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ТУЖИЛАШТВО У БЕОГРАДУ
КТН 581/95
05. јул 2016. године
Београд
МЈ/СР

Вујасиновић Радислав

Београд, ул. Милутина Миланковића бр. 118/18

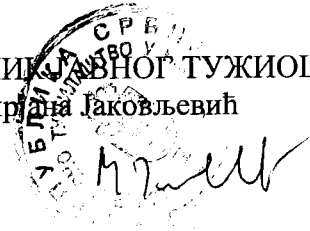
Поштовани,

У прилогу дописа достављам копију налаза и мишљења Института за форензичка истраживања у Хагу на енглеском језику, који је овом тужилаштву достављен преко Републичког јавног тужилаштва у Београду.

С обзиром да је превођење у току, примерак на српском језику ћемо Вам доставити накнадно по пријему преведеног примерка.

С поштовањем

ЗАМЕНИК ЈАВНОГ ТУЖИОЦА
Мирјана Јаковљевић





Nederlands Forensisch Instituut
Ministerie van Veiligheid en Justitie

**Forensic report on examinations and
interpretations in the investigation into
the death of Radislava Vusjasinovic on
9 April 1994 in Novi Beograd III
Bulevar 118**

10 June 2016

Case number NFI
Number of inquiry
Applicant

2014.12.04.245
002
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Case information

Case number NFI	2014.12.04.245
Number of inquiry	002
Date of inquiry	29 september 2015
Quotation reference numbers	KRI-1783/96, OFF-2015-082
International Forensic Advisor	J.T.M. Eerhart
Suspect	-
Victim	Radislava Vujasinović
Return of items	Returned separately
Additional information	-
Copy of this report to	-
Attachment	1 Used shotshells [AAHO8122NL]
General information	T +31 (0) 8886 548/547
Content related information	Biological traces and DNA analysis dr. A.J. Kal Medical Review Prof. dr. B. Kubat Firearms and ammunition examination P.J.M. Pauw-Vugts, BSc Gunshot residue examination dr. A. Brouwer-Stamouli

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1 Exhibits

The items of evidence in this case were received on several dates. Upon arrival at the NFI¹ the items were labeled by the International Forensic advisor with a sticker containing a unique code (SIN)², a barcode and a Radio Frequency Identification (RFID) chip. The RFID chip is used to track and trace an item within the building of the NFI. Table 1 lists the items of evidence, the date of receiving and their assigned SIN.

In table 1 the list of the received reports is illustrated.

Received from Embassy of the Kingdom of the Netherlands
Via via D. Eerhart (NFI) from D. Milojevic
Receiving dates 26th August 2014 and 18th November 2014

Table 1 List received reports

Assigned SIN	Description
AAHO8893NL	Case file consisting of: <ol style="list-style-type: none"> 1. Report on the trace evidence inspection of the Scene dd: 1994-04-09 2. Report dd: 1994-04-09 3. Autopsy report dd: 1994-04-11 4. Report paraffin casts hand victim dd:1994-04-11 5. Report Rifle investigation dd: 1994-04-13 6. Summaries of witness testimonies dd: 199-04-22 7. Review of relevant findings dd: 1994-09-03 8. Critical revision of findings and MOD dd: 1994-11-21 9. Critical revision ballistics and (some) medical findings commissioned by family dd 1994-12-12 (this date could not be verified) 10. Review by Judge Gerasimovich dd: 2001-08-03 11. Review by Judge Todoc dd: 2003-11-04 12. Addition to 11: dd: 2003-11-04 13. Review ballistics by Kostic and 4 attachments dd:2007-09-12 14. Final report Kostic dd: 2008-05-30 15. Opinion by Alesksandric on Kostic report dd: 2010-10-27 16. Report on the discovery of additional evidence dd: 2013-04-12
Explanatory note: This dossier was transferred back to the Serbian authorities on the 26th August 2014 and received back on the 18th November 2016.	

¹ Netherlands Forensic Institute

² The code consists of four letters, four digits and the code NL. The entire code is referred to as SI-Number or SIN.

Received from Embassy of the Kingdom of the Netherlands
Via via D. Eerhart (NFI) from D. Milojevic
Receiving date 29 September 2015

Tabel 2 List of received items

Assigned SIN	Description
AAHJ2628NL	One (1) shotshell, retrieved from left barrel (crimescene)
AAHJ2630NL	Shotgun (TOZ registration nr: 164040-63, crimescene)
AAHJ2631NL	Three (3) shotshells (Manufactured by Krusik-Valjevo Kal. 16/70)
AAHJ2633NL	Felt wad-parts (retrieved from the body/clothing)
AAHJ2634NL	Pellets (retrieved from the body/clothing)
AAHJ2635NL	Spent shotshell, retrieved from the right barrel (crimescene)
AAHJ2636NL	Disassembled shotshell (received from the parents of the victim)
AAHJ2637NL	Disassembled shotshell (seized in 2008 used as reference)
AAHJ2638NL	Cotton pieces used to clean the left barrel
AAHJ2639NL	Three wads (used for test in court)
AAHJ2640NL	Pellet (retrieved from the apartment on the ground near the balcony)
AAHJ2641NL	Four (4) pellets (retrieved from the wall behind the chair in which the victim was found)

Received from Embassy of the Kingdom of the Netherlands
Via via D. Eerhart (NFI) from D. Milojevic
Receiving date 11 January 2016

Tabel 3 List of received items

SIN	Item description
AAHO8122NL	Shotshells for testfiring

2

Received information

During the forensic intake meeting held on the 26th Augustus 2014, information over the case was given by the Serbian authorities. Specific information is discussed in the following chapters of the report.

3 Examination request

In order to formulate the examination request prior to the start of the examinations contact moments took place with the Serbian authorities. The main goal of the examination was to investigate whether it would be possible to differentiate between suicide and murder. Accidental self-inflicted shooting is as mechanism comparable to a suicide. Therefore it was not considered separately.

Based on the received questions (for more information see the forensic intake report of February 20, 2015) and the received information the following examination request was formulated:

- 1) DNA sampling of exhibits (felt wads , pellets and cotton pieces), analysis and comparison with the DNA profiles of Radoslav Vujasinovic and Teresa Nevenka Vujasinovic, in order to investigate if the material in the samples can originate from Radisiava Vujasinovic, a biological daughter of Radoslav Vujasinovic and Teresa Nevenka Vujasinovic.
- 2) Forensic medical review. Examination whether it would be possible differentiate between murder or suicide.
- 3) Examination if the spent shotshell was fired with the shotgun and examination of the felt wad-parts in order to determine whether the wad-parts originate from one or two shotshells.
- 4) Shooting distance estimation using the information of the case (photos, results and experiments).

Examination request 1) was performed by discipline biological traces & DNA and can be found in Chapter 4. The forensic medical review was performed by the discipline forensic pathology and can be found in Chapter 5. Examination request 3) was performed by the discipline firearms & ammunition and can be found in Chapter 6. Examination request 4.) was performed by disciplines firearms & ammunition and gunshot residue and can be found in Chapter 7. Finally in Chapter 8 the findings of the examination performed by the NFI are summarized.

4 Biological traces and DNA analysis

4.1 Information received

Information received relevant to the investigation:

Radoslav Vujasinovic and Teresa Nevenka Vujasinovic are the biological parents of the victim Radislava Vujasinovic.

4.2 Methods

The Netherlands Forensic Institute (NFI) is accredited by the Dutch Accreditation Council (RVA) (www.rva.nl) according to ISO/IEC 17025 standards.

Detailed information about the methods applied in this investigation can be provided upon request.

4.3 Examination of the items

Felt wad [AAHJ2633NL]

The item described as "felt wad AAHJ2633NL" consist of two parts on a filter paper in a petri dish. The outside of the felt wad and the stain on the filter paper have been examined for the presence of blood using the tetrabase test. No evidence for the presence of blood was found.

Because of the possibility that blood stains on the felt wad may have been subjected to decomposition over the years and therefore may give a negative test result using the tetrabase test, a sample from the filter paper and a sample from the larger part of the felt wad were taken using a scalpel. These samples were secured as [AAHJ2633NL#01 and #02] for the purpose of DNA and/or RNA analysis.

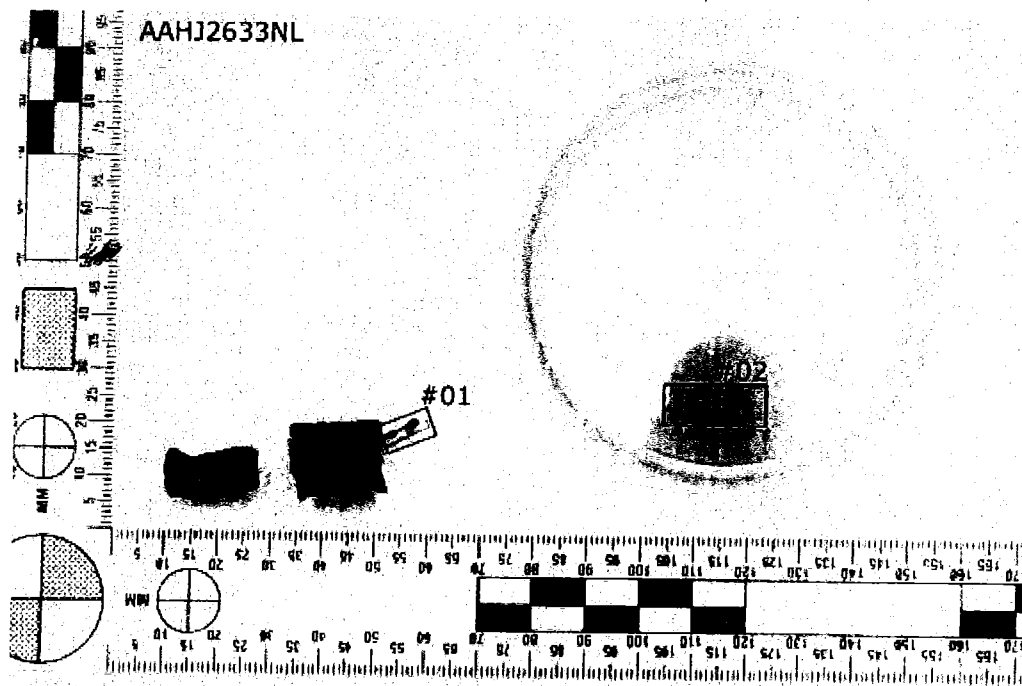


Figure 1 View of the felt wad [AAHJ2633NL] . The locations of samples [AAHJ2633NL#01 and #02] are indicated.

Because of the results obtained from the DNA investigation on the samples [AAHJ2633NL#01 and #02] (see part 'DNA analysis results' in this report) additional sampling was undertaken. Two pieces of the larger part of the felt wad were sampled – these samples were taken using a scalpel. One sample was secured as [AAHJ2633NL#03] for the purpose of DNA analysis. The other sample was secured as [AAHJ2633NL#04] for the purpose of DNA and/or RNA analysis.

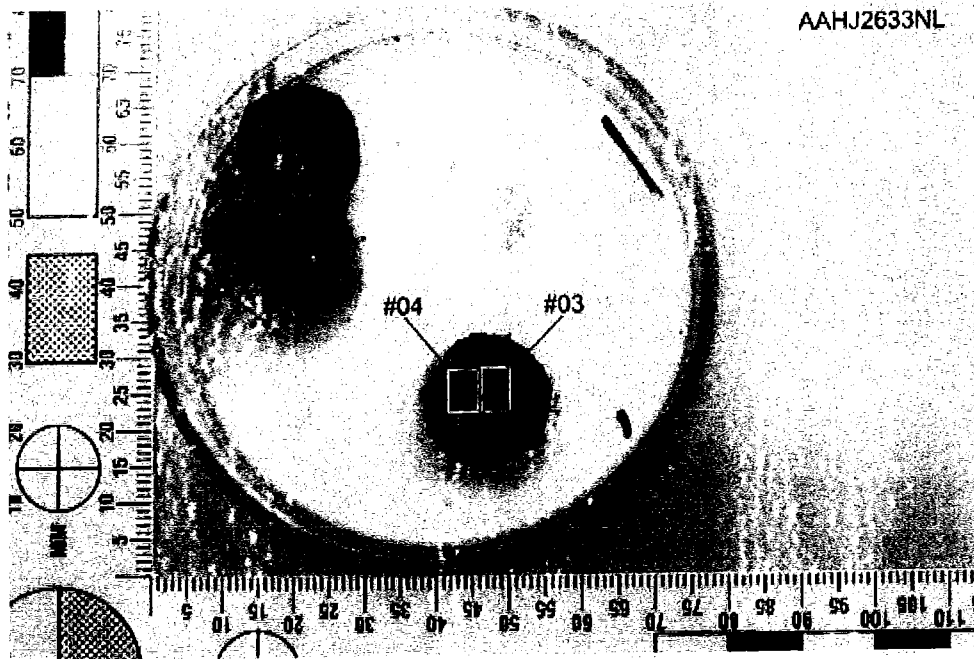


Figure 2 View of the felt wad [AAHJ2633NL]. The locations of samples [AAHJ2633NL#03 and #04] have been indicated.

