italian soldiers operated, it deemed that the occurrence of such diseases is of itself sufficient (*probability criterion*) to grant victims and their families the right to apply for and receive compensation, as envisaged by the existing law (including acknowledgement of compensation for death or disability resulting from disease contracted in the line of duty and recognition of special benefits) in all those cases where the Military Administration cannot totally rule out a cause-effect relationship. It expresses its concrete hope that efforts to simplify the administrative procedures providing access to such forms of welfare will continue, also through wider dissemination of information and by raising the awareness of the citizens and institutions involved.

In this sense, the Committee's first recommendation is to complete the collection and epidemiological analysis of health data relating to the military and civilian personnel involved in the inquiry, of the personnel working in the firing ranges and in the military bases in Italy and also of those deployed on international missions abroad.

The Committee also deems it appropriate to promptly start a general review of the protocols for preventive health check-ups, in particular for personnel to be sent abroad, by performing more targeted clinical tests and tests aimed at checking the immune conditions of such individuals, so as to timely spot conditions that may put the individual's health at risk or that require additional precautions.

It is also to be hoped that this verification be made through tests diversified by gender so as to take into account differences in radiosensitivity and in response to the vaccinations.

It would be useful to promptly start a programme to check the current vaccination protocols applied to the same individuals, with follow up tests in case of successive missions, so as to check and track the immunological conditions of the individual and therefore whether vaccination should be repeated in relation to the mode of preparation of the vaccines and above all of the schemes of administration, also in the light of the presence of heavy metals found both in the urine and sperm of some vaccinated servicemen.

It is necessary to gather a detailed personal health history of each serviceman, and provide such soldier with all the diagnoses, treatments and preventive measures adopted during service on a magnetic storage device.

The Committee recommends that an epidemiological survey be started, aimed at checking the increase, if any, in the rate of morbidity and congenital malformations in children born since 1990 from servicemen who went on missions to the areas of interest, as well as the infertility rates of such servicemen.

Furthermore a detailed evaluation should be carried out of the specific environmental conditions of the various operational scenarios, with a view to selecting the best forms of logistic arrangement and the most appropriate protection gear for the troops deployed; adequately equipped, specialized professionals should also be embedded with the troops so as to guarantee continuous and adequate monitoring of the nuclear, bacteriological, chemical and radiological risks and provide indications for developing appropriate equipment.

The Committee confirms the need for detailed control of the activities carried out, and materials used, in the firing ranges in Italy, both by the Armed Forces and by third, public and private, parties, with special attention to health and environmental checks, within the firing facilities and in the surrounding areas. It furthermore recommends to continue with the monitoring activity and the thorough examination of facts that have already been started by the civil and military authorities involved.

The Committee expresses the hope that in the future, without prejudice to absolute respect for individual freedom, procedures be adopted to take a census of the civilian staff working for NGOs which, in the framework of solidarity initiatives, intend to offer their services in war zones abroad, and possibly extend to them the health check protocols envisaged for military personnel and for personnel from other public administrations, and envisage adequate forms of assistance and protection, including insurance policies.

The Committee found that in many cases research institutes and the competent public bodies are not equipped to timely provide investigating parliamentary bodies with the necessary technical and scientific support; it follows that the aims and duration of such parliamentary bodies cannot be reconciled either with the time-frames of academic and scientific research, or the bureaucratic and administrative restraints of public bodies. In the future, it would be desirable that parliamentary investigation committees, acting within the scope and limits of their mandate which under the Constitution is made equal to that of the Judicial Authority, be empowered to have research and sample surveys carried out in short timeframes by public research bodies, so as to facilitate their task and avoid, amongst other things, recourse to the assistance and consultancy services of private experts who, besides being more expensive for the State budget, might not always be impartial.

And finally the Committee expressed the hope that, by way of caution, depleted uranium be banned from military use given its radioactive and genotoxic nature and the unquestionable environmental pollution it causes, as confirmed by the international literature. The Committee also pointed to the need to deepen research into the mechanisms of action of depleted uranium, especially in relation to possible synergies.

5. NOTES

¹ Published in the *Official Journal* no. 247 of 23 October 2006.

² The Report was presented at the morning sitting of 21 November 2006.

³ The Report was presented at the afternoon sitting of 6 February 2007.

⁴ Under Article 5(2), of the resolution establishing the Committee, the Committee was assisted in its activities by the following experts:

Dr. Armando Benedetti, expert in radioprotection, Joint Force Research Centre for Military Applications (CISAM);

Lieutenant-colonel Ezio Chinelli, director of the Anatomical Pathology and Hematology Department, "Ravanello" Test Laboratory in Veneto;

Dr. Antonietta M. Gatti, director of Biomaterials Laboratory, Neuroscience Department, University of Modena and Reggio Emilia;

Dr. Valerio Gennaro, Head Physician, Epidemiology and Prevention Department, National Cancer Research Institute of Genoa;

Dr. Domenico Leggiero, director, Defence Division, Permanent Observatory and Research Centre for Servicemen of the Armed Forces, Enforcement Agencies and the Civil Society (*up until 4 October 2007*);

Captain Paride Minervini, ballistics expert;

Professor Massimo Zuchetti, professor of protection from radiations, Turin Polytechnic.

⁵ PLENARY SITTINGS. Besides the 1st and 2nd plenary sittings on commencement procedures already mentioned in the text and the 13th and 14th sittings (6 and 12 February 2008), on the approval of the final report and resolution on the final publication of the proceedings, the following hearings were held:

3rd sitting (27 March 2007): hearing of consultants.

4th sitting (11 April 2007): hearing of representatives of the Higher Institute for Health and of consultants.

5th sitting (17 April 2007): hearing of representatives of the Higher Institute for Health.

6th sitting (2 May 2007): hearing of experts.

7th sitting (17 May 2007): hearing of Army Corps General, Fabrizio Castagnetti, Operational Head of the Joint Force Command, and of Admiral Head Inspector Vincenzo Martines, Director General of Military Health.

8th sitting (17 May 2007): hearing of experts and of consultants.

9th sitting (4 October 2007): hearing of consultants.

10th sitting (9 October 2007): hearing of the Minister of Defence, Mr Arturo Parisi.

11th sitting (6 December 2007): hearing of the Minister of Defence, Mr Arturo Parisi.

12th sitting (13 December 2007): debate on the report by the Minister of Defence and hearing of consultants .

SITE VISIT (20-21 September 2007). At the Lecce Prefecture, the Committee met a representation of soldiers affected by the diseases object of this inquiry and their families, and then it visited the nearby military firing range of Torre Veneri, where an exhaustive meeting was held with the Commander, his aides and high officers of the Armed Forces.

SITE VISITS BY CONSULTANTS. The first site visit (8-11 July 2007) at the military firing range of Salto di Quirra, in the Province of Cagliari, looked into the activities carried out at the firing range (in particular the munitions used), and the environmental and epidemiological conditions inside and outside the facility. Environmental samples and matrices were also taken. As to the epidemiology, a series of meetings were held with representatives of the regional and local health authorities and with representatives of the communities living in the areas neighbouring the firing range. The second site visit (8-16 September 2007), made to the other military firing range at Cape Teulada, still in the Province of Cagliari, focused specifically on checking the type of ammunitions used in the ballistic activities conducted at that site. The third site visit (8-15 October 2007) was made to the Italian troops stationed in Lebanon as part of the United Nations Mission. During this activity, the inquiry focused on the type of ammunitions used by the Italian soldiers, the adequacy of preventive treatment, prevention measures and monitoring activities adopted in relation to the specific environmental, hygiene and health conditions of the operational theatre.

⁶ See, on this, the final report of the Parliamentary Inquiry Committee of the XIV Parliament, Doc. XXII-*bis*, no. 4.

⁷ *Depleted uranium* is the inert byproduct (as with low specific activity) of the uranium enrichment treatment used as nuclear reactor fuel. Owing to its high density and pyrophoric power, the main civilian uses include counterweights in aircraft, radiation shields in medical radiation therapy, containers for the transport of radioactive materials. The military industry uses depleted uranium for the production of various alloys to be used as armour-platings or as armour-penetrating military ordnance (for instance armour-piercing shells to pierce tanks).

⁸ *Nanoparticles* are spherical particles smaller than one micron in size, which seem to be produced in the presence of very high temperatures – on the order of 3,000°C – generated among other things by the impact of depleted uranium shells on the surfaces they hit (armour-plates of tanks, ammunition deposits), following the instant vaporization and re-solidification of the materials present in the area surrounding the explosions. According to some hypotheses, the end result of these processes would be the formation of ultrathin dusts capable of depositing inside the cells of the human body if inhaled or ingested.

⁹ In particular, the representatives of the Higher Institute for Health (heard at the sittings of 11 and 17 April 2007) and of the General Military Health Directorate (at the sitting of 17 May 2007).

¹⁰ In particular, it is worth mentioning the monitoring programme “on the health conditions of military and civilian personnel deployed to former Yugoslavia territories” carried out jointly by the Ministry of Defence and the Ministry of Health under Act no. 27 of 28 February 2001 the results of which are contained in *ad hoc* reports sent every four months to Parliament. The latest report (Doc. CCVII, no 4), on the period 1 January - 30 April 2007 and forwarded on 23 November of the same year, explicitly acknowledges the methodological limits of the study and proposes alternative research paths.

¹¹ It is a fact, however, that in many cases, especially in past years, diseases affecting servicemen were not diagnosed early enough, in spite of the fact that some of the soldiers had undergone the health checks envisaged for soldiers to be deployed to international missions, in particular those coming under the so-called “Mandelli Protocol”. This prompted the need to review these clinical tests so as to check their effectiveness in order to detect the onset of certain diseases. According to the evidence collected from the physicians interviewed, special attention should be attached to the monitoring of the immune conditions of the individuals observed, especially before proceeding with the administration of vaccines, the action of which could worsen the individual’s immune conditions, since immune-depression, albeit not immediately evident, is often a signal of more severe pathologies that are in the process of developing. The current protocols could therefore be supplemented by fewer but more specific tests to control immune defence levels (for instance blood tests), because they are more effective and quicker.

¹² Already in the past Parliament, indeed, the Committees of Inquiry had focused their attention on this firing range, as they were seeking to ascertain the many reports on the occurrence, in the surrounding areas, of an anomalous incidence of cancer and congenital malformations amongst the civilian population (the so-called “Salto di Quirra Syndrome”). The checks carried out on the spot by the consultants of the Committee, with the contribution of the health authorities of the Region of Sardinia and the military command of the firing range, did not provide conclusive results (presented at the hearing of 13 December 2007). On the one hand, at least at that point in time, no trace was found of the presence or use of depleted uranium, and some calculations made by the consultants of the Committee deemed it unlikely that the diseases reported were caused by exposure to such material, since the amounts required to produce cancer are too large.

On the other hand, both inside the firing range and in the immediate surroundings, traces were found of other non-radioactive heavy metals (*e.g.* lead) which, in terms of amount and location, prompted suspicions of possible but not yet identified forms of pollution. This prompted the attention of experts to the health and environmental monitoring activity mentioned above. Moreover, even though the local health authorities denied that in the areas surrounding the firing range there is higher incidence of neoplasias and malformations with respect to other areas of Sardinia – which are often subject to heavy forms of pollution due to past mining and industrial activities – the consultants of the Committee pointed out that some of those diseases (for instance leukemia) are absolutely anomalous in a rural context where there are no production plants: an aspect that, once again, requires adequate investigation.

¹³ The site visit to Lebanon confirmed that environmental controls were being carried out by teams – specialising in checking out nuclear, biological, chemical and radiological risk (NBCR) – embedded in all Italian units operating abroad, thus proving the need for the constant presence of specialised staff and suitable equipment. Viceversa, critical aspects emerged from the logistic, hygiene and health standpoints, owing to the fact that, after several months, a part of the Italian troops deployed in Lebanon were still living in tents and served by an insufficient number of chemical toilets. Furthermore, according to some reports, the equipment of the soldiers (overalls, boots, masks and gloves), albeit of standard level, would not be suited to the special climate and operational conditions of the Lebanese mission.

Obviously, these are incidental and hopefully temporary situations, that nevertheless appear to be worrying, considering that the Italian unit (the most numerous amongst the forces operating in Lebanon as part of the United Nations international mission) may have to remain in that country for a long time, in an environmental context that is in any case difficult and derelict. The competent military authorities should therefore constantly monitor the logistic, hygiene and health conditions of the various theatres of operation and, consequently, carefully select the equipment to use, which should be as much as possible tailored to the specific context.

¹⁴ Sophisticated tests carried out using a scanning electron microscope have shown in many cases, both in the tissues of sick patients and in “suspicious” environmental contexts (for instance the Salto Quirra area), the presence of nanoparticles of heavy metals of foreign origin in the form of superfine dust which, if inhaled or ingested, could

produce harmful effects on human health, and could even induce cancer. Such evidence, albeit prompting suspicion, is not sufficient to reach unquestionable conclusions, since this field of scientific research is still being explored, but it does appear to be promising and therefore it deserves receiving appropriate attention.

¹⁵ For instance at the hearing of experts held on 26 July 2007.

¹⁶ By the Director General of Military Health, Admiral Vincenzo Martines, in the hearing of 17 May 2007.

¹⁷ Partial indications were however obtained from simulations carried out by the consultants of the Committee who, on the basis of available data on the use of depleted uranium in the Balkans in 1999 and in Iraq, both in 1991 and in 2003, evaluated the scenarios of exposure, namely the average amount of radioactivity to which the Balkan and Iraqi populations were exposed in the time frames considered. This work then produced the final estimate of the possible abnormal extra number of cancer cases in the same population.

The simulations described at the hearing of 13 December 2007 showed that the residues of depleted uranium – in the form of shells stuck in the ground or dust suspended in the air – were more persistent in Iraq than in the Balkans because of the larger amount of uranium used in Iraq (100 times more than in the Balkans), and because of the different climate and environmental conditions (in Iraq the arid and sandy soil facilitates the resuspension of dusts, whereas in the Balkans the humid soil and higher rainfall facilitate the leaching of the dust out of the soil). As a consequence of such phenomena, the effects in terms of greater incidence of cancer among the population would be dampened and negligible from the epidemiological point of view for the Balkans, while they would be more conspicuous in the case of Iraq, even though, in statistical terms, they would not be too much higher than the current average. Of course, also these conclusions (confirmed by international studies) are relative and should be appropriately checked through field surveys which would be somewhat problematic at the present time.

¹⁸ These are the opinions expressed on 16 January 2008 by the Senate Budget, Health and Justice Committees. The latter in particular stated it would be useful to extend the parliamentary inquiry “especially because, as also requested by Committee Members and Consultants, it is important to understand how depleted uranium was used in Italy and abroad starting from the early 1990s, and gather information about the results of the tests and studies carried out by the Higher Institute for Health following assignments the deadline of which was extended by several months and, finally, obtain data in order to accurately evaluate the cases of death or severe disease that affected the civilian population living in areas of conflict and in areas adjacent to military bases”.