PARLIAMENTARY COMMITTEE OF INQUIRY

INTO CASES OF DEATH AND SERIOUS ILLNESS AMONG ITALIAN MILITARY PERSONNEL ENGAGED IN INTERNATIONAL PEACE MISSIONS, AND INTO THE STORAGE CONDITIONS OF DEPLETED URANIUM AND ITS POSSIBLE USE IN MILITARY EXERCISES ON NATIONAL SOIL

Established by Senate Decision of 17 November 2004

REPORT TO THE PRESIDENT OF THE SENATE

PURSUANT TO ARTICLE 2 OF SENATE DECISION OF 17 NOVEMBER 2004

ON THE RESULTS OF THE INVESTIGATION CARRIED OUT BY THE COMMITTEE OF INQUIRY

Rapporteur: Senator Paolo FRANCO

Approved by the Committee in the sitting of 1 March 2006
Composition of the Parliamentary Committee of Inquiry into cases of death and serious illness among Italian military personnel engaged in international peace missions, and into the storage conditions of depleted uranium and its possible use in military exercises on national soil

(Senate Decision of 17 November 2004)

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REPORT TO THE PRESIDENT OF THE SENATE

PURSUANT TO ARTICLE 2* OF SENATE DECISION OF 17 NOVEMBER 2004 ON THE RESULTS OF THE INVESTIGATION CARRIED OUT BY THE COMMITTEE OF INQUIRY

APPROVED BY THE COMMITTEE IN THE SITTING
OF 1 MARCH 2006

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* Article 2 of the Senate Decision of 17 November 2004 was amended by Article 1 of the Senate Decision of 20 December 2005, that extended the term for the conclusion of the Committee work, previously fixed to one year, to the end of the 14th Parliament.

** See also Annex 2 to this Report

*** See also Annex 3 to this Report
micro/nano particles present in human serum samples of some soldiers and attempt to trace the same type of particles in particle samples collected in Kosovo and in Iraq)

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1. INTRODUCTION

1.1 Background

During the NATO Allied Force Operation lasting from 23 March to 10 June 1999 concerns arose within the political debate – as reflected especially in parliamentary questions and interpellations - and in the media that those military operations could in due time lead to a repetition of what was now known as the Gulf Syndrome\(^1\). In particular, there was increasing concern that the use of ammunition containing depleted uranium\(^2\) could potentially lead to a significant increase in health risks for those exposed to possible associated radiological and toxicological effects, i.e. the military personnel and civilian population residing in the areas affected.

In this context, after the dissemination of a NATO Shape (Supreme Headquarters Allied Powers Europe) report of 1 July 1999 describing the risks associated with exposure to DU and suggested precautions for military personnel at risk, new concerns emerged regarding the possibility that, at least in previous periods and particularly during operations carried out by troops deployed in Bosnia and Herzegovina (BiH), military commands had not correctly perceived the problem, and that adequate technical precautions now deemed necessary in the case of possible exposure to DU munitions had been neglected (a list of rules to be adopted under such circumstances, compiled by Colonel Osvaldo Bizzarri of KFOR, was released on 22 November 1999)\(^3\).

In the same period the general public was becoming aware of reports claiming that there had been a sharp increase in the incidence of serious pathologies, and in particular of hematopoietic neoplasia, among the troops that in previous months and years had taken part in military missions in the Balkans.

1.2 The fact-finding activities of the 13\(^{th}\) Parliament

In the final phase of the 13\(^{th}\) Parliament, after the Government had supplied the Parliament with data on these issues on several occasions, both the Chamber of Deputies and the Senate felt the need to initiate more comprehensive fact-finding and investigative activities aimed at clarifying at least some aspects of an issue that was taking on particularly alarming implications.

On 10 January 2001 the Chamber of Deputies Defence Committee unanimously decided to conduct a fact-finding investigation into risk prevention and safety conditions of the Italian soldiers deployed in the Balkans, to be completed by 15 February 2001.

This investigation was aimed at the detailed examination of:

a) the amount and means of information available to Italian Armed Forces Headquarters regarding the use of DU ammunition by some contingents deployed in NATO operations in the Balkans;

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\(^1\) In the period following military operations in Iraq in 1991 a marked increase was noted in the incidence of several serious illnesses, with a tendency to become chronic, among U.S. and British military personnel that had taken part in those operations. This became known as the “Gulf War Syndrome”. Among the clinical symptoms most frequently reported by veterans of the Gulf War were: depression, fatigue, mood swings, memory loss, muscular and joint pain, respiratory problems and general malaise. Whether such symptoms can effectively be attributed to the unified clinical picture that the label implies remains the subject of controversy. As for the origin of these disturbances, several factors have been suggested over the years, and attention seems concentrated on possible exposure to nerve gas, large-scale use of pesticides on camp tents, the use of multiple vaccines and the consumption by military personnel of NAPS (Nerve Agent Pre-treatment Set) tablets.

\(^2\) Hereinafter DU.

b) the areas in which those munitions were used, the degree of environmental contamination that might result and the precautionary measures adopted in order to protect both military and civilian personnel, as well as the personnel of volunteer organisations and the resident civilian population, from health damage, in the light also of World Health Organisation (WHO) recommendations;
c) the precautions taken and operational instructions provided by national and international military commands in order to prevent exposure to the detrimental effects of any residual radiation leaking from shell casings and other fragments of DU munitions;
d) human health risk factors deriving from any other causes, even in combination with the use of such munitions, in the generation of the pathologies noted in Italian soldiers who had been deployed in the Balkans;
e) deployment areas and safety measures adopted for each Italian soldier and officer deployed in the Balkans and subsequently deceased upon return in Italy as a result of pathologies with which they were not affected before taking part in the mission, or else who were at the time [of the inquiry] affected by such pathologies;
f) the information available to the Ministry of Defence, national military authorities and NATO regarding similar pathologies suffered by military personnel of other countries deployed to the same areas;
g) initiatives already undertaken or planned, also at international level, by the international organisations that had responsibility for the peace missions involving Italian participation in order to deal with the problems revealed by the investigation.

On that same day Defence Minister Mattarella’s reported to the Senate Assembly and, in that same sitting, the Chairman of the 4th Committee (Defence) of the Senate, Senator Di Benedetto, announced a proposal for a parallel fact-finding investigation that was agreed on by the Senate Defence Committee of on 16 January 2001. The investigation was to be focused on “How much Italy knew about NATO’s use of DU ammunition in the Balkans and the measures that had been taken by Italian Armed Forces to prevent possible associated health risks4”.

On 17 January 2001, the Senate Defence Committee jointly considered two proposals aimed at activating the more incisive instrument of a parliamentary inquiry pursuant to Article 82 of the Constitution. The first proposal (Doc. XXII, no. 72), initiated by Senator Semenzato and others, was distinguished by its choice of a unicameral inquiry (in this case, the committee was envisaged as consisting solely of senators); the second (Bill no. 4951, proposed by Senators Forcieri and Agostini)5 advocated a joint committee. After a debate stretching over several sittings, on 8 February 2001 the Senate Defence Committee, acting as a reporting body, approved the two proposals in a single consolidated text providing for the establishment of a parliamentary inquiry committee, pursuant to Article 82 of the Constitution, composed of fifteen senators thereby adopting the unicameral solution. The Committee was given the task (as Article 1 of the unified text approved reads) “of inquiring into how aware Italy was of NATO’s use of DU munitions in military operations in the Balkans, and into the measures taken by the Italian Armed Forces to prevent possible associated health risks and to acquire data on the use of weapons containing depleted uranium in the Balkans as well as on the use by the Italian Armed Forces of ammunition or other materials containing depleted uranium”. That proposal was not carried forward and, consequently, the parliamentary inquiry it envisaged was not activated.

4 Title of the inquiry.
5 Titles of the two proposals cited: (Doc. XXII, no. 72) SEMENZATO et al. — Institution of a Parliamentary Inquiry Committee into death and illnesses among Italian military personnel associated with the radioactive and toxic effects of depleted uranium; (4951) FORCIERI and AGOSTINI. — Institution of a Parliamentary Inquiry Committee into the cases of death and serious illness of Italian military personnel engaged in international peace missions in the former Yugoslavia.
In the meantime the prospect of activating a parliamentary inquiry, pursuant to Article 82 of the Constitution, had led the Senate Defence Committee to abandon both the unicameral fact-finding investigation as previously decided and the joint fact-finding investigation with the Chamber Defence Committee\(^6\). An invitation to consider proceeding with this Committee had been formulated in a letter of 26 January 2001 by the President of the Senate. However, as the other House had already started holding the hearings planned in its investigation agenda, it was considered preferable to avoid any organisational arrangements that could delay proceedings.

Meanwhile, the fact-finding investigation resolved by the Chamber Defence Committee went ahead with its planned hearings of the Chief of Defence General Staff Mario Arpino, Army Chief of Staff Francesco Cervoni, Navy Chief of Staff Umberto Guarnieri, Air Force Chief of Staff Andrea Fornasiero, Commander General of the Carabinieri Sergio Siracusa, several Italian officers who had served in the Balkans, delegations from COCER (central council for representation of the military), the Director General of Military Healthcare, the Director and other representatives of the Istituto Superiore di Sanità (Italian national health institute), representatives of CISAM (joint centre for the study of military applications), Defence Minister Sergio Mattarella and Undersecretary of State for Foreign Affairs Ugo Intini.

A delegation from the Chamber Defence Committee also visited NATO Headquarters in Brussels (1 February 2001), where it met with the Secretary General Lord Robertson, the Chairman of the Military Committee Adm. Venturoni and Supreme Allied Commander Europe (SACEUR) Gen. Ralston.

At the conclusion of the hearings cycle, during the Chamber Defence Committee sitting of 15 February 2001, on the one hand Committee Chairman Valdo Spini expressed appreciation for the information that it had been possible to collect, but on the other he noted that many aspects remained unclear as regarded “the risks associated with the use of depleted uranium in Balkans operations”, all the more so as the results of the work of the technical–scientific committee set up by the Ministry of Defence by Ministerial Decree of 22 December 2000 would soon be made available. This committee’s task was to “ascertain all the medical–scientific implications of recent cases of tumour pathologies in military personnel, in particular in soldiers that had been deployed to the Balkans, verifying whether a correlation existed with the DU munitions used in that area or whether these pathologies could be associated with other causes\(^7\)”.

In the same meeting Chairman Spini announced the presentation of the draft conclusions of the investigation, which however did not take place within the time remaining before the conclusion of the 13\(^{th}\) Parliament.

\textit{1.3 The Mandelli Committee}

The technical–scientific committee to which Chairman Spini had made reference to in the final sitting of the Chamber Defence Committee’s investigation was known as the “Mandelli Committee”, after the illustrious haematologist invited to chair it. The other members were Prof. Carissimo Biagini, Prof. Martino Grandolfo, Dr. Alfonso Mele, Dr. Giuseppe Onufrio, Dr. Vittorio Sabbatini and Medical Inspector General Antonio Tricarico. After having introduced preliminary and intermediate reports on 19 March 2001 and 28 May 2001 respectively, the Committee completed its work and its Final Report was approved on 11 June 2002.

First of all, as of 31 December 2001, a total of 44 cases of malignant tumours had been detected among the 43,058 military and civilian personnel employed by the Defence Ministry who,

\(^6\) The decision to set aside both the autonomous investigation as well as the one to be carried out together with the Chamber Defence Committee was announced by the Chairman of the Senate Defence Committee in the sitting of 31 January 2001.

\(^7\) Article 1 of Ministry of the Defence Decree of 22 December 2000.
in the period from December 1995 up to the final date of observation\(^8\), had been at least on one mission in BiH or Kosovo; the data were broken down into the following tumour pathologies:

- Hodgkin’s lymphoma (HL) (12 cases);
- non-Hodgkin lymphoma (NHL) (8 cases);
- acute lymphatic leukaemia (ALL) (2 cases);
- solid tumours (22 cases).

An incidence rate was then calculated for each tumour class in the population surveyed. As stated in the Final Report, this calculation was made “considering the numerator as the number of cases for each of the pathologies revealed, and the denominator as the total monitoring time of each subject, equal therefore to the total number of years/person (from the date of the first mission to the date either of final observation or of diagnosis of the case)”.  

These incidence rates among the surveyed population were then compared with those of the male population entered in the Italian tumour registries, assuming that these reflect the incidence of tumours among the general population\(^9\). The comparison was done by calculating the ratio of cases of tumours observed in the soldiers who had been in BiH and Kosovo in the aforesaid period to those that would have been expected in the same population on the basis of the data contained in the tumour registries. This ratio, known as the SIR (Standardized Incidence Ratio), measures the risk differential in developing a malignant tumour between those belonging to the surveyed population and the general population of the areas covered by the tumour registries considered. A SIR with a value of 1 corresponds to an absence of risk differential, while a value is higher than 1 shows a higher risk since the number of cases observed is greater than the number expected (and vice versa in the case of a SIR lower than 1).

The most significant data emerging from the Tables\(^10\), according to the assessments expressed in the Final Report, were the following:

“a statistically significant excess of HLs, and a number significantly lower than expected for the total solid tumours and overall malignant tumours.

The excess of ALLs, on the other hand, is not statistically significant and can be the result of chance”.

The Final Report is supported by a series of data and assessments aimed at identifying the eventual presence of conditions under which the risk of developing a tumour is greater as compared with the rest of the population. In particular ENEA (Italian National Agency for New Technologies, Energy and the Environment) had searched for the possible presence of DU contamination in the urine samples of soldiers that had been deployed in risk areas, and in the samples of a control group

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\(^8\) The date was the day in which updated data became available for each armed force, i.e.: 6 November 2001 for the Army, 31 August 2001 for the Air Force, 8 August 2001 for the Navy and 31 July 2001 for the Carabinieri Corps.

\(^9\) In this regard, the Final Report noted that the 12 registries used were those for which updated data were available for the period from 1993 through 1997.

\(^10\) Table 7 below is annexed to the Mandelli Final Report.

\(\text{Table 7. Comparison between cases observed in military deployed in BiH and/or Kosovo and expected cases (SIR) on the basis of the incidence recorded in Italian tumour registries, without taking into account latency periods.}\)

<table>
<thead>
<tr>
<th>Pathology</th>
<th>Cases observed</th>
<th>Cases expected</th>
<th>p*</th>
<th>SIR</th>
<th>I.C. 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL</td>
<td>12</td>
<td>5.08</td>
<td>0.006</td>
<td>2.36</td>
<td>1.22-4.13</td>
</tr>
<tr>
<td>NHL</td>
<td>8</td>
<td>8.53</td>
<td>0.519</td>
<td>0.94</td>
<td>0.40-1.85</td>
</tr>
<tr>
<td>ALL</td>
<td>2</td>
<td>1.12</td>
<td>0.308</td>
<td>1.78</td>
<td>0.21-6.44</td>
</tr>
<tr>
<td>Other haematological tumours</td>
<td>0</td>
<td>2.93</td>
<td>0.053</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Solid tumours</td>
<td>22</td>
<td>74.28</td>
<td>&lt;0.001</td>
<td>0.30</td>
<td>0.19-0.45</td>
</tr>
<tr>
<td>All tumours</td>
<td>44</td>
<td>91.94</td>
<td>&lt;0.001</td>
<td>0.48</td>
<td>0.35-0.64</td>
</tr>
</tbody>
</table>

*Poisson Test: the value of ‘p’ becomes statistically significant at <0.05”
of persons who had never been in areas at risk or been exposed for professional reasons to uranium. In its conclusions the ENEA report, dated 30 September 2001 and entitled “Report on analyses of samples for possible internal contamination by depleted uranium of Italian military contingents deployed in the Balkans”—Annex 1A of the Mandelli Committee’s Final Report—noted the following:

“There was no statistically significant difference in concentrations of uranium in the urine either among the groups into which it was possible to subdivide the military personnel (by duty: operational/non-operational tasks; by destination: Bosnia/Kosovo; length of stay in operational theatre; age) or in comparison with the control group.

In brief, as regards uranium content in urine (…) the data do not reveal any statistically significant difference between persons surely not exposed and military personnel that has completed missions in the Balkans (Bosnia and Kosovo) affected by the recent military operations”.

On the basis of these and other assessments, the Mandelli Committee’s Final Report formulated the following conclusions:

«1) The overall number of malignant tumours (haematological and otherwise) observed is lower than expected (...).
2) There is a statistically significant excess of Hodgkin’s lymphoma (...).
3) The results of the survey among Italian military personnel deployed in Bosnia and Kosovo have not revealed the presence of depleted uranium contamination. These results concur with those of the other national and international studies carried out to date both on soldiers as well as on the environment.
4) Based on the data collected and the information currently available it is impossible to identify the causes of the excess in Hodgkin’s lymphoma revealed in the epidemiological analysis carried out.»

The Report concluded with a series of recommendations that are listed below in their entirety, since these have subsequently been taken as the point of departure for relevant initiatives - including, in particular, the monitoring of the health of the military personnel sent on Balkans missions – that have been reviewed and assessed by this Inquiry Committee in the course of its proceedings.

The recommendations of the Mandelli Committee’ Final Report read as follows:

«The Committee recommends:

a) monitoring the cohort of military personnel deployed in Bosnia and/or Kosovo for incidence of solid or haematological tumours and tracking the evolution of the epidemiological picture that has thus far emerged;
b) identifying the persons, military or otherwise, who, for various reasons, may have been exposed to DU and enrolling them in a long-term health monitoring programme;
c) fostering campaigns, within the appropriate international institutions, for the monitoring of regions where DU munitions have been used, with the goal of detecting associated long-term effects on the civilian population and the environment (possible future presence of this contaminant in water and in the food-chain);
d) promoting studies at national and international level on the effects of exposure to DU, as occurred in the Balkans and elsewhere;
e) proposing to the appropriate international organisations — e.g. UNEP—, the extension of studies on possible spreading of DU in the environment to include Bosnia and, in particular, the area of Sarajevo;

f) carrying out detailed studies on the possible other causes of the increased incidence of lymphomas since, on the basis of the most current data available, no correlation has been drawn between Hodgkin’s and non-Hodgkin’s lymphomas and internal exposure to ionizing radiation.

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The Mandelli Committee’s Final Report revealed the existence of an increased incidence of some tumours of the hematopoietic apparatus.

It was, however, immediately clear that the Report was not sufficient to establish a framework of reasonable certainty regarding the issues submitted to the attention of the Mandelli Committee. It is necessary to keep in mind its provisional nature pending the results of new and more comprehensive data, particularly epidemiological ones, as per the above recommendations11.

Furthermore, some people found that there were significant incongruities in the work of the Mandelli Committee that would at least partially invalidate its conclusions.

It must also be pointed out that, as was predictable, after the presentation of the Report, additional deaths and serious illness have been reported among the military and civilian personnel engaged in the Balkans and, unfortunately, continue to date.

2. THE COMMITTEE OF INQUIRY

2.1 Establishing the Committee of Inquiry

Against this backdrop, towards the end of the current 14th term the Parliament once again began to consider the establishment of an ad hoc Parliamentary Committee of Inquiry; as noted above, this step had been already advocated in the final phase of the previous Parliament, but the time remaining had been insufficient for its implementation. Thus on 28 July 2004 the Senate Defence Committee, in its reporting capacity, began to consider the proposal for an inquiry introduced by Senator Forcieri and other senators entitled “Establishing a Parliamentary Committee of Inquiry into cases of death and serious illness among Italian military personnel engaged in...
international peace missions, into the storage conditions of depleted uranium and its possible use in military exercises on national soil’’ (Doc. XXII, No 27). Given the limited time available, and in agreement with the other House, a unicameral act was deliberated, as opposed to a bill, thereby accelerating the approval procedure. The result was a unicameral committee made up solely of senators.

The proposal was further considered and approved with a very broad consensus by the Senate Defence Committee in the sitting of 15 September 2004, and finally, on 17 November 2004, it was passed by the Senate in a single sitting.

2.2 The Seating of the Committee

Pursuant to Article 3 of the Decision establishing it, the Committee is composed of 21 senators appointed by the President of the Senate in proportion to the number of members in the various parliamentary groups.

On 9 February 2005 the President of the Senate appointed the following senators to the committee:

- Archiutti, Bedin, Bonatesta, Coviello, De Zulueta, Debenedetti, Demasi, Forcieri, Franco Paolo, Frau, Guasti, Malabarba, Mecarelli, Pellicini, Ripamonti, Ronodo, Salini, Tredese, Tunis, Zorzoli.

The following day the President of the Senate appointed Senator Salini as Committee Chairman.

On 15 February 2005 the Committee was convened in order to elect its Bureau: together with Chairman Salini, Senators Bonatesta and Forcieri were elected as Vice-Chairmen, and Senators Malabarba and Zorzoli as Secretaries.

Senator Salini left his position on 15 March 2005 to become a member of the second Berlusconi Government and, on 21 March 2005, the President of the Senate appointed Senator Paolo Franco as Committee Chairman.

The Committee was finally ready to begin its activity and did so in the sitting of 6 April 2005 in which it considered its draft Rules of Procedure to be approved in the following sitting of 13 April 2005.

Then the enlarged Bureau, including the Representatives of the parliamentary groups, adopted the Rules on Documents Confidentiality (meeting of 20 April 2005) and the Committee’s Programme of Business (meeting of 27 April 2005).

These obligations having been satisfied, on the basis of the guidelines and recommendations formulated in the aforementioned Programme, the Committee began its inquiry.

2.3 The subject of the inquiry

Under the Decision establishing it, the Committee was charged with inquiring into:

12 The proposal by Senator Forcieri, signed by Senators Boco, Chiusoli, Crema, Giovanelli, Iovene, Longhi, Pedrini, Piatti, Ripamonti, Vicini and Di Siena, had been notified to the President of the Senate on 20 July 2004.
13 A bill (A.S. 1196) had already been introduced in the Senate on 28 February 2002 by Senator Forcieri et al. entitled “Establishing a Parliamentary Committee of Inquiry into cases of death and serious illness among Italian military personnel engaged in international peace missions in the former Yugoslavia, into the storage conditions of depleted uranium and its possible use in military exercises on national soil”. The Bill called for a Committee composed of 15 senators and 15 deputies; in the sitting of 1 April 2004 the Parliamentary Group of Left Democrats/Olive Tree formally endorsed the Bill and the Senate Defence Committee began consideration in the sitting of 12 May 2004.
14 The Decision to establish the Committee, approved by the Senate Assembly on 17 November 2004, was published in Gazzetta Ufficiale (Official Journal) No 276 of 24 November 2004.
15 Announced in the morning sitting of the Senate Assembly on 10 February 2005.
16 Announced in the afternoon sitting of the Senate Assembly on 15 February 2005.
17 Announced in the afternoon sitting of the Senate Assembly on 21 March 2005.
cases of death or serious illness among the Italian personnel engaged in international peace missions and their causes;

storage conditions of DU and its possible use in military exercises on national soil.

** * * *

In this regard, a brief note on DU is deemed useful.

This substance derives from natural uranium, a radioactive element found in abundance in rocks and soil.

Natural uranium contains three different uranium isotopes: U-235, U-234 and U-238. An isotope is an atom of a simple chemical element with the same atomic number, same position on the periodic table and almost identical chemical behaviour, but whose atomic mass and physical properties are different.

Uranium is used for many civilian and military purposes, but an enrichment process is needed in order to reach a sufficiently high level for it to be used. For example, in the production of nuclear energy the percentage of U-235 (the most fissionable isotope) in the fuel required by reactors needs to be raised above its natural level of approximately 0.72 per cent to approximately 3 per cent.

The enrichment process almost completely extracts the U-234 isotope and two-thirds of the U-235 isotope. The residue of this process, called depleted uranium, is mainly composed of the less radioactive isotope U-23818.

Consequently, DU has a residual activity of 60 per cent as compared with that of natural uranium and enriched uranium and is thus classified by the International Atomic Energy Agency (IAEA) as a Low Specific Activity material.

In addition to its civilian uses (e.g. counterweights in the aeronautic industry, radiation protection devices for medical radiation therapy, containers for transporting radioactive material), DU is also used for military purposes in the formulation of the various alloys used in kinetic projectiles or armoured plating.

In particular, DU alloys are used as inert components in projectiles because of their capacity to penetrate armoured plating of tanks. This capacity derives both from their high density (approximately 19 g/cm3) — nearly equal to that of tungsten and over 1.5 that of lead — and from their pyrophoric power on impact with the surface hit, leading to the fusion and vapourisation of the materials the targets are composed of.

In the Balkans theatre DU penetrators with an approximate length of 100 millimetres and mass of 330 grams were used as the inert components of the 30 mm ammunition fired by A-10 aircraft in 1994-95 in BiH and in 1999 in Kosovo.

DU munitions were used at 12 sites in BiH, for a total of approximately 10,000 rounds fired, corresponding to approximately 3,000 kilograms of DU, and at 85 sites in Kosovo, for a total of approximately 31,000 rounds fired, corresponding to a total of approximately 10,200 kilograms19.

** * * *

Pursuant to Article 2 of the Decision establishing it, the Committee was to submit a final report to the President of the Senate on the results of its inquiry within one year of its establishment, and to make proposals for changes, if any, to applicable legislation and international treaties.

However, following the Decision of the Senate of 20 December 2005, this deadline was extended to the end of the 14th Parliament20.

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18 The specific activity of U-238 is about ten times lower than that of U-235.
19 For a rough estimate of how many DU rounds were fired during the first and second Gulf Wars, see in Annex 1 the summary of the hearing of Dr. Pekka Haavisto, Chairman of UNEP (United Nations Environment Programme) Post-Conflict Assessment Unit, held at the sitting of 27 July 2005.
2.4 Working criteria

In drafting the aforementioned Programme of Business of 27 April 2005 and in order to fulfil the Committee’s mandate, it was felt necessary to establish directives that were to be compatible with the limited time remaining for the inquiry before the conclusion of the 14th Parliament.

In due consideration of this, the following criteria were to be applied:

- in keeping with its remit, the Committee decided to work on the assumption that there was an abnormal incidence of death and serious illness among Italian personnel engaged in international peace missions, and to base its analysis on the most significant data inferred from the Mandelli Committee Reports since independent and duly systematic measurements and data processing was viewed as unrealistic;
- more generally, the indications provided by the bodies that had dealt with health problems affecting veterans of international missions would be taken as the inquiry’s point of departure, even though they were to be carefully evaluated;
- investigations regarding international missions would be limited to the veterans of the Balkans, given that this was the region associated with the majority of cases of death and serious illness reported among personnel engaged in missions abroad;
- investigations regarding firing range installations would be limited to Sardinia;
- given the impossibility of reaching conclusive results on many of the inquiry’s questions within the very limited time available—the Committee would aim at objectives that it was thought could realistically be achieved by the end of the mandate, so as to:
  - offer the government and parliament its analysis and proposals for possible future action to change existing legislation;
  - offer the parliament a useful contribution toward any successive parliamentary inquiry, pointing out those areas in which reasonable certainty would be reached and those for which further study was deemed necessary.

2.5 Activities completed

The Committee, whose activities were based on the above criteria, met in 19 sittings and carried out two missions, which were intended:

- to ascertain any issues associated with conditions of DU storage and its possible use on firing ranges (mission to Sardinia);
- to verify the safety conditions in which Italian military troops had worked or were working in BiH and in Kosovo (mission to the Balkans).

2.5.1 Hearings in plenary sitting\(^{21}\):

A total of 36 persons were heard in the hearings held by the Committee in 19 plenary settings:

4\(^{th}\) SITTING\(^{22}\): 4 May 2005, Hearing of the Director General for Preventive Health of the Ministry of Health Donato Greco.

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\(^{20}\) The extension called for by Senate Doc. XXII, No 27-bis, proposed by Senator Paolo Franco and others, was debated and approved by the Senate Defence Committee in the sitting of 20 December 2005 and published in Gazzetta Ufficiale no. 299 of 24 December 2005.

\(^{21}\) A document entitled “Summary of the hearings by the Committee in Plenary Sitting”, annexed to this Report, has been drafted as an aid to a reading of the verbatim reports of each of the plenary sitting hearings, as already published.

6th SITTING: 18 May 2005, Hearing of the Director of Biomaterials Laboratory, Department of Neurosciences, University of Modena and Reggio Emilia, Antonietta Gatti, and the Director of the Department of Medical Oncology, National Tumours Institute in Aviano, Umberto Tirelli.


8th SITTING: 1 June 2005, Hearing of Armando Benedetti, expert in radiation protection of CISAM (joint centre for the study of military applications)

9th SITTING: 15 June 2005, Hearing of Falco Accame, former MP and President of ANAVAFAF (Italian national association for assistance to military victims and the families of deceased soldiers).

10th SITTING: 23 June 2005, Hearing of the President of the Permanent Observatory and Study Centre for Armed Forces, Police and Civil Society Personnel Cosimo Tartaglia.

11th SITTING: 29 June 2005, Hearing of Massimo Zucchetti, Professor in Environmental Protection and Impact of Energy Systems, II Faculty of Engineering, Turin Polytechnic University.

12th SITTING: 13 July 2005, Hearing of the Chairman of the Scientific Committee of the SIGNUM Project (study on the genotoxic impact on military troops) Sergio Amadori.

13th SITTING: 27 July 2005, Hearing of the Head of UNEP (United Nations Environment Programme) Post-Conflict Assessment Unit Pekka Haavisto,

14th SITTING: 22 September 2005, Hearing of Tuscany Regional Coordinator of the Italian League for the Fight against Tumours Franco Nobile.

15th SITTING: 29 September 2005, Hearing of experts from the Istituto superiore di sanità (Italian national health institute): Alessandra Carè, Director of Research, Department of Haematology, Oncology and Molecular Medicine; Pietro Comba, Director of Research, Department of Environment and Associated Primary Prevention; Arduino Verdecchia, Director of Research, National Centre for Epidemiology and Health Control and Promotion; Cristina Nuccetelli, Senior Researcher, Department of Technologies and Health.

16th SITTING: 12 October 2005, Hearing of the Director General of APAT (agency for environmental protection and technical services) Giorgio Cesari.

17th SITTING: 20 October 2005, Hearing of Martino Grandolfo, Director of Research, Department of Technologies and Health of the Istituto superiore di sanità.

18th SITTING: 27 October 2005, Second hearing of the Director of Biomaterials Laboratory, Department of Neurosciences, University of Modena and Reggio Emilia, Antonietta Gatti.

22 The first three Committee sittings, held respectively on 15 February, 6 April, and 13 April 2005, were devoted to preliminary requirements (election of the Vice-Chairmen and the Secretary Senators; discussion and approval of the Committee Rules).
Hearing of military personnel formerly engaged in international peace missions in the Balkans and their families.

19th SITTING: 10 November 2005, Hearing of the Public Prosecutor of Cagliari Military Tribunal Mauro Rosella.

20th SITTING: 17 November 2005, Hearing of Massimo Esposito, expert in Radiation Protection, and Giuseppe Forasassi, Professor of the Department of Mechanical, Nuclear, and Production Engineering, University of Pisa.

21st SITTING: 24 November 2005, Postponement of the second hearing of Martino Grandolfo, Director of Research, Department of Technologies and Health of the Istituto superiore di sanità..

22nd SITTING: 1 December 2005, Hearing of Paolo Vanoli, journalist; Massimo Montinari, Director of the Healthcare Office of the 9th Mobile Division of State Police of Taranto, and Santa Passaniti, mother of deceased soldier Francesco Finessi.

23rd and 24th SITTINGS: 22 December 200523 and 2 February 2006, Hearing of Raffaele Guariniello, Assistant Prosecutor of Turin Tribunal.

2.5.2 The missions 24

**Sardinia.** The mission (17-18 October 2005) included visits to the firing ranges of Cape Teulada and Salto di Quirra; broad discussions were held with the commanders of both facilities, their collaborators and other high-ranking officers of the armed forces.

Hearings were conducted in Cagliari with representatives of the regional government and local authorities—including the President of Sardinia Region Renato Soru, President of the Regional Assembly Giacomo Spissu, Vice President of Cagliari Provincial Government Cesare Moriconi, the Mayors of Villaputzu, Teulada and Perdasdefogu, Gianfranco Piu, Giovanni Albai and Walter Mura respectively — and the heads of several regional healthcare facilities.

The mission concluded with a meeting with representatives of the civil society and the families of several deceased soldiers.

**Balkans.** The mission (28-29 November 2005) included visits to:

- Sarajevo - **Tito Barracks** military compound where most of the Italian troops assigned to the EUFOR-ALTHEA mission were stationed;
- Dakova, Kosovo - the Italian airport AMIKO—acronym for Aeronautica militare italiana (Italian Air Force) in Kosovo.
  A site inspection was carried out in the surroundings of Dakova on the so-called «site 28», an area indicated as having been targeted by DU ammunition.
  Briefings, followed by a questions and answer period, were given both at the Tito Barracks in Sarajevo and at the AMIKO airport in Dakova by the commanders of the Italian troops assigned to the EUFOR-ALTHEA and KFOR missions, and their collaborators and other high-ranking officers of the armed forces.

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23 The hearing, that should have taken place during the sitting of 22 December 2005, was postponed due to coinciding Senate Assembly proceedings and then held on 2 February.
24 Verbatim reports of all the hearings carried out during the visits described have been published.
Moreover, a meeting was held in Sarajevo, in the premises of the BiH Parliament, with the
Parliamentary Inquiry Committee on the Degree of Radiation from Depleted Uranium and the
In the BiH Parliament the Committee heard also the Head of the Institute of Clinical
Pathology and Cytology of the Clinical Centre of the University of Sarajevo and the Heads of the
Departments of Oncology and Haematology of the same facility.
Finally, several Italian physicians working within the framework of international
cooperation efforts were heard at Dakova base in Kosovo.

2.5.3 Informal meetings
In addition to plenary sitting hearings and visits, some informal meetings took place. The
enlarged Committee Bureau, including the leaders of parliamentary party groups, convened twice
together with the Committee consultants to form working groups. One more meeting was devoted
to closer consideration of the hypothesis of problems deriving from vaccination schedules, as
already emerged in the hearing of 1 December 2005.

3. STUDIES REQUESTED BY THE COMMITTEE

3.1 Background
In order both to combine available scientific as well as empirical data and to assess the
feasibility of future work on the environmental consequences of DU munitions use, the Committee
assigned scientific–technical studies to two highly qualified research centres. The results of the
research are briefly outlined below, while a summary of the first study and the final report of the
second are attached to this Report respectively as Annexes 2 and 3).

3.2 Study on dust particle samples collected in Kosovo and Iraq and on human
serum samples taken from several soldiers
This study involved the following tasks by the contracting research centre:
I. to analyse a component from two vehicles used in Kosovo in order to verify whether
conditions of environmental contamination existed under which Italian soldiers might have worked;
II. to detect contamination and formation of ultra-fine particles after explosion in a “blast-
hole” (samples collected in Iraq);
III. to verify the presence of particles in human serum.

In this study an environmental scanning electron microscope with a customised x-ray micro-
analyzer was used to examine the air and motor oil filters of sample vehicles taken from those used
by the Italian contingent in Kosovo. The analysis was based on the assumption that ultra-fine
particles, if present in abundance in the environment, would have been incorporated into the
materials under examination, given the high mileage recorded by those vehicles.
The conclusions of the research centre’s report indicated that nano-particles were not
detected in the air and motor oil filters of the vehicles used by Italian troops in the Balkans that had
been examined.

25 The transcript of the taped recording of the meeting, held on 19 January 2006, is available.
26 NANODIAGNOSTICS srl, located in Via E. Fermi, 1/L, 41057 San Vito di Spilamberto (Modena).
Nevertheless, the coordinator of the study Dr. Antonietta Gatti, Director of the Biomaterials Laboratory of the Department of Neurosciences of the University of Modena and Reggio Emilia, when meeting informally to discuss the results with the enlarged Committee Bureau reported that the failure to detect nanoparticles in the air and motor oil filters of the vehicles used as samples could be due to the still inaccurate technique used for the measurements.

II

In this study some “newly created” dust particles were collected in proximity to a so-called “blast-hole” in Iraq, in a place known as An Nasiriyah (Tallil), in which 200 kilograms of high-power bombs were detonated. Particles were collected at distances of 100, 200 and 300 metres from the explosion site.

The sample collected at 100 metres showed a large presence of particles with a diameter of from 150 to 0.1 microns, whose chemical composition was highly variable and unusual. In addition to strontium, carbon, sulphur, iron, silicon, lead and silicon-zirconium compounds, gold, silver and mercury compounds were detected also in nanometric scale and as aggregate particles.

Analysis of the sample collected at 200 metres from the detonation site (“blast-hole”) showed the presence of iron, lead, silicon and zirconium compounds chemical compounds similar to those taken at 100 metres. In addition, smaller copper, cadmium and nickel-based particles ranging from 80 to 0.1 microns were identified, as well as micro and nanometric spherulites.

Finally, analysis of the sample collected at 300 metres from the detonation site revealed the presence of fewer and smaller particles of 50 to 1 micron. No nanometric particles were detected, while debris was present.

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It can be concluded that explosions of high power bombs such as those containing depleted uranium or tungsten, or of a large amount of explosive ordnance, engender more or less high temperatures that can result in the creation of dust particles even of nanometric dimensions with a “new” chemical composition depending on the materials present at the detonation site.

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The presence of high concentrations of nanoparticles in the areas close to the “blast-hole”, as measured with the procedures described above, must obviously be further verified by the appropriate technical–scientific bodies.

It appears, however, immediately necessary to stress the need for military commands to ensure that the personnel involved in the activities indicated always be supplied with suitable protection gears (coveralls, masks, gloves and goggles).

III

The results of the human serum analysis are difficult to read due to the way in which the control groups and sample groups were formed for testing by means of environmental scanning electron microscope. This despite the fact that the research centre assigned to do the study has confirmed the effectiveness of the technique used and stressed once again the possibility that, however they are formed and whatever their nature is, submicronic dust particles enter the blood stream and there they interact with the biological environment and may then manifest chemical and physical toxicity.

27 Meeting held on 15 February 2006.
It is, in any case, recommended that the relevant section of the summary of the report by Nanodiagnostics, published in Annex 2 to the present Report, be consulted. [See also the full text of the report “Valutazione di campioni tramite indagine nanodagnostica di microscopia elettronica a scansione e microanalisi a raggi X”]

3.3 Study of the ecological and health consequences of the use of DU weapons

A second study, assigned by the Committee to another research centre and entitled “Ecological and health consequences of the use of DU weapons”, was aimed at describing the dimensional and morphological distribution of particles formed as a result of the use of DU ammunition, and at analysing the possible interactions of such particles with the environment and human health.

The study, as explained by its Coordinator Massimo Esposito in the presentation he made on 15 February 2006 at the aforementioned informal meeting with the enlarged Committee Bureau, was based on his assumption that ballistics experiments thus far conducted in this field had been designed in such a way so as to respond mainly to the need not to affect the success of military operations.

In his opinion, this approach had considerable limitations in terms of the conclusions presented at the end of those experiments, and disallowed the collection of exhaustive data applicable to other situations.

In particular, existing metabolic models and current knowledge of how particles generated by DU munitions interact with organisms did not permit definitive conclusions to be drawn with regard to the health risks associated with their introduction into the human body. Consequently, the hypotheses adopted by the models, the experimental data regarding the description of particles, and the results of in vivo and in vitro experimentation, were all in need of major improvement, otherwise, as Dr Esposito stressed in his briefing, no conclusion could be possibly reached on whether a causal connection existed between the outbreak of illness and exposure to DU particles.

He then observed that the majority of previous studies referred to industrial processing and mining of uranium, which generate particles that are very different in form and chemistry from those generated by the impact of DU penetrators.

As regards the description of the particles generated by impact of DU weapons, previous studies had focused on impacts of high-calibre ammunition on metal targets; moreover, the number of samples analysed was sufficient only for particles larger than 1 micron.

In vitro solubility tests on dust particles generated by the use of DU weapons were very scarce — as Mr Esposito also pointed out — and they mostly related to particles with a diameter of more than 1 micron, while studies on uranium clinical and radiological toxicity were almost all been done on animals using the uranyl ion UO$_2^{2+}$ in solution, which was very different from the DU produced by DU weapons use.

There were very few experimental results that permitted to pass from in vitro onto in vivo experimentation, and there were no data on the distribution in the open field of particles generated by DU impact; in fact, what happened to them in the environment was not known.

Against this background, Mr Esposito presented a feasibility study into the possibility of conducting research with the following objectives:

1) to describe particles of up to 0.01 microns in size formed as a result of the ballistic impact of small and large calibre ammunition on civilian and military targets;
2) to describe the open field distribution of the particle cloud;

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29 The final report of this study is included, as previously mentioned, as Annex 3 to the present Report.
3) to verify the hypotheses of the International Commission on Radiological Protection (ICRP) regarding critical organs (lungs and kidneys); describe the distribution of this type of particles in organs and tissues; assess how the body accumulates and expels them;

4) to make recommendations (choice of samples and type of analysis) for subsequent clinical trials - not included within the scope of his research - on the persons exposed.

4. CONCLUSIONS

4.1 Inquiry into the causes of death and serious illness among soldiers engaged in missions abroad

The initial remarks depart from the analysis of one factor, i.e. exposure to depleted uranium, on which the experts’ attention was mainly focused.

Neither the hearings held, nor the test results and oral evidence gathered on the mission to the Balkans, have yielded sufficient data to assert that the pathologies observed are to be attributed to the toxicological or radiological effects deriving from exposure to the ionising radiation or chemical contamination caused by DU ammunition. It is important to note that, as far as the Committee is aware, to date no traces of DU have been found in the histological samples of the Italian soldiers deployed on missions in BiH and Kosovo who have since developed tumours.

On the basis of available scientific literature, it seems that the existence of a significant health risk traceable as such to DU is to be limited to those individuals that have somehow inhaled the aerosol that develops on impact of DU munitions. In essence, this circumstance is likely to have occurred only in the case of individuals who, shortly after DU rounds had been fired, were in the immediate proximity of vehicles or buildings hit; however, this is not realistically applicable to the Italian troops in the Balkans since there is no indication that they have taken part in ground battles.

It should, however, be kept in mind that almost all forms of tumour have a multiple aetiology and that, in particular, exposure to a wide range of chemical, physical and biological agents can lead to mutagenic and oncogenic effects.

This applies, for example, to environmental degradation and contamination resulting from war, as well documented in UNEP studies, that may have played an important role in the initial operational phase of the Italian troops, when the concentration of pollutants deriving from the industrial or civilian facilities damaged or destroyed in the war was higher. Potential risk resulting from exposure to pollutants may also exist if proper individual protection gears are not used when munitions in danger of accidental detonation are disposed of in so-called “blast-holes”, a common practice in military operations as previously noted.

However, an accurate appraisal of environmental risks in the areas where Italian troops assigned to missions in BiH and Kosovo have operated is quite difficult, given the lack of epidemiological data on the health conditions of the resident population in the targeted areas of BiH and Kosovo. This problem was mentioned also during of the Committee’s mission to the Balkans and is attributable, among other things, to the difficulty in obtaining a reliable control population due to the dramatic increase in refugee flows determined by the conflicts in former Yugoslavia.

Special mention should be made of the so-called nano-particles on which the Committee dwelt at length in its hearings of Dr. Gatti in the plenary sittings of 18 May and 27 October 2005. In addition, consideration has been given to the indications emerging from the study conducted under Dr. Gatti’s coordination, published in Annex 2 to this Report, entitled “Description of micro/nano
particles present in human serum samples of some soldiers and attempt to trace the same type of particles in particle samples collected in Kosovo and in Iraq”.

Inhalation of nano-particles — spherical corpuscles smaller than a micron that seem to be produced at extremely high temperatures, around 3000°C—has been indicated as the possible cause of the increased incidence of tumours. For the purposes of this inquiry, it should be noted that these high temperatures can be generated, in particular, by the impact of DU ammunitions with targeted surfaces (armour plating of tanks, ammunition deposits). This suggests the hypothesis that DU may have an indirect role in promoting the pathologies under examination through the inhalation of the nano-particles it generates, which seem to be subjected to dispersion even at great distances from the impact site and for a still undetermined amount of time.

On this issue the second study commissioned by the Committee entitled “Ecological and health consequences of the use of DU weapons” deserves attention. The study, that was already mentioned in paragraph 3.3 and is published in Annex 3 to this Report, contains a proposal for direct experimentation aimed at describing two aspects that are not sufficiently documented in scientific literature: the distribution, by size and morphology, of submicrometric particles generated by the use of DU penetrators, and the possible interaction of those particles with the environment and human health.

Environmental risk factors such as those cited above are likely to have resulted in major clinical consequences for individuals in conditions of greater vulnerability, even transitory ones. During the informal meeting of the enlarged Committee Bureau, on 19 January 2006, which was devoted to discussing health issues possibly associated with vaccination schedules, significant indications emerged regarding a major increase in the incidence of immune system alterations - in particular monoclonal gammopathy - among military personnel engaged in missions. In the majority of cases these either regress or remain asymptomatic, but in current literature they are associated with an increased incidence of tumours, particularly of the hematopoietic system.

These alterations, which deserve special attention in the monitoring programmes of the Ministry of Health and Ministry of Defence, could be ascribed to a range of different factors that have been mentioned to the Committee by various experts.

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In the final stage of its inquiry the Committee considered the hypothesis that the increased incidence of the pathologies examined was due:

– to some components of the vaccines administered to the military personnel before leaving on the mission or during the mission itself, in particular, additives such as thimerosal — currently being phased out — or metals such as aluminium;
– to vaccine administration procedures that were allegedly different from recommended protocols; in the hearings it emerged that, especially in view of the need for the rapid deployment of military personnel, military medical facilities had not always complied with prescribed vaccination procedures.

In both cases there are factors liable of increasing the risk of developing certain types of tumours, especially in predisposed individuals (e.g. carriers of monoclonal gammopathy). This is a working hypothesis that will have to be carefully evaluated by the next Parliament.

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In conclusion, it should be pointed out that despite the intense work carried out it has not been possible to arrive at univocal conclusions on some of the issues addressed. In particular:
a) The Committee has been unable so far to obtain indisputable data on the number of soldiers deployed on international peace missions abroad who have developed tumours. This parliamentary inquiry gathered indications that some cases of tumour had not been brought to the attention of the Mandelli Committee, thus leading to an underestimation of the number of tumours reported as of 31 December 2001 and indicated in that Committee’s Final Report. Although it was not possible to examine the presumed unaccounted cases in detail, it is likely that some of the subjects who developed tumours after taking part in the missions failed to be included among the Ministry of Defence reported cases on which the Mandelli Committee’s study was based31;

b) Uncertainty partly remains on whether any significant differences do exist between the incidence rate of tumours — both in aggregate form as well as by tumour class — recorded among the military personnel engaged in international missions and the rate in the control population. As previously discussed, in order to calculate the SIR (Standard Incidence Ratio), which measures the risk differential for the population surveyed, the Mandelli Report identified the control population as males belonging to the population of the areas covered by the tumour registries taken into account32. Such a comparison leads, nevertheless, to some distortions: for example, approximately 70 per cent of the cohort of the military personnel engaged in international missions studied by the Mandelli Committee came from Southern Italy - where the overall incidence of tumours is lower than in Northern Italy - whereas the majority of the tumour registries considered covered the population living in Northern Italy;

c) As discussed above, no final answer has been found to the questions regarding long-term damage to the military and the resident population that could result from exposure to fine and ultra-fine dust particles; these are released into the environment following combustion at extremely high temperatures, such as those determined by the impact of DU penetrators on the surfaces they hit and during the disposal of substantial quantities of munitions in the so-called “blast-holes”.

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As regards the query outlined in a) above, important assessment elements may be obtained in the near future from examination of the new data that will become available through the health monitoring of the subjects surveyed under Article 4-bis of Decree Law No. 393 of 29 December 2000, as amended and enacted by Law No. 27 of 28 February 2001; the monitoring is already been conducted by the Centre for Studies and Research in Health and Veterinary Medicine of the Ministry of Defence and the Istituto Superiore di Sanità on the basis of an agreement signed on 30 May 2002 by the Italian government, the regional administrations and the autonomous provinces of Trento and Bolzano, thus implementing the above-mentioned Article 4-bis.

Concerning b), once the tumour registry for the military population envisaged by the Collaboration Agreement signed on 15 December 2004 between the Ministry of Health and the Istituto Superiore di Sanità is fully operational, it will eventually be possible to assess the SIR measuring any significant risk differential assigned to the cohort of the troops engaged in international peace missions as compared to a completely homogeneous control population, i.e. all military personnel. This monitoring activity should help also to reduce the possibility of undetected cases of tumour among military personnel highlighted in a) above.

As for c), some doubts regarding the existence of health risks for the military population engaged in international peace missions that might be associated with the presence, in the areas of

31 Significant in this regard is the following statement of the Final Report of the Mandelli Committee, under the section “Epidemiological Aspects. Population studied: data sources and methods”: “The data, partly resulting from voluntary reports, include all malignant tumours communicated to the Ministry of the Defence by 31 December 2001 that had been diagnosed prior to the conclusion of the screening period.”.

32 It should be recalled that, according to the Final Report itself, the incidence ratios between the military population surveyed and the control population as it has been defined showed the existence of “a statistically significant excess of HL and a significantly lower number than expected for the total solid and malignant tumours as a whole”.

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operation, of chemical, physical or biological agents capable of causing mutagenic or oncogenic effects could emerge in the near future upon examination of the data to be made available by the monitoring programme established by the SIGNUM Protocol\textsuperscript{33}.

However, this study is not sufficient to determine whether long-term effects from exposure to the particles released by either conventional or DU munitions exist.

Therefore, it is the Committee’s hope that the Italian Government may actively advocate the planning and development of a scientific study on this subject in the appropriate EU and NATO bodies.

At the same time, it believes that a parliamentary inquiry by the next Parliament to further examine the problems addressed by this Committee’s inquiry could significantly contribute to establishing reasonable certainties on some still controversial issues. To this end, a new inquiry would greatly benefit from the more extensive knowledge and data that could become available thanks to the monitoring and research activities mentioned in this section.

4.2 Inquiry into the storage conditions of DU ammunition and its possible use in military exercises on national soil

According to Minister Martino’s statements in his hearing before the Committee, and in line with the answers given by Defence Ministers over the years in response to the many parliamentary questions raising this issue, the use of DU munitions on national soil has never been authorised.

Studies carried out by CISAM for Cagliari Military Prosecutor Mauro Rosella – who was heard by the Committee – showed no trace of the use of DU ammunition in the area of the four firing ranges in Sardinia where training takes place, i.e. Cape Teulada, the firing ranges on land and at sea at Perdasdefogu, and the airforce firing range at Cape Frasca. It should be stressed that these were conducted on random sampling of those sites specifically used for target practice.

Nevertheless, at the meeting that the Committee held with representatives of the civil society during its mission to Sardinia, there were statements suggesting that peaks in the incidence of tumours and teratogenic effects, i.e. induction of congenital malformations, were to be found in some areas next to Sardinian firing ranges. They mentioned in particular the Quirra suburb of the town of Villaputzu, near by Perdasdefogu firing range, and the neighbouring town of Escalaplano. These reports, however, do not seem to have been confirmed by the committee set up by the local health services agency “ASL 8” of Cagliari, as shown by the results supplied by ASL Director General Dr. Gumirato in a hearing, during the Committee’s visit to Sardinia.

To date the Committee has not collected any evidence supporting the idea that DU munitions might play a role in the pathologies observed in the resident population in the areas near Sardinian firing ranges. On the other hand, it has been suggested —although this is currently just a working hypothesis—that some activities carried out on the firing ranges can contribute, at the high temperatures they generate, to the production of nanoparticles, which are subsequently dispersed in the surrounding area. It must be recalled that the Decision establishing the Committee, in the question concerning activities on national soil, asked the Committee to investigate into the presence and use of DU bullets only.

Nevertheless, the Committee cannot fail to report the following critical elements that emerged in the course of its investigation into the use of the firing ranges:

–There is no direct preventive supervision by those in charge of the firing ranges of the material to be used either in exercises or in the testing activities generally carried out for and by private companies interested in using the technical facilities of the firing ranges; in practice, self-declaration is sufficient, often in quite generic terms, and only recently it required the inclusion of specific clauses attesting to the absence of unstable chemical substances or DU;

\textsuperscript{33} Cf. note 11.
– There is inadequate coordination among the agencies that are responsible for monitoring the healthiness of the environment of the firing range and the surrounding areas, and between the agencies and the persons in charge of the firing ranges;
– Without prejudice to the specific function of these essential facilities, special agreements are needed between all local authorities concerned in order to identify more appropriate means for monitoring the environment in the areas affected by the activity of firing ranges.

4.3 Proposed legislative changes

In light of the Committee’s work it seems plausible that at least a portion of the cases of serious illness arising during and after participation in international peace-keeping missions is attributable to exposure to chemicals, toxic substances or radiation on site.

Irrespective of whether the conditions to obtain official recognition of service-attributable death or illness recur in individual cases, it seems necessary to identify the most suitable way for those citizens having lost their health, if not their lives, while serving their country in international operations, and for their families to receive adequate healthcare and financial support.

In this regard, following the written response of the Minister of Defence to parliamentary questions nos. 4-08533, 4-08741 and 4-09980 posed by Senator Malabarba34, the Committee welcomed the elimination of the interpretative uncertainties that have arisen in the past regarding the right of volunteer and career personnel to the same benefits granted to conscripts, pursuant to Law No 30835 of 3 June 1981, as amended by Law No 28036 of 14 August 1991.

The Committee, nevertheless, recommends that the “special allowance” envisaged by Article 6(3) of the aforementioned Law for the families of the military personnel who suffer a damaging event during their service leading to their death be extended to military personnel that contract permanently disabling illnesses, and that the relevant sum —equal to “50 million lire” [now Euros 25,822] — be raised considerably in keeping with the increased cost of living.

In view of the measures adopted in the Budget Law for 200637— whereby a general repeal was approved of all those provisions of national collective contracts and of those regulatory instruments implementing union agreements which, under all circumstances, required state administrations to cover expenses for specific health treatment for their employees— the Committee also welcomes the decision made to maintain the services owed by the Ministry of Defence to the personnel of the Armed Forces or belonging to the Police Corps who have contracted diseases or infirmities during missions carried out abroad38.

34 Response announced at Senate sitting no. 961 of 21 February 2006.
35 “Rules in favour of military conscripts and active service personnel of the Armed Forces, Armed Corps and militarily organized Law-Enforcement Corps, injured or killed in service, and their survivors”.
36 “Amendments and additions to Law No. 308 of 3 June 1981, containing rules in favour of military conscripts and active duty personnel of the Armed Forces, Armed Corps and militarily organized Law-Enforcement Corps, injured or killed in service, and their survivors”.
37 Law No. 266 of 23 December 2005, “Provisions on the formation of the annual and multiannual State Budget” (Budget Law 2006)”.
38 Paragraph 221 of Law no. 266 of 23 December 2005 reads as follows: “221. All provisions of national collective contracts and all regulatory instruments transposing union agreements, including those regarding the prefectorial and diplomatic careers as well as the civilian and military Police Forces, and in particular those regulations transposing the framework agreement regarding Armed Forces personnel, that, under all circumstances, attribute employees’ healthcare expenses to the State Administrations concerned, shall be repealed. The repeal under this paragraph shall be without prejudice to the services owed by the Ministry of Defence to Armed Forces or Police Corps personnel who contracted illnesses or infirmities during missions outside the national territory.” The Committee, however, has been informed of delays concerning the payment by the Ministry of Defence of allowances for travel and accommodation expenses for family members assisting severely ill military personnel.
Finally, the Committee recommends a revision of firing range regulations in order to ensure:  
– adequate and periodic environmental cleanup of the areas within firing ranges, with a view to protecting the health of both individuals working at the ranges and the resident population of nearby areas; it should, however, be kept in mind that the activities carried out at these facilities cannot realistically be required to meet the same environmental standards set out for productive activities;  
– transparency on the users of firing ranges and introduction of registration requirements whereby the material being used in each exercise or test is analytically described before and after these activities. Such registration should include also an analysis of possible risk profiles deriving from the activities in question to be provided to those in charge of the firing range.