Pellets [AAHJ2634NL]

The item described as "Pellets AAHJ2634NL" contains 16 pieces. The 16 pieces were examined with an operating microscope for the presence of blood. Blood was found on several pieces. The outside of the 16 pieces were, therefore, sampled using a small cotton swab. The sample was then secured as [AAHJ2634NL#01] for the purpose of DNA and/or RNA analysis.

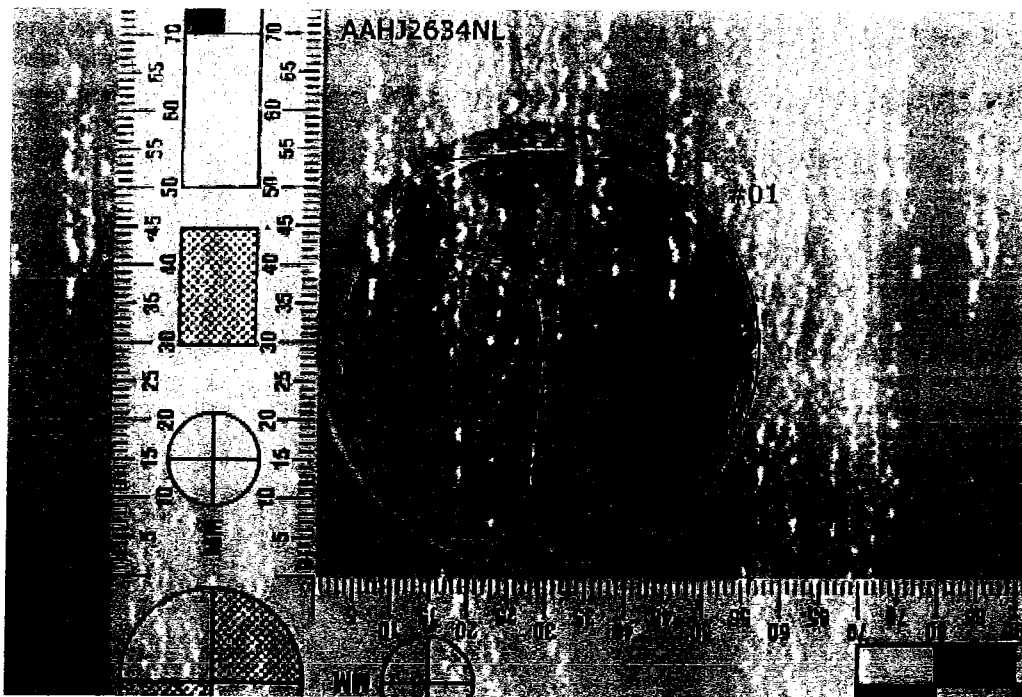


Figure 3 View of the pellets [AAHJ2643NL]. The locations of sample [AAHJ2634NL#01] is indicated.

Cotton pieces used to clean the left barrel [AAHJ2638NL]

The item described as "Cotton pieces used to clean the left barrel AAHJ2638NL" consists of three pieces of cloth. Two pieces are of a light color and one piece has a dark color (see figure 4).

The two light colored pieces were examined with an operating microscope for the presence of blood. The stains on the two pieces of cloth were examined for the presence of blood using the tetrabase test. No evidence for the presence of blood was found.

The dark colored piece was examined with an infrared camera for the presence of blood. Possible blood stains on the dark colored piece were examined for the presence of blood using the tetrabase test. No evidence for the presence of blood was found.

Because of the possibility that blood stains on the cloth have been subjected to decomposition over the years and therefore may give a negative test result with the tetrabase test, a piece of a stain on the dark colored piece of cloth was sampled by cutting out a piece of cloth with a scalpel. The sample was secured as [AAHJ2638NL#01] for the purpose of DNA and/or RNA analysis.

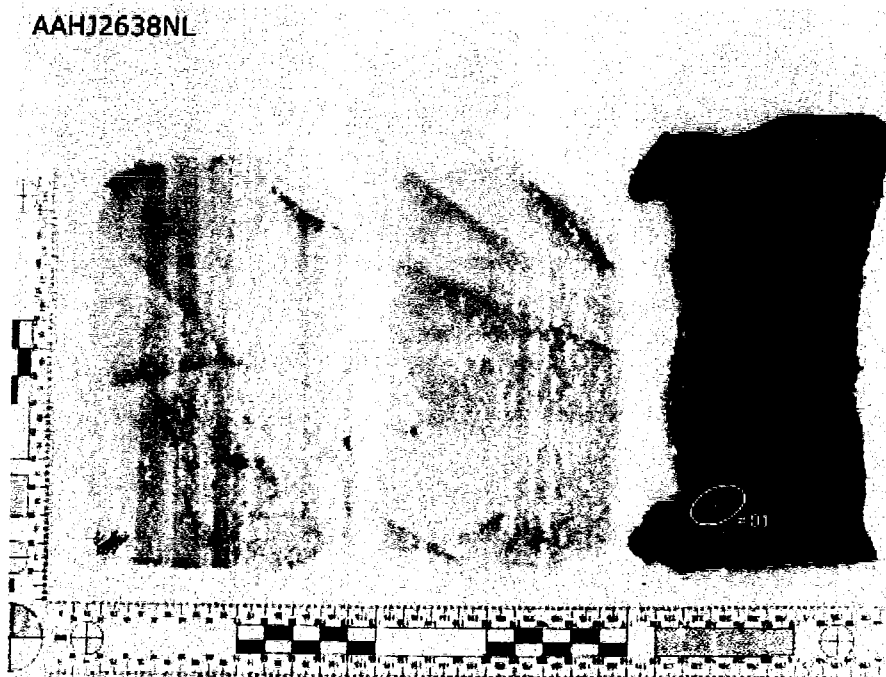


Figure 4 View of the cotton pieces used to clean the left barrel [AAHJ2638NL]. The location of sample [AAHJ2638NL#01] is indicated.

Pellet [AAHJ2640NL]

The item described as "Pellet AAHJ2640NL" consists of one pellet. The pellet was examined with an operating microscope for the presence of blood. No evidence for the presence of blood was found. The outside of the pellet was sampled using a small cotton swab. The sample was secured as [AAHJ2640NL#01] for the purpose of DNA and/or RNA analysis. Sample [AAHJ2640NL#01] has been examined for the presence of blood using the tetra base test. No evidence for the presence of blood was found.

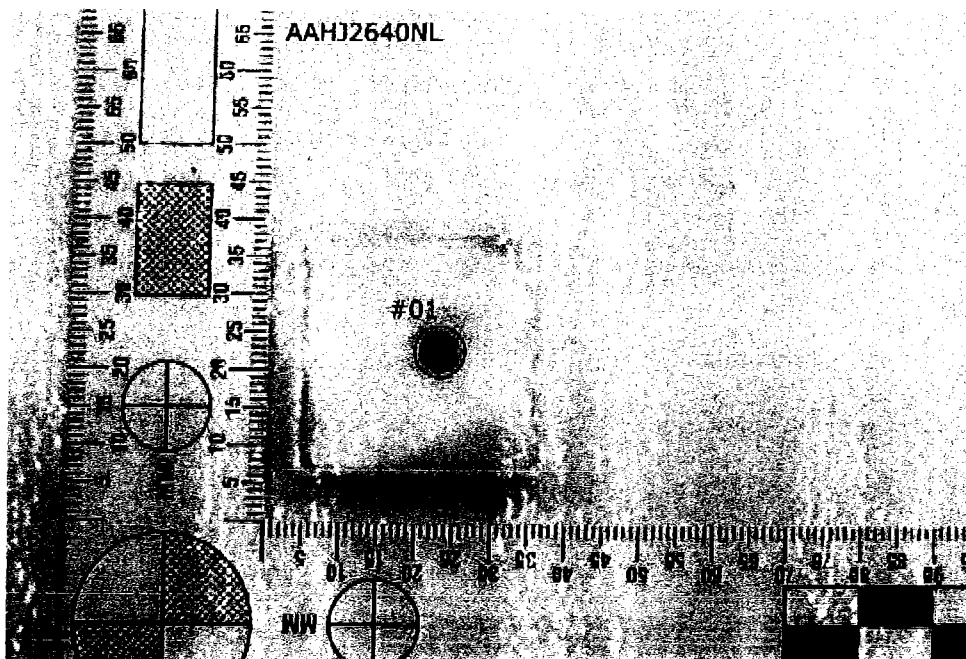


Figure 5 View of the pellet [AAHJ2640NL]. The location of the sample [AAHJ2640NL#01] is indicated.

Four pellets [AAHJ2641NL]

The item described as "Four pellets AAHJ2641NL" consists of four pellets. The four pellets were examined with an operating microscope for the presence of blood. No evidence for the presence of blood was found. The outside of the four pellets was sampled using a small cotton swab. The sample was secured as [AAHJ2641NL#01] for the purpose of DNA and/or RNA analysis. Sample [AAHJ2641NL#01] was examined for the presence of blood using the tetra base test. No evidence for the presence of blood was found.

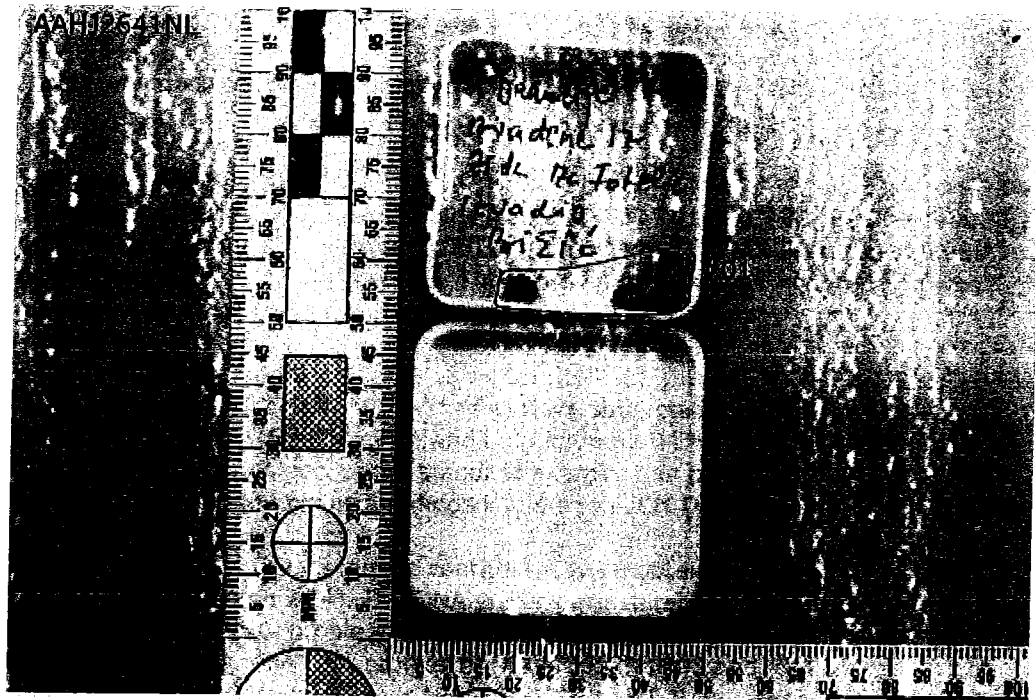


Figure 6 View of the four pellets [AAHJ2641NL]. The location of sample [AAHJ2641NL#01] is indicated.

4.4

DNA analysis results

Reference samples (buccal swabs) [RAAA0572NL and RAAA0573NL]

DNA profiles based on 20 autosomal loci (NGM analysis system and Identifier analysis system, Life Technologies) were obtained from the reference samples (buccal swabs) [RAAA0572NL] from R. Vujasinovic and [RAAA0573NL] from T.N. Vujasinovic.

Cotton pieces used to clean the left barrel [AAHJ2638NL#01], pellet [AAHJ2640NL#01], four pellets [AAHJ2641NL#01]

The DNA concentration of the samples [AAHJ2638NL#01, AAHJ2640NL#01 and AAHJ2641NL#01] was below 0.002 ng/µl. DNA concentrations below 0.002 ng/µl rarely provide DNA profiles suitable for comparison with other DNA profiles. Therefore no further DNA investigation was conducted on these samples.

Felt wad [AAHJ2633NL]

The DNA concentration of the samples [AAHJ2633NL#01 and #02] was below 0.002 ng/µl. DNA concentrations below 0.002 ng/µl rarely provide DNA profiles suitable for comparison with other DNA profiles. Therefore no further DNA investigation was conducted on these samples.

Based on the initial findings of the standard DNA analysis (NGM analysis system) the DNA extracts [AAHJ2633NL#03 and #04] were subjected to Low Copy Number (LCN) DNA analysis (5 extra cycli) and an additional DNA analysis system (Minifiler, Life Technologies). As part of the standard examination procedure, the reproducibility of the obtained findings is tested in LCN DNA analysis.

Partial DNA profiles from a female contributor were obtained from DNA extracts [AAHJ2633NL#03 and #04]. The DNA profiles are suitable for comparison with other DNA profiles. The DNA profile of [AAHJ2633NL#03] matches the DNA profile of [AAHJ2633NL#04]. The DNA profiles of [AAHJ2633NL#03 and #04] do not match the DNA-profiles of R. Vujasinovic [RAAA0572NL] or T.N. Vujasinovic [RAAA0573NL]. This means that the DNA in the samples [AAHJ2633NL#03 and #04] does not originate from R. Vujasinovic or T.N. Vujasinovic but can be from the same unknown female contributor, unknown woman A.

The DNA profiles also contain a few relatively low peaks which are either due to stochastic effects (stutter or allele drop-in) or belong to a relatively small amount of DNA from a second contributor. These peaks are not suitable for comparison.

Pellets [AAHJ2634NL]

Based on the initial findings of the standard DNA analysis (NGM analysis system) the DNA extract [AAHJ2634NL#01] was subjected to an LCN DNA analysis (enhanced CE injection). As part of the standard examination procedure, the reproducibility of the findings was tested in LCN DNA analysis.

A partial DNA profile from a single female contributor was obtained from DNA extract [AAHJ2634NL#01]. This DNA profile is suitable for comparison with other DNA profiles. The DNA profile of [AAHJ2634NL#01] matches the DNA profile of the unknown woman A ([AAHJ2633NL#03 and AAHJ2633NL#04]). This means that the DNA in sample [AAHJ2634NL#01] can originate from the same unknown female contributor, unknown woman A as the DNA in the samples [AAHJ2633NL#03 and AAHJ2633NL#04]. The random match probability for the female DNA profile is less than one in a billion. This means that the probability of a randomly selected female having a DNA profile that matches the female DNA profile is less than one in a billion.

The DNA profile also contains a few relatively low peaks which are either due to stochastic effects (stutter or allele drop-in) or belong to a relatively small amount of DNA from a second contributor. These peaks are not suitable for comparison.

4.5 DNA kinship analysis

DNA kinship analysis was carried out to investigate whether unknown woman A could be the biological daughter of R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL]. Therefore, the DNA profiles from the cell material in the samples [AAHJ2633NL#04 and AAHJ2634NL#01] and the DNA profiles from the reference samples from R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL] were compared. The following two hypotheses were considered:

- Hypothesis 1:* unknown woman A [AAHJ2633NL#04/AAHJ2634NL#01] is a biological daughter of R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL]
- Hypothesis 2:* unknown woman A [AAHJ2633NL#04/AAHJ2634NL#01] is not biologically related to R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL]

This comparison showed that for each of the examined loci from the DNA profile of unknown woman A [AAHJ2633NL#04/AAHJ2634NL#01] one allele matches an allele for the relevant locus in the DNA profile of R. Vujasinovic [RAAA0572NL] and the other allele matches an allele for the relevant locus in the DNA profile of T.N. Vujasinovic [RAAA0573NL]. This is in agreement with a kinship of a child and both biological parents. This means that unknown woman A [AAHJ2633NL#04/AAHJ2634NL#01] can be a biological daughter of R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL].

A statistical evaluation was carried out on the basis of hypotheses 1 and 2 in order to gain insight into the evidential value of the DNA analysis in this case. The statistical evaluation demonstrates that the likelihood of the findings obtained from the DNA kinship analysis for DNA extract [AAHJ2633NL#04] is more than one thousand million times greater under hypothesis 1 than under hypothesis 2. In other words: The findings of the DNA kinship analysis are more than one thousand million times more likely if unknown woman A is a biological daughter of R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL] than if unknown woman A is not related to R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL].

The statistical evaluation demonstrates that the likelihood of the findings obtained from the DNA kinship analysis for DNA extract [AAHJ2634NL#01] is approximately 100 million times greater under hypothesis 1 than under hypothesis 2. In other words: The findings of the DNA kinship analysis are approximately 100 million times more likely if unknown woman A is a biological daughter of R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL] than if unknown woman A is not related to R. Vujasinovic [RAAA0572NL] and T.N. Vujasinovic [RAAA0573NL].

5 Interpretation autopsy reports

5.1 Assignment

Forensic medical review of the forensic medical reports in the dossier shall be performed and a comment on the possibility of the determination of the manner of death (specifically *inflicted injury by others versus suicide*) based on the type, extent and form of the injuries shall be provided.

5.2 Materials

Table 4 Received reports

Document	Title	Date
1	Report on the trace evidence inspection of the scene	1994-04-09
2	Report	1994-04-09
3	Autopsy report	1994-04-11
4	Report paraffin casts hands victim	1994-04-11
5	Report rifle investigation	1994-04-13
6	Summaries of witness testimonies	1994-04-22
7	Review of relevant findings	1994-09-03
8	Critical revision of findings and MOD	1994-11-21
9	Critical revision ballistics and (some) medical findings <i>commissioned by family</i>	(Possibly 1994 12-12)
10	Review judge Gerasimovich	2001-08-03
11	Review judge Todic	2003-11-04
12	Addition to 11	2003-11-04
13	Review ballistics by Kostic & 4 attachments	2007-09-12
14	Final report Kotic	2008-05-30
15	Opinion on Kotic report by Aleksandric	2010-10-27
16	Report on the discovery of additional evidence	2013-04-12

No photographic documentation on the autopsy findings was received. The only photographs of the victim/injuries provided were among the photographs of the death scene.

5.3 Methodology and materials used in the analysis

All received reports were checked for reported forensic medical examination. Based on this selection reports were selected for the forensic medical review. The findings of the review are summarized in the table 5, the document numbers correspond with the numbers in table 4.

Based on the data in the Autopsy report a chart of the injuries was made in which the position of the injuries is approximately scaled based on the estimation of the position of the heel and the position of the arm pit/axillary fossa (figures 7 and 8).

Table 5 Summary of the review findings

Document nr. author	Relevant information
1. M. Kostadinovič	<p>An entrance wound is visible on the chest of the corpse 3 cm above the left breast, around which are visible traces of gunpowder, and an exit wound of a large opening exists in the armpit under the left arm.</p> <p>Hunting rifle ... was found under the left leg of the deceased, ...</p>
3. Dr. Aleksanric Dr. Kovacevic	<p><u>Body length</u> 179 cm <u>Body weight</u> not measured; moderate osteomuscular built and moderately nourished <u>Length right arm:</u> Axillary arch to tip middle finger – 71 cm Elbow to tip middle finger – 45 cm</p> <p>External lesions</p> <p><u>Frontal wound:</u> left breast, transversal, ellipsoid wound, 2.0x1.6 cm; 141 cm above left heel level and 7 cm left of the midline <u>Wound margins</u> uneven, jagged edges and sides, progressing internally <u>Blackened and scorched skin</u> 7 cm to the right, 3 cm above, 3.5 cm to the left 2.5 cm below the wound <u>Patchy scorning contours</u> above and to the right of the scorched area, 8x3mm <u>Test for gunshot residues:</u> positive</p> <p><u>Wound left axillar fossa:</u> Ca. 8 cm diameter wound; 143-154 cm above the left heel level <u>Wound margins</u> loosely hanging rolled up, blood suffused</p> <p><u>Wound left arm:</u> The wound (<i>meaning chest wound</i>) extends through a 2 cm-wide zone to another widely opened wound at the inner part of the forearm partially involving outer part of the upper arm immediately below the axillary arch This wound (left upper arm): irregularly shaped, ellipsoid, ca. 10x8cm, longitudinally positioned <u>Wound sides:</u> uneven, contused, loosely hanging, blood-suffused Smallest <u>width</u> of the <u>preserved skin</u> between the 2 wounds in posterior direction 5 mm, at the posterior side of the both wounds up to 3 cm below the wound 1 cm</p> <p><u>Left arm further lesions:</u> On posterior side and partially interior side of upper 1/3 of left arm 15 wheat grain-sized wounds; sides: uneven; area: ellipsoid, longitudinally positioned, ca. 10x7 cm; closest margin to interior upper arm wound 3.5 cm</p> <p>Same small wounds on posterior side of thorax side From the small wounds - buckshot pellets retrieved The total area of small lesions when left arm is leaning to the thorax ca. 22x15 cm</p>

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	<p>No other injuries</p> <p>Internal lesions</p> <p>Left axillary fossa: Destruction of axillary and humeral veins, humeral artery, fracture and fragmentation upper 1/3 humerus with displacement outwards and posteriorly Anemic mucosae and inner organs I No pneumothorax, no air in the hart cavities Fracture rib 3,4,5 left in anterior axillary line with hematomas</p> <p>No other injuries</p> <p>Conclusion COD: exsanguination due to vascular injury in course of a shot wound</p> <ul style="list-style-type: none">- Entrance wound anterior from absolute close range- Canal in the left side an slightly posteriorly, advancing ... to interior wall of the left axillary fossa, internal and posterior internal side of left upper arm <p>Under 'Pathoanatomical diagnosis' : Suicidium ...</p>
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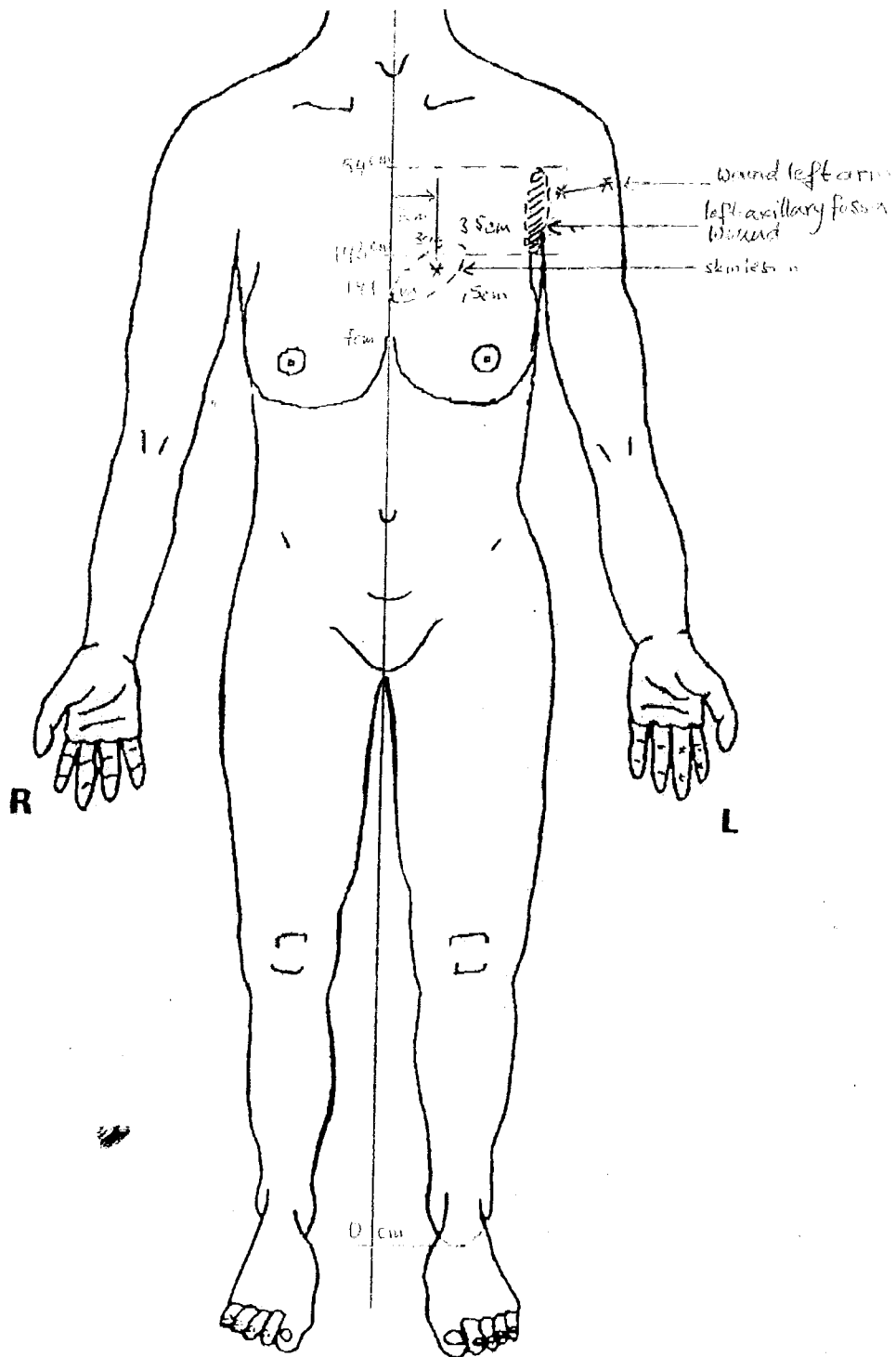


Figure 7 Position of the injuries approximately scaled (1)

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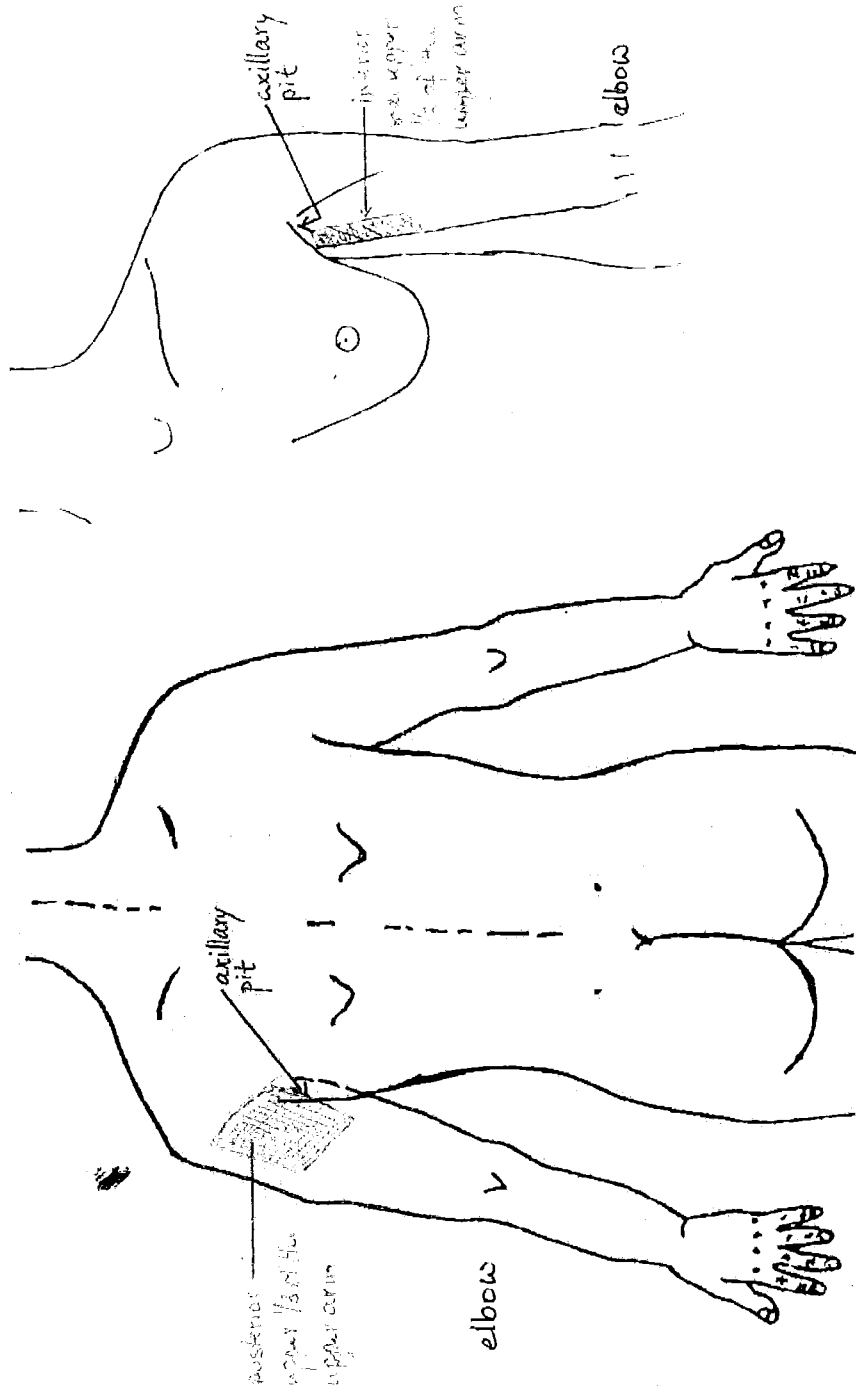


Figure 8 Position of the injuries approximately scaled (2)

5.4

Analysis

The description of the injuries in the autopsy report is complete and detailed.

In the description of the injuries to the left arm a mistake has been made either by the authors or by the translator; it is stated that *'The wound (meaning chest wound) extends through a 2 cm-wide zone to another widely opened wound at the inner part of the forearm'*. With the chest wound positioned near the arm pit/axilla it is not possible to have a wound of the forearm (i.e. the part of the arm between the hand and the elbow) at a distance from the aforementioned chest wound of 2 cm. Therefore it has to be assumed that not 'forearm' but 'upper arm' was meant.

From the description can be concluded that the entrance wound was on the front part of the chest and the exit wound was in the axilla. Besides it is very likely that the injury to the left upper arm was a continuation of the trajectory in the chest.

The trajectory was oriented to the left, slightly to dorsal (back) part of the body and minimally towards the crown. Thus the direction of the projectile in the body would have been to the left, slightly to the dorsal (back) part of the body and either minimally towards the crown, or (depending on the position of the thorax) horizontal compared to the surroundings of the victim.

Lacking photographic autopsy documentation it is difficult to comment in detail on the distance from which the shot took place. Considering the measurement of the entrance wound and the skin lesions/changes described around the entrance wound, it seems likely that the distance was short. It needs to be mentioned that the interpretation of blackened and scorched skin changes is problematic, considering the fact that the wound probably was covered by clothing, particularly if the clothing was not scorched (damaged by heat).

For the aforementioned reasons statements regarding any concrete distance between the muzzle and the skin should be based on measurements of the distribution and density of shot gun residue on the skin or skin lesions caused by shotgun powder particles.

Based only on the characteristics of the injuries it is not possible to draw conclusions with regard to the manner of death. It is therefore not possible to differentiate between 'inflicted injury by others' and 'suicide'.

This conclusion, if possible at all, has to be based on more than the autopsy findings alone and should therefore not be drawn or stated in the autopsy report.

5.5 Conclusion

The autopsy findings were well reported and the descriptions met current standards. The conclusions with regard to the injuries and the trajectory are consistent with the described injuries. d

Photographic autopsy documentation is lacking, for which reason the accuracy of the descriptions of the injuries cannot be reviewed. e

The conclusions with regard to the **cause of death** (i.e. exsanguination) are consistent with the described injuries and the observation of pale discoloration of the inner organs/structures.

Conclusions with regard to the **manner of death** cannot be drawn on the basis of the findings described in the report of the post mortem examination. The injuries as described in the autopsy report can be the result of murder, suicide or accident.

6 Firearm and ammunition examination

Comparison of spent shotshells

In a comparative bullet and cartridge case examination the marks left by firearms on bullets and cartridge cases are compared. It is a visual examination carried out by means of optical devices, such as a comparison microscope. The investigation includes the examination of the firearm(s) and/or ammunition components, the comparative examination, the interpretation and formulating the conclusion.

Comparison ammunition features

To examine if the wad-parts [AAHJ2633NL], pellets [AAHJ2634NL] and spent shotshell [AAHJ2635NL] are from the same make (brand) and type of shotshell the ammunition features are compared with the disassembled shotshell [AAHJ2637NL] and three of the fired shotshells [AAHO8122NL]. Examples of ammunition features of shotshells caliber 16 gauge are make, number of pellets, mass/diameter of pellets, type of wad, mass of wad, type of gunpowder, color and print on the spent shotshell hull.

In comparing ammunition features an indication can be determined whether the wad-parts [AAHJ2633NL] originate from one or two wads, combining with all found pellets, if one or two shots were fired.

6.1 Results of the comparison of spent shotshells

6.1.1 Description items

Shotgun [AAHJ2630NL]

This side by side double barrel shotgun has the markings and the external features of shotguns manufactured by the Russian manufacturer Tula Arms Plant (Tulsky Oruzheiny Zavod), model TOZ-63, caliber 16 gauge-70. The shotgun has the serial number N164040 on the double barrel, the number 16404063 on the forearm and the number 164040-63 on the receiver.

Markings on the double barrel show that the right barrel has a half choke bore³ and the left barrel has a full choke bore. The shotgun has proof marks showing it was tested in 1963 in the former Soviet Union. The shotgun has two triggers, the trigger in front to discharge the right barrel and the trigger behind for the left barrel. Before being able to fire with this shotgun, one or two shotshells must be placed in one or both barrels. After closing the shotgun, the external hammer or hammers must be cocked. By pulling the front or back trigger the cartridge in one of the barrels is discharged. The possibility of firing two barrels at the same time was not examined.

Test firing for comparison of spent shotshells

Several test shots were fired with the shotgun for the purpose of the comparison examination. This involved the use of shotshells of different makes from the ammunition collection of the NFI. In addition test shots were fired using the shotshells [AAHO8122NL], these were also used for the comparison examination. During all test firings no malfunctions occurred.

Spent shotshell [AAHJ2635NL]

This spent shotshell is bearing the headstamp 'VALJEVO 16 KRUŠIK 16'. Given this headstamp and its dimensions the spent shotshell is caliber 16 gauge. The letters

³ In firearms a choke bore is a tapered constriction of a shotgun barrel's bore at the muzzle end. Chokes are almost always used with modern hunting and target shotguns, to improve performance. Their purpose is to shape the dispersion of the shot in order to gain better range and accuracy.

'VALJEVO KRUŠIK' indicate the Russian ammunition brand Krušik, formally produced in Valjevo, Serbia. In the middle of the primer is a circular impression, made during the manufacturing process.

The spent shotshell has a green cardboard hull bearing a print of the brand logo of Krušik, the text 'VALJEVO', a drawn hare and the text '-70mm-'. The compiled figure 9 shows different sides of the spent shotshell.

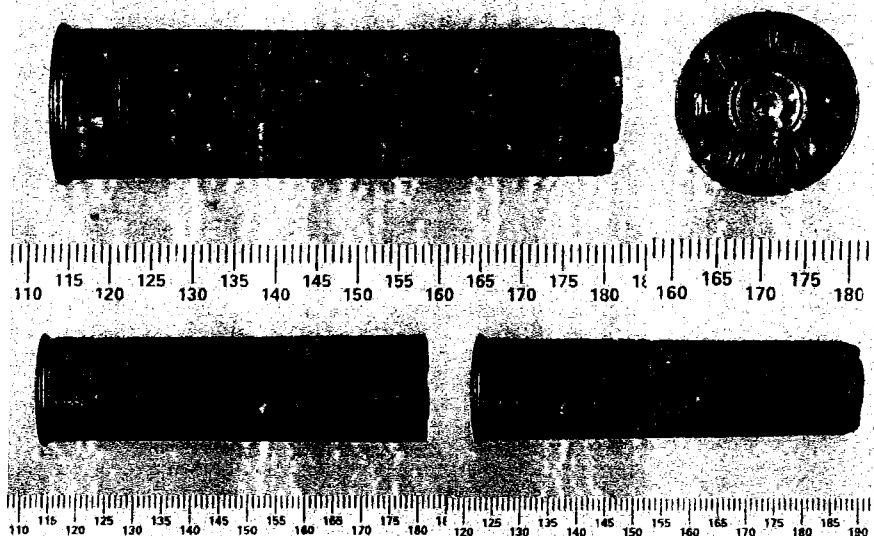


Figure 9 Spent shotshell [AAHJ2635NL]

System marks

The spent shotshell shows marks caused during the firing from a firearm. These are marks of a firing pin, a breechface and the chamber of a barrel. The overall shape, location and size of the system marks match the system characteristics of shotgun [AAHJ2630NL].

Individual marks

Part of the system marks show striae and / or irregularities which are caused during the firing from a firearm. These marks are suitable for the comparison of spent shotshell examination.

6.1.2 Comparison of spent shotshells

Hypothesis regarding the spent shotshell [AAHJ2635NL] and the shotgun [AAHJ2630NL]

Given the questions and the results of the initial examination the following hypotheses are considered for the spent shotshell and the shotgun:

- Hypothesis 3:* The spent shotshell is fired by the shotgun.
Hypothesis 4: The spent shotshell is fired by another shotgun bearing the same system characteristics as the shotgun.

Results

During comparison of the markings in the spent shotshell and the spent shotshells fired out of the right barrel of the shotgun the following findings were observed:

- a part of the irregularities in the breech face marking are the same;
- irregularities in the firing pin impressions differ;
- in other markings no significant similarities or differences were found.

Interpretation

The found correspondence between breech face markings are expected when the spent shotshell is fired by the shotgun (hypothesis 3).

Based on general knowledge about breech faces of firearms, this mark is assessed to be characteristic. Considering the assessed characteristic value of this mark it is expected that this degree of correspondence, conservatively assessed, will be found within less than 10 to 100 other firearms from the same calibre and with the same class characteristics (hypothesis 4). Based on the current knowledge, the minimal occurrence of the findings cannot be assessed reliably, this could be less than 1 in 1.000.000.

The found difference between the firing pin impressions are expected if the spent shotshell is fired by another shotgun (hypothesis 4).

For hypothesis 3 to be true, changes must have been made to the surface of the firing pin or the firing pin must have been replaced by a different firing pin during the time between firing the shotshell [AAHJ2635NL] and receiving the shotgun at the NFI.

6.2 Results comparison ammunition features

6.2.1 Description of the items

Wad-parts [AAHJ2633NL]

Upon receipt there were two parts of a felt wad with a mass of 1.2 and 1.1 gram⁴. During first handling of the two parts the larger part split into two parts, leaving three parts in total. Compiled figure 10 shows the wad-parts upon receipt on the left and the three parts on the right, the original parts are marked A and B, after splitting A1, A2 and B. The photo bottom left in the compiled figure 10 shows where this part first was attached.

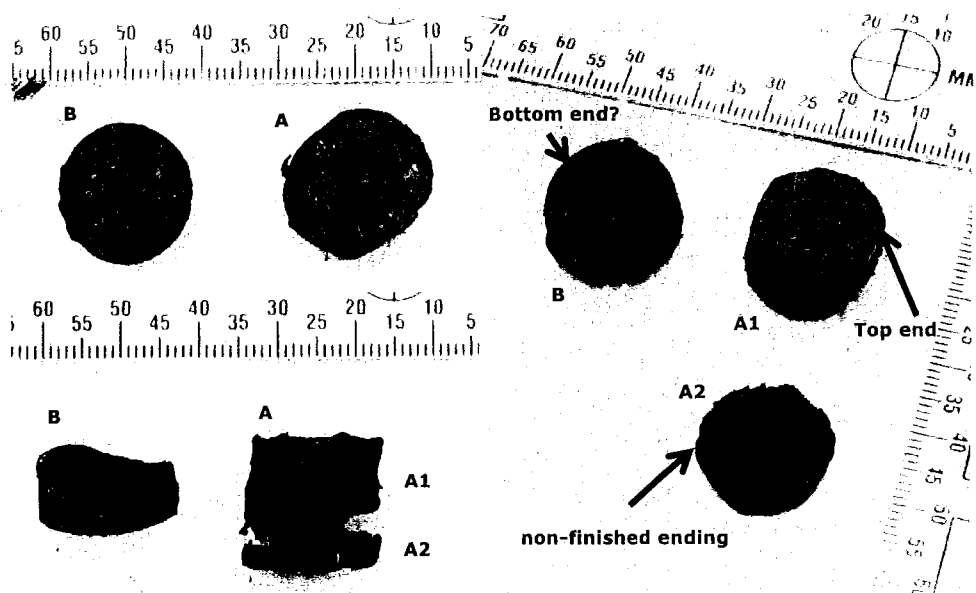


Figure 10 Wad-parts [AAHJ2633NL] upon receipt on the left and the three parts after handling on the right.

Examination of the felt wad-parts showed that the original heights can be enlarged by absorbance of (body) fluids. Current heights vary from 9.4 to 10.2mm (A1); 3.0 to 3.2mm (A2) and 8.2 to 9.2mm (B). The diameter of wad-parts A varies from 16.3 to 17.0mm; wad-part B varies from 16.3 to 17.0mm, also see paragraph 'Comparison ammunition features, original number of wads and shots', table 6. The wad parts show one plasticized top end (A1), where in a shotshell the wad is pressed against the pellets during the shot. This top end shows impressions of 8 pellets. The wad parts also shows another end, possibly a bottom end (B), where in a shotshell the wad is pressed against the gunpowder. The top end and possible bottom end are marked in the right photo of the compiled figure 10. The other two ends of the original two wad-parts (A and B) show no finished ending and look similar to both ends of the newly loosened parts A1 and A2.

Pellets [AAHJ2634NL]

These 16 lead pellets each have a mass varying from 0.72 to 0.75 gram⁵, with one exception of 0.56 gram. Average mass of all these pellets is 0.72 gram. One pellet is flattened, the other 15 pellets have a diameter varying from 4.2 to 5.6mm.

Shotshell [AAHJ2628NL]

This shotshell is bearing the headstamp 'VALJEVO 16 KRUŠIK 16'. Given this headstamp and its dimensions the shotshell is caliber 16 gauge. The letters 'VALJEVO KRUŠIK' indicate the Russian ammunition brand Krušik, formally produced in Valjevo, Serbia. In the middle of the primer is a circular impression, made during the manufacturing process.

The shotshell has a green cardboard hull bearing a print of the brand logo of Krušik, the text 'VALJEVO', a drawn hare and the text '-70mm-'. The top end cover is red cardboard bearing the number '2' and text '5m/m'. The number '2' indicates this shotshell has a load number 2. The text '5m/m' indicates that the load consists of pellets with a diameter of 5mm. The compiled figure 11 shows different sides of the shotshell.

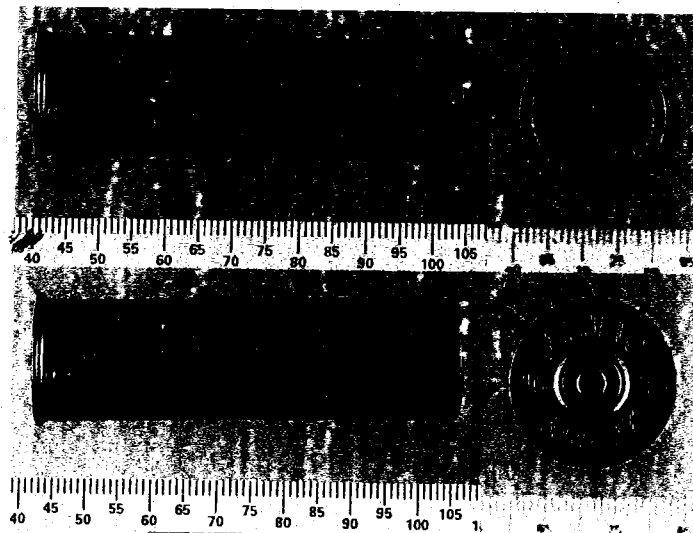


Figure 11 Shotshell [AAHJ2628NL]

Shotshells [AAHJ2631NL]

These three shotshells are bearing the headstamp 'VALJEVO 16 KRUŠIK 16'. Given this headstamp and the dimensions the shotshells are caliber 16 gauge. The letters

⁵ The measurement is made with an accuracy of 0.005 gram. The stated value is rounded off.

'VALJEVO KRUŠIK' indicate the Russian ammunition brand Krušik, formally produced in Valjevo, Serbia. In the middle of the primer is a circular impression, made during the manufacturing process.

The shotshells Have a green cardboard hull bearing a print of the brand logo of Krušik , the text 'VALJEVO', the text '-70mm-', two have a drawn bird (goose) and one a drawn hare. The top end cover is orange cardboard bearing several numbers '2'. The number '2' indicates this shotshell has a load number 2, corresponding to a load consisting of pellets with a diameter of 5mm.

Disassembled shotshell [AAHJ2636NL]

This disassembled shotshell is bearing the headstamp 'TREPČA 12 YU 12'. Given this headstamp and its dimensions the shotshell is caliber 12 gauge. The letters 'TREPČA' indicate the former Yugoslav ammunition brand Trepča. Due to the difference in caliber from the shotgun [AAHJ2630NL] no further examinations are conducted to this disassembled shotshell.

Disassembled shotshell [AAHJ2637NL]

This disassembled shotshell is bearing the headstamp 'VALJEVO 16 KRUŠIK 16'. Given this headstamp and its dimensions the shotshell is caliber 16 gauge. The letters 'VALJEVO KRUŠIK' indicate the Russian ammunition brand Krušik, formally produced in Valjevo, Serbia. In the middle of the primer is a circular impression, made during the manufacturing process.

The shotshell has a green cardboard hull bearing a print of the brand logo of Krušik , the text 'VALJEVO', a drawn hare and the text '-70mm-'. The top end cover is red cardboard bearing the number '2' and text '5m/m'. The number '2' indicates this shotshell has a load number 2. The text '5m/m' indicates that the load consists of pellets with a diameter of 5mm.

The felt wad has a mass of 1.58 gram, a height varying from 14.9 to 17.1mm and a diameter varying from 17.2 to 17.3mm. The wad has two plasticized endings, shown on the right in the compiled figure 12 of the disassembled shotshell. The plastic covers a cardboard ending of the wad. The material of the wad looks similar to the

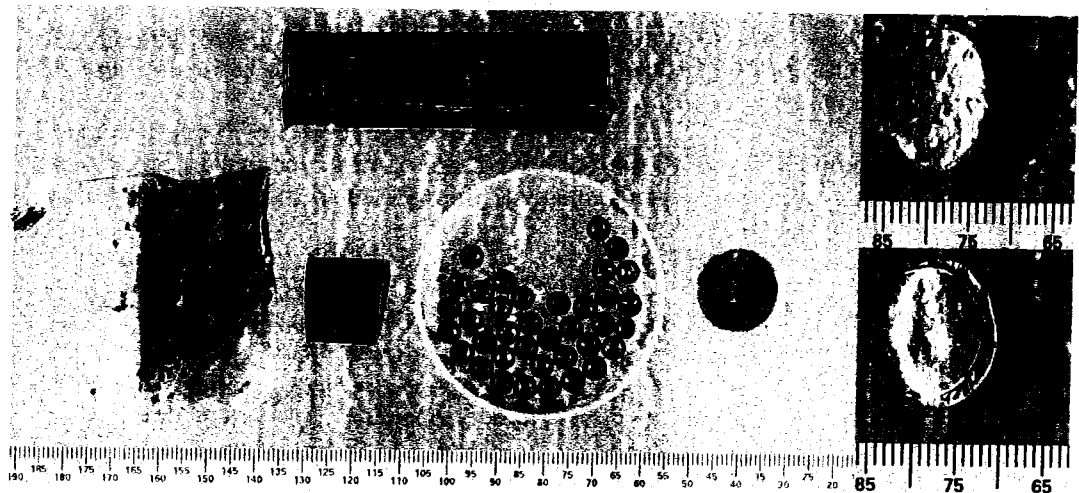


Figure 12 Disassembled shotshell [AAHJ2637NL]

wad-parts [AAHJ2633NL] retrieved from the victim. There is no imprint of pellets in the wad as this is created by the pressure during the firing of a shotshell. The load consists of 37 lead pellets, each have a mass varying from 0.71 to 0.76 gram, with one exception of 0.53 gram. Average mass of all these pellets is 0.74 gram. One pellet is smaller and has a diameter varying from 4.3 to 4.4 mm, the other 36 pellets

have a diameter varying from 5.0 to 5.1mm. The compiled figure 12 shows different sides of the shotshell.

Cotton pieces [AAHJ2638NL]

No ammunition examinations are conducted to these cotton pieces.

Wads [AAHJ2639NL]

These three felt wads are numbered as shown in compiled figure 13. The wads have a mass of 2.51 (C); 0.94 (D) and 0.94 gram (E), a height varying from 17.2 to 17.7 (C); 7.5 to 8.2 (D) and 5.8 to 7.9mm (E) and a diameter varying from 19.0 to 19.6 (C); 18.7 to 19.1 (D) and 18.8 to 19.1mm (E).

Wad C has green endings and the material looks different from the wad-parts [AAHJ2633NL] retrieved from the victim. Wads D and E have two plasticized endings, shown on the right in the compiled The compiled figure 13 shows different sides of the the three wads. The material of wads D and E looks similar to the wad-parts [AAHJ2633NL] retrieved from the victim.

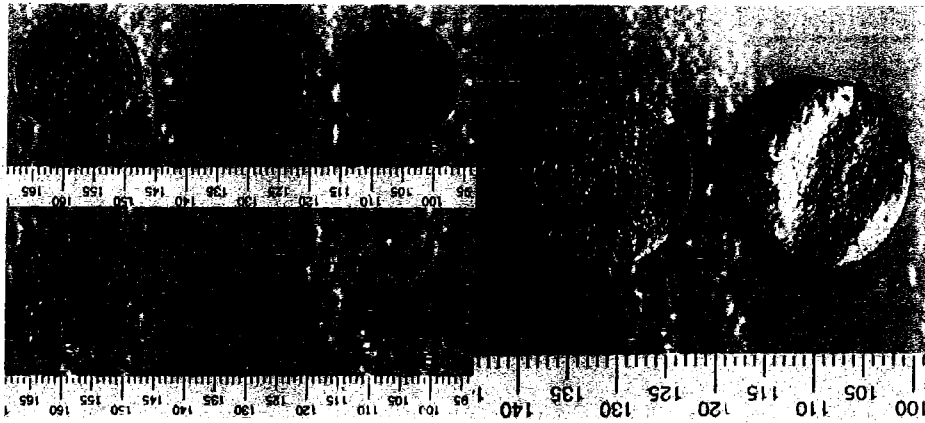


Figure 13 Three wads [AAHJ2639NL]

Pellet [AAHJ2640NL]

This lead pellet has a mass of 0.71 gram and a diameter varying from 4.8 to 5.2mm.

Pellets [AAHJ2641NL]

These 4 lead pellets each have a mass varying from 0.69 to 0.73 gram. Average mass of all these pellets is 0.72 gram. The pellets have a diameter varying from 4.4 to 5.5mm.

Shotshells [AAHO8122NL]

These 75 shotshells were submitted to be used in test firing during the examination. From these 75 shotshells 45 shotshells were bearing the headstamp 'VALJEVO 16 KRUŠIK 16'. Given this headstamp and its dimensions these 45 shotshells are caliber 16 gauge. The letters 'VALJEVO KRUŠIK' indicate the Russian ammunition brand Krušik, formally produced in Valjevo, Serbia. In the middle of the primer is a circular impression, made during the manufacturing process. These 45 shotshells have different loads, only 34 are used in test firing, see paragraph 7.3.1 "Results shot dispersion versus distance" and. Only the shotshells used in test firing and two which are disassembled are described in appendix 1 "Used shotshells [AAHO8122NL]", the shotshells were numbered upon receipt.

Shotshells #1 to #3 were fired into ballistic gelatin to examine the wad and load for ammunition features comparison. Results of these measurements are shown in table 6, paragraph 6.2.2 "Results comparison ammunition features".

6.2.2 **Comparison ammunition features, original number of wads and shots**

Fired wads and pellets can deform during the shot and penetration of materials. Three of the shotshells [AAHO8122NL] were shot in a body simulant consisting of ballistic gelatin, covered with leather. This way the wad and pellets were captured similar to entering a body, with the least possible extra damage.

Hypothesis proposition wad-parts [AAHJ2633NL] and pellets [AAHJ2634NL, AAHJ2640NL and AAHJ2641NL]

Given the questions and the results of the initial examination the following hypotheses are considered for the wad-parts and pellets:

Hypothesis 5: The wad-parts and pellets derive from one cartridge

Hypothesis 6: The wad-parts and pellets derive from two or more cartridges

Results

The wad-parts [AAHJ2633NL] were retrieved from the body of the victim and because of this submerged in body fluids. To compare the wad-parts properly two wads from test fired spent shotshells [AAHO8122NL#1 and -#2] were submerged in fluids (water) overnight and dried afterwards. The submerged wads expanded and easily broke upon handling, as occurred during the first examination of the wad-parts [AAHJ2633NL]. Compiled figure 14 shows the wads of the test fired shotshells [AAHO8122NL#1 and -#2] after submerging and drying. Wad #1 broke during handling this wad after submerging the wad in water, wad #2 was found broken inside the ballistic gelatin in which the shotshell was fired, the test firing is described in paragraph 7.1 "Test firing for shot- and GSR dispersion versus distance". Unfired wads have two plasticized endings. After firing the wads, the top end will show an impression of the pellets and the bottom end will have lost its plastic coating, probably due to the heat of the igniting gunpowder. The three wads of the test fired shotshells [AAHO8122NL#1 to -#3] show impressions of 8 pellets. All ammunition features are summarized in table 6.

The top- and bottom ends at wad-parts A1 and B [AAHJ2633NL] look similar to the top- and bottom ends from the wads of the test fired shotshells [AAHO8122NL#1, -#2 and -#3].

Table 7 shows the ammunition features for all examined pellets. It shows the fired pellets are more deformed (wider range diameter) than the unfired, but all within each other's range. It also shows all examined pellets have a mass within each other's range.

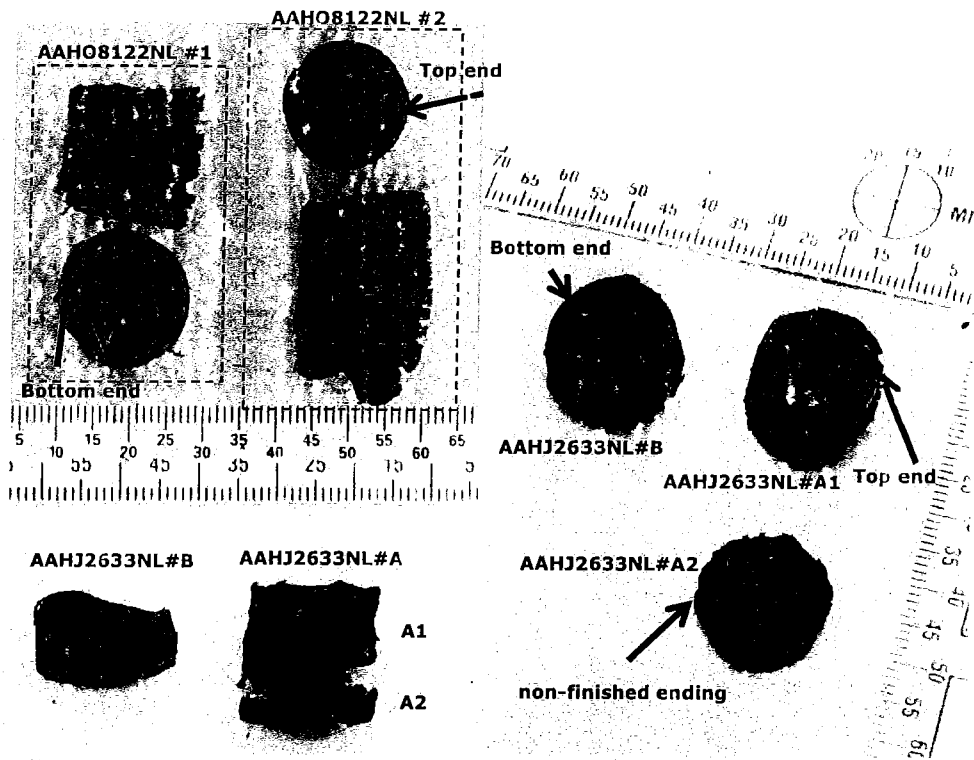


Figure 14 Wads from fired shotshells [AAH08122NL#1 and -#2] (left top) and repetition of part of compiled figure 10: Wad-parts [AAHJ2633NL] upon receipt (left bottom) and the three parts after handling on the right.

Table 6 Ammunition features wads

SIN	item description	mass wad (gram)		diameter wad ** (mm)	(summed) height wad(mm)	
		dry	submerged*		dry	submerged
AAHJ2637NL	disassembled cartridge	1.58	-	17.2	14.9 - 17.1	-
AAH08122NL	cartridge #1	1.52	1.99	18.0	18.0	20.9 - 22.4
	cartridge #2	1.50	1.92	17.9	17.0	22.0 - 25.5
	cartridge #3	1.55	-	17.6	15.8 - 18.0	-
AAHJ2633NL	wad-parts	-	2.3	17.2	-	20.6 - 22.6
AAHJ2639NL	wad D	0.94	-	18.9	7.5 - 8.2	-
	wad E	0.94	-	18.9	5.8 - 7.9	-

*: Wads retrieved from shotshells #1 and #2 were placed in water for 19 hours to determine the weight and height difference of the wads after absorption of fluids, the wad-parts were submerged in body fluids.
 **: Average of three measurements.

Table 7 Ammunition features pellets

SIN	item description	number of pellets	mass pellets / average (gram)	diameter pellets (mm)
AAHJ2637NL	disassembled cartridge	37	27,28 / 0,74	4,9 - 5,1
AAHO8122NL	cartridge #1	41	29,55 / 0,72	4,2 - 5,4
AAHO8122NL	cartridge #2	37	27,24 / 0,74	4,3 - 5,4
AAHO8122NL	cartridge #3	40	29,41 / 0,74	4,4 - 5,2
AAHJ2634NL	16 pellets	16	11,48 / 0,72	4,2 - 5,6
AAHJ2640NL	pellet	1	- / 0,71	4,8 - 5,2
AAHJ2641NL	4 pellets	4	2,87 / 0,72	4,4 - 5,5

Interpretation

The appearance and behavior (breaking up upon handling) of the wad-parts [AAHJ2633NL] is very similar to the appearance of the submerged fired shotshells [AAHO8122NL#1 and -#2]. All similarities in appearance, size and mass are expected if the wad-parts derive from one cartridge (hypothesis 5). There are parts of wad missing if the wad-parts derive from two cartridges (hypothesis 6). In one shotshell make Krušik, appearance similar to the disassembled shotshell [AAHJ2637NL] and shotshells #1 to #3 [AAHO8122NL], 37 to 41 pellets are present. In total 21 pellets were retrieved from the victim, her clothing and her apartment. This number is more expected to be found in case of one fired shotshell (hypothesis 5) than in case of two fired shotshells (hypothesis 6). The two results are expected if one shot was fired (hypothesis 5). The chance of finding these results if two or more shots were fired (hypothesis 6) is expected to be extremely small.

6.3 Conclusion weapon and ammunition examination

6.3.1 Conclusion comparison of spent shotshells

The following hypotheses are considered for the spent shotshell [AAHJ2635NL] and the shotgun [AAHJ2630NL]:

Hypothesis 3: The spent shotshell is fired by the shotgun.

Hypothesis 4: The spent shotshell is fired by another shotgun bearing the same system characteristics as the shotgun.

The findings of the comparison cartridge cases examinations are *more probable*⁶ if **hypothesis 3** is true, than if hypothesis 4 is true.

6.3.2 Conclusion comparison ammunition features

The following hypotheses are considered for the wad-parts [AAHJ2633NL] and pellets [AAHJ2634NL, -40NL and -41NL]:

Hypothesis 5: The wad-parts and pellets derive from one cartridge.

Hypothesis 6: The wad-parts and pellets derive from two or more cartridges.

The findings of the comparison ammunition features examinations are *far more probable* if **hypothesis 5** is true, than if hypothesis 6 is true.

⁶ This term is part of a standard verbal scale (the left column in the table below). This scale is used when the scientist has no or insufficient numerical data to explicitly substantiate a numerical conclusion. The selection of the specific verbal term is based on expert knowledge, experience in research and casework, etc. To promote the transparency for the reader and the uniformity among the different experts the NFI has defined the verbal terms numerically. These definitions are expressed in orders of magnitude and are listed in the right column in the table below. For example, the term 'slightly more probable' means that the probability of observing the results of the investigation is considered 2 to 10 times larger when one hypothesis is true than when the other hypothesis is true.

Verbal equivalent	Order of magnitude of evidential strength
approximately equally probable	1-2
slightly more probable	2-10
more probable	10-100
appreciably more probable	100-10.000
far more probable	10.000-1.000.000
extremely more probable	>1.000.000

The conclusion expresses the evidential strength of the results regarding the hypotheses. The conclusion does not represent the probability that a particular hypothesis is true. That probability depends on other evidence and information outside the domain of forensic expertise and falls outside the scope of this report. More information about this way of concluding is available in the professional annex "De reeks waarschijnlijkheidstermen van het NFI" (Dutch, English translation of previous version is available on request). This annex is, among others, available through the NFI website www.forensischinstituut.nl.

7 Shooting distance estimation

In order to determine the shooting distance shot- and gunshot residue (GSR) dispersion characteristics were used. In the following section the two characteristics are described and used in order to estimate the possible shooting distance between muzzle of the shotgun and wound of victim. The test firing and the experiments with stand-ins were performed under the supervision of both GSR and F&A expertises.

7.1 Test firing for shot- and GSR dispersion versus distance

Shotshells caliber 16 gauge consist of different types of load. If the load consists of pellets the shot dispersion and shooting distance are related. By firing the same load type at different shooting distances the relation between shot dispersion and shooting distance can be determined. Cartridges with different loads can be used as indications to this relation. Shot fired with shotguns with a choke bore will start dispersing at a further distance compared to shots fired with a shotgun without a choke bore.

In this case there is no (obvious) dispersion of pellets. The description of the shape and size of the frontal wound of the victim is ellipsoid wound, 2.0 x 1.6cm, 141cm above left heel level and 7cm left of the midline (accuracy of measurements unknown). There is one photograph (figure 15) in the received documents that shows the frontal wound, sideways, from a short distance and without ruler in the photograph. The photograph shows one hole, but from the photograph it cannot be ruled out if there are one or few loose entrance holes of loose pellets.



Figure 15 Part of photo "CS Photographs Folders 01 And 02\01\CNV000022.JPG" from CD, victim photographed at her apartment.

To compare hole sizes in different materials is difficult as human skin is flexible. The type "cowhide, semi-finished chrome tanned upholstery crust, not treated to final

softness", thickness of approximately 1.1mm, is used as skin simulant⁷ for measuring bullet penetration, not as simulant for appearance of gunshot wounds. Also firing shotshells with pellets will give a different shot pattern each different shot, because of the loose pellets. The holes will not be circular but more random of shape.

In this examination it was chosen to determine shooting distance by looking at the different appearances of the dispersion versus distance. Does the shot create:

1. one hole;
2. is there dispersion starting (one or few loose pellets);
3. is there a dispersion (loose pellets and a hole);
4. is there a clear dispersion (only loose pellets).

Preferably test firing for shot dispersion is done using exactly the same make and type shotshells as used in the incident itself. In this case very little ammunition was available as the manufacturer in Valjevo, Serbia, is no longer active. At forehand the choice was made to use the seven cartridges [AAHO8122NL#1 to -#7] for shooting distances shorter than 1m in combined tests with the test firing for GSR distribution versus distance.

To determine where dispersion clearly started distances of 1, 3 and 5 meter were shot using cartridges bearing loads of 3.5mm [AAHO8122NL#16 to -#19] and 8mm pellets [AAHO8122NL#32 to -#40].

Cartridges [AAHO8122NL#1 to -#3] were fired into a body simulant consisting of ballistic gelatin covered with leather and a piece of cotton cloth. The gelatin model was used to capture all pellets and wads for use in the comparison of ammunition features. All other test firing shots were fired at cardboard covered with a piece of cotton cloth (size approximately 22 x 22 cm).

7.2

Choice of used shooting distances

Main question in this examination is: is the death of the victim Radislava Vujasinović result of a murder or suicide. In case of suicide the shooting distance is always limited by the physical dimensions of the victim. Inside the NFI ten female stand-ins were selected with body lengths varying from 176 to 182cm (the body length victim was 179cm). Using these stand-ins maximum shooting distances for suicide were determined by placing them in different positions. In these positions the cocked right hammer was released by pulling the front trigger by (right) finger or thumb (A) and by the (right) toe (B). The shotgun was placed in three directions, aiming at the location of the frontal wound of the victim:

1. parallel to / touching the body, flattened on the chest
2. in between position 1 and 3
3. perpendicular to the chest

Compiled figure 16 shows examples of the positions. It was found impossible by the stand-ins to reach and pull the trigger with finger or thumb with the shotgun in position 3. The stand-ins were also asked to place the shotgun as far away as possible (C) while still aiming at the location of the frontal wound of the victim and pull the frontal trigger.

Results of this examination were that within the group of stand-ins the maximum shooting distance for a possible suicide is:

- 13cm pulling the trigger using the finger or thumb (in position A2)
- 45cm pulling the trigger using the toe (in position B1)
- 61cm pulling the trigger using the toe (in position C)

These maximum shooting distances were selected for examination of shot dispersion at these distances. In addition, shooting distances of

⁷ J. Jussila, A. Leppäniemi, M. Paronen en E. Kulomäki (2005) "Ballistic Skin Simulant", Forensic Science International, Vol. 150 No. 1, 2005.

100cm, 300cm and 500cm were selected to determine when dispersion occurs. Furthermore, the selected shooting distances for examining GSR distribution are 0cm, 25cm and 80cm. These distances are used in standard GSR test firing.

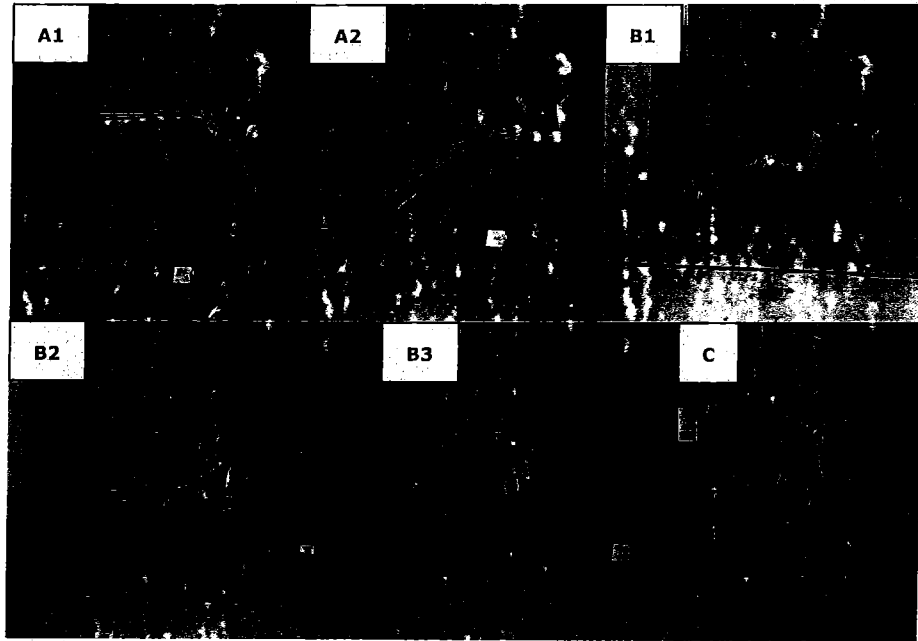


Figure 16 Different positions for determining maximum shooting distances for suicide.

7.3 Shot dispersion versus distance

7.3.1 Results shot dispersion versus distance

The results of the appearance of the dispersion of pellets is described as followed:

1. one hole
2. dispersion starts (one or few lose pellets)
3. dispersion (loose pellets and a hole)
4. clear dispersion (only lose pellets)

Compiled figure 17 shows examples of the different descriptions. Table 8 shows results of all dispersion appearances in the two different used materials.

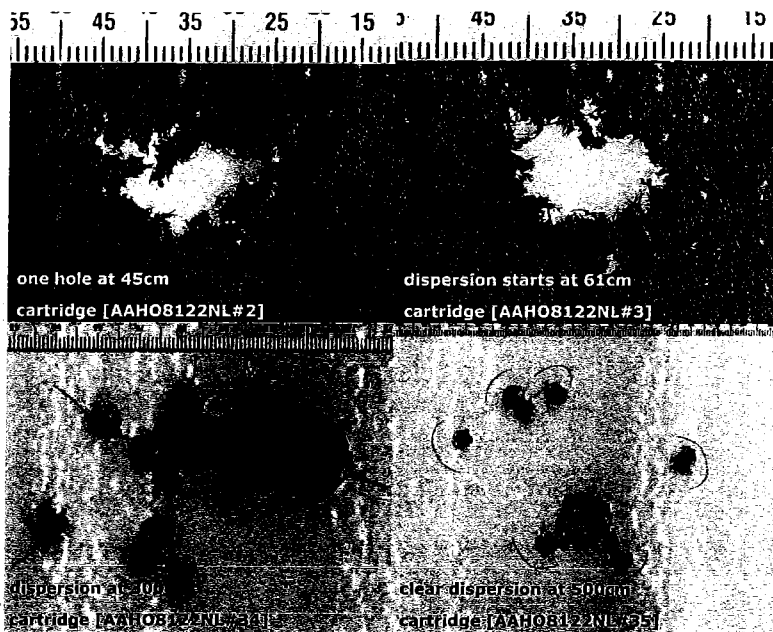


Figure 17 Examples of different appearances of dispersion in leather (upper) and cardboard (lower).

Table 8 Results dispersion appearance

shooting distance (cm)	cartridge [AAH08122NL #...] (diameter pellets)	type of pattern
13	#6 (5mm)	one hole
25	#1 (5mm)	one hole
45	#2 (5mm)	one hole
61	#3 (5mm)	dispersion starts
61	#7 (5mm)	dispersion starts
61	#17 (3.5mm)	one hole
61	#32 (8mm)	one hole
61	#39 (8mm)	one hole
80	#4 (5mm)	dispersion starts
100	#5 (5mm)	dispersion starts
100	#16 (3.5mm)	dispersion starts
100	#33 (8mm)	one hole
100	#38 (8mm)	one hole
100	#40 (8mm)	one hole
300	#18 (3.5mm)	dispersion
300	#34 (8mm)	dispersion
300	#37 (8mm)	dispersion
500	#19 (3.5mm)	clear dispersion
500	#35 (8mm)	clear dispersion
500	#36 (8mm)	clear dispersion

The results of these test firings can be divided in three groups:

1. Up to 45cm one hole was observed in all test firings.
2. Between from 45 to 100cm dispersion starts but still one hole also occurred.
3. Over 100cm only dispersion was observed in all test firings.

7.3.2 **Interpretation shot dispersion versus distance**

Given the questions and the results of the dispersion of the pellets the following hypotheses are considered for frontal wound and the shooting distance:

- Hypothesis 7:* The frontal wound in the chest of the victim is caused by a shot fired at a shooting distance shorter than 45cm.
- Hypothesis 8:* The frontal wound in the chest of the victim is caused by a shot fired at a shooting distance between 45 and 100cm.
- Hypothesis 9:* The frontal wound in the chest of the victim is caused by a shot fired at a shooting distance longer than 100cm.

The found results (i.e. no obvious dispersion of pellets at the frontal wound of the victim) are expected if the shooting distance was shorter 45cm (hypothesis 7). The chance of finding these results if the shooting distance was between 45 and 100cm (hypothesis 8) is expected to be smaller than finding these results if the shooting distance was shorter 45cm (hypothesis 7) but extremely larger than finding these results if the shooting distance was longer than 100cm (hypothesis 9). The chance of finding these results if the shooting distance was longer than 100cm (hypothesis 9) is expected to be extremely small.

7.3.3 **Conclusion shooting distance versus shot dispersion**

The following hypotheses are considered for frontal wound and the shooting distance:

- Hypothesis 7:* The frontal wound is in the chest of the victim caused by a shot fired at a shooting distance shorter than 45cm.
- Hypothesis 8:* The frontal wound is in the chest of the victim caused by a shot fired at a shooting distance between 45 and 100cm.
- Hypothesis 9:* The frontal wound in the chest of the victim is caused by a shot fired at a shooting distance longer than 100cm.

The findings of the shooting distance versus shot dispersion examinations are *far more probable*⁶ if **hypothesis 7 or 8** is true, than if hypothesis 9 is true.

Also:

The findings of the shooting distance versus shot dispersion examinations are *more probable*⁶ if **hypothesis 7** is true, than if hypothesis 8 is true.

7.4 Gunshot residue versus shooting distance examination

7.4.1 *General information about the examination approach*

When a cartridge is discharged with a firearm, the process by which the primer composition and the gunpowder burns, causes a gas cloud. Among other things, this gas cloud contains remains of burned gunpowder (soot particles), unburned gunpowder particles and particles which together form the gunshot residue. Most of the gunshot residue is released at the front, from the barrel of the weapon, together with the discharged projectile(s).

A discharged projectile coming into contact with clothing or with a body usually causes one or more bullet holes. The traces of the gas cloud created during the discharge can also be deposited on a piece of clothing or on the body.

The gas cloud is of importance for determining the shooting distance. After leaving the barrel of the firearm, the gas cloud expands and travels with decreasing velocity and density. If this cloud comes into contact with the victim's clothing or body, this will create a deposit of (extremely) small particles and condensed gases around the entrance hole. The size of this deposit will depend on the type of weapon and ammunition used and the distance between firearm and victim: the shooting distance.

In general a submitted piece of evidence as clothing is visually examined for the presence of bullet holes. Each bullet hole found will be examined separately using an operation microscope. The position on the clothing, the shape and dimensions of the bullet hole will be recorded. The material in the immediate vicinity of the bullet holes found on both the inside and outside of the clothing will be examined with an operation microscope for the presence of blood, body tissue fragments, grey deposit (soot)⁸, bullet wipe ring and gunpowder particles. In the case of indirect entrance holes, traces such as wood, paint, brick, dust etc. will be secured if present. Investigators will also look at whether fibres of the material around the edge of the holes are pointing towards or away from the body. Microchemical test reactions to lead and copper will be carried out at the site of bullet holes on the outside and inside of the material. The observations and results of the tests will be recorded.

After this initial examination, the relevant holes will be chemographical treated. Using a chemographical method, a discoloration image is made of the area around the bullet entrance hole in the victim's clothing in order to reveal the gunshot residue which is not visible to the naked eye.

In order to determine the shooting distance, the NFI GSR Distance Standards database is consulted. A GSR Distance Standard series of a weapon/ammunition combination is made by shooting at pieces of cotton cloth (witness panels) from various distances. Discoloration images are then made of these cloths. The cotton cloths (trace image) and the discoloration images of these together form a series.

If necessary, a GSR Distance Standards series can be made of a weapon/ammunition combination used in the shooting incident. This series will then be used to determine shooting distance and will be added to the file.

Comparing the discoloration and trace images of a bullet entrance hole with those of the GSR Distance Standards series from the database will enable investigators to give an opinion concerning the shooting distance.

⁸ Grey deposit: grey tinge caused by the gas cloud settling around the entrance hole.

If the weapon and the ammunition used is not known the shooting distance can still be determined with the help of the test series database. In this case, broader shooting distance margins will be applied.

7.4.2 Examination approach is this case

In this case the garment of the victim was not available for examination. Therefore visual examination and chemographical tests could not be applied. The pieces of evidence that were available were photographs of the victim at the crime scene, reports from previous forensic investigations, the used firearm and ammunition similar to the one used in the shooting incident.

Since a part of the gunshot residue can be visible on the photographs of the victim, photographs can be used to estimate the shooting distance. Moreover information of the size and shape of the wounds of the victim was known.

In this case the following approach was used:

- 1) Determine the maximum possible shooting distance, since in the case of suicide the shooting distance is always limited by physical dimensions of the victim.
- 2) Perform test firing with firearm [AAHJ2630NL] and ammunition [AAHO8122NL] in order to determine the amount and spacial distribution of GSR around entrance holes and the shape and dimension of entrance holes.
- 3) Determine the dimensions and amount of possible deposited GSR from the photographs.
- 4) Determine the dimensions of the entrance wound from the reports of the previous forensic examinations.
- 5) Compare the test firing results with the information in the case.

7.4.3 Determination of the dimensions and amount of possible deposited GSR

A series of photographs including the photographs in figure 18 was received. A marked area on the knitted sweater depicted by an arrow was observed. The location of this marked area most probably corresponds to the position of the entrance wound in the victim. The photograph depicts a discoloration at this position. This discoloration may be blood, may be dirt or may be gunshot residue.

A size indication was not used when taking the photographs. Since the size of a possible deposited GSR pattern is important in estimating the shooting distance, an estimation of the size of the discoloration (in the photographs depicted with an arrow) was obtained by using information of the autopsy reports. In the autopsy report of 11 April 1994 of dr. Aleksanric and dr. Kovacevic about the length of the right arm, it is stated that the distance of the axillary arch to the tip of the middle finger was 71 centimeter and the distance of the elbow to the tip of the middle finger was 45 centimeter. These two distances were used as a reference in order to get an estimation of the size of the discoloration of the knitted sweater.

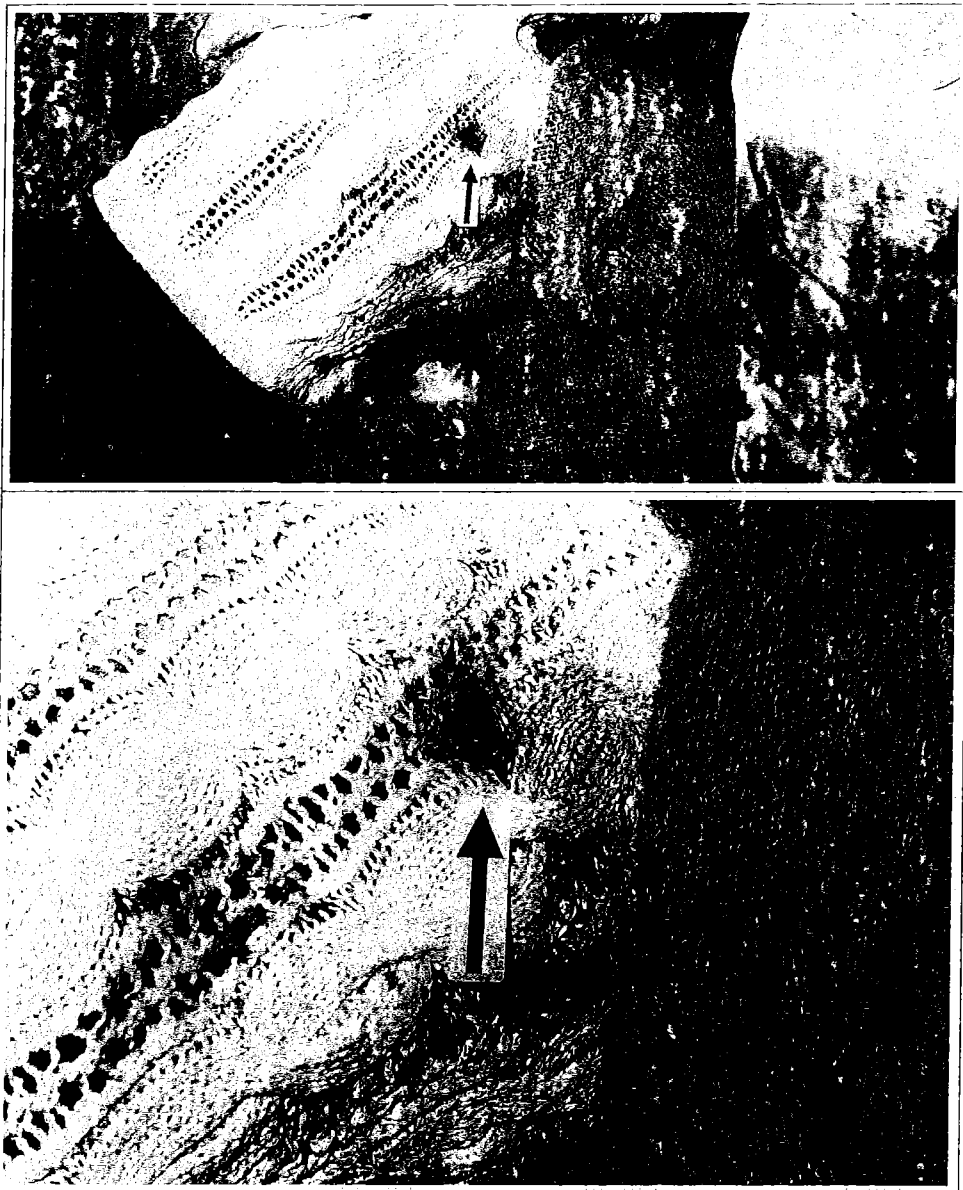


Figure 18 Part of the photo "CS Photographs Folders 01 And 02\01\CNV000019.JPG" (above), and photo "CS Photographs Folders 01 And 02\01\CNV000020.JPG" (below) from CD victim photographed at her apartment.

Based on these distances the dark discoloration of the knitted sweater was estimated to be around 4 × 3 centimeter. The estimated area should be seen as one with large margins.

It needs to be stated that the nature of this discoloration cannot be determined and furthermore is not described in the received documentation. As mentioned the discoloration may be deposited gunshot residue (soot), blood from the victim or something else. To my view in the received reports of previous forensic examinations the dimensions and the nature of this discoloration of the knitted sweater are not described.

In the autopsy report of 11 April 1994 of dr. Aleksanric and dr Kovacevic it is stated that a blackened and scorched skin 7 centimeter to the right, 2 centimeter above,

3.5 centimeter to the left and 2.5 centimeter below the wound was observed. This corresponds to an area of 10 × 5.5 centimeter.

7.4.4 ***Determination of the size and the shape of the entrance wound***

In the autopsy report of 11 April 1994 of dr. Aleksanric and dr Kovacevic several wounds in the victim are described. The wound that seems to be most relevant for the gunshot residue examination is the frontal wound. According to the report it was an ellipsoidal 2.0 × 1.6 centimeter wound.

7.4.5 ***Test firing***

Test firing was performed in order to determine the amount and spacial distribution of visible gunshot residue and the shape and size of the entrance hole. In figure 19 pictures the cotton cloths that were shot upon are depicted.

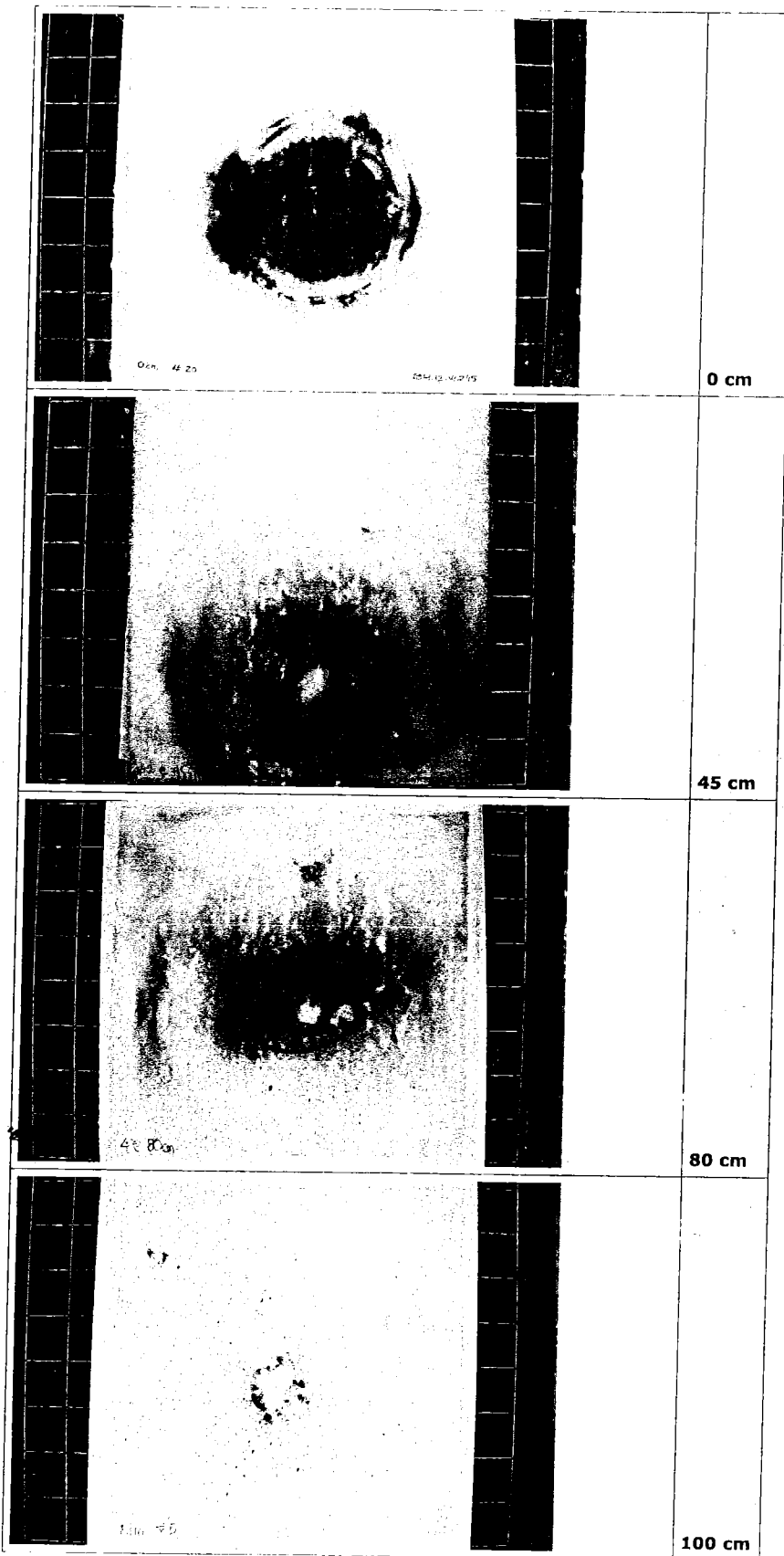


Figure 19 Photographs of the cotton cloths that were shot upon.

As shown in the examples of the photographs of the cotton cloths that were shot upon, shorter shooting distance corresponds to intenser soot deposition around the entrance hole. At some distance the soot is not visible anymore with the naked eye and one needs to use other characteristics to estimate the shooting distance. Another finding is that the shape of the entrance hole at a distance of 0 cm is different from that at greater distances before the dispersion starts. At 0 cm a star-shape entrance hole is formed. This is expected because at this distance all the gasses are forced through the cotton cloth. This force tears the cotton cloth and causes a large damage.

One of the uncertainties in this investigation is the determination of the dimensions of the soot based on the dimensions of the discoloration of the clothing and the blackening on the skin of the victim. From photographs it is quite difficult to see if light soot (if any) is present. For example, an amount of soot comparable to the the soot of the example in photograph 4 (100 cm) in figure 19 would probably not be visible on the received photographs of the victim. The dark soot is believed to be visible in the photographs. In order to compensate with this uncertainty light soot was not taken into account when measuring the dimensions of the soot resulting from the test firings. For example photographs 3 (80 cm) in figure 19 only the soot in the circled area was taken into account
The dimensions of the soot on the cotton clothes was measured and taking into consideration the above mentioned point (see table 9).

Table 9 Results dimensions of the soot on the cotton clothes

shooting distance (cm)	cartridge [AAH08122NL #...] (diameter pellets)	type of pattern	dimensions of soot (cm)
0	#20 (3.5mm)	one hole	10 × 8
5	#21 (3.5mm)	one hole	14 × 14
10	#22 (3.5mm)	one hole	12 × 11
13	#23 (3.5mm)	one hole	14 × 14
13	#6 (5mm)	one hole	16 × 16
15	#24 (3.5mm)	one hole	8 × 8
25	#25 (3.5mm)	one hole	9 × 9
25	#1 (5mm)	one hole	6 × 6
45	#26 (3.5mm)	one hole	12 × 11
45	#2 (5mm)	one hole	9 × 7
45	#27 (3.5mm)	one hole	6 × 6
61	#3 (5mm)	dispersion starts	5 × 7
61	#7 (5mm)	dispersion starts	6 × 6
61	#17 (3.5mm)	one hole	7 × 6
61	#32 (8mm)	one hole	3 × 3
61	#39 (8mm)	one hole	4 × 4
80	#4 (5mm)	dispersion starts	6 × 6
100	#5 (5mm)	dispersion starts	light soot
100	#16 (3.5mm)	dispersion starts	light soot
100	#33 (8mm)	one hole	light soot
100	#38 (8mm)	one hole	light soot
100	#40 (8mm)	one hole	light soot
200	#18 (3.5mm)	dispersion	no soot
300	#34 (8mm)	dispersion	no soot
300	#37 (8mm)	dispersion	no soot
500	#19 (3.5mm)	clear dispersion	no soot
500	#35 (8mm)	clear dispersion	no soot
500	#36 (8mm)	clear dispersion	no soot

7.4.6 Comparison between test firing and pieces of evidence

As mentioned earlier the area covered by possible soot on the pieces of evidence could be 10 x 5.5 cm (related to the het body of the victim -autopsy report) or 4 x 3 cm (related to the clothing -as calculated from the photographs). Based on the results of the test firing, the resulting soot distributions on the cotton cloths and the results concerning the maximum shooting distance for a possible suicide using the group of stand-inns (section 7.2), five categories of shooting distance were defined:

1. Shooting distance smaller than 13cm: the area of the soot is intense and covers an area greater than 10 x 5.5cm (the area stated in the autopsy rapport as blackened).
2. Shooting distance of 13 to 45cm: the area of the soot covers an area greater than 4 x 3 cm (the area of the discoloration on the photographs of the victim).
3. Shooting distance of 45 to 80cm: the area of the soot covers an area comparable to the area 4 x 3 cm (the area of the discoloration on the photographs of the victim).
4. Shooting distance of 80 to 100cm: light soot was observed at the test firings. Such a soot would not be clearly visible in a photograph.
5. Shooting distance greater than 300cm: in none of the test firings soot was observed.

It needs to be noted that for the test firing cartridges with different loads were used. Such conditions of test firing are not ideal but since appropriate ammunition was not available the test firing was performed as such. This was also taken into account for the conclusion.

Concerning the shape of entrance hole it was observed that there were no differences between the shape of the entrance hole and at the different distances (except for the 0 cm shooting distance and distances beyond the start of the dispersion). At a distance of 0 cm one expects a lot of damage at the entrance hole.

7.4.7 Conclusion shooting distance using gunshot residue

Under the assumption that the discolorations on the skin and the clothing consist of deposited gunshot residue, the following conclusion for the frontal wound and the shooting distance can be drawn:

The findings using gunshot residue examination are *far more probable*⁶ if the shooting distance lies in the range between 13 and 80 cm than another shooting distance range.

The findings are *more probable*⁶ if the shooting distance was not 0 cm.

Under the assumption that the discoloration on the skin and the clothing do not consist of deposited gunshot residue, the following conclusion for the frontal wound and the shooting distance can be drawn:

The findings using gunshot residue examination are *far more probable*⁶ if the shooting distance is larger than 80 cm than lower than 80 cm.

The findings are *more probable*⁶ if the shooting distance was not 0 cm.

8 Summary of findings

The main goal of the examination was to investigate whether it would be possible to differentiate between suicide and murder. In this chapter the findings from the various experts in the case are summarized taking into account the above mentioned goal.

Biological traces and DNA analysis

The DNA profiles obtained from the felt wads [AAHJ2633NL] and from the pellets [AAHJ2634NL] can originate from the victim R. Vujasinovic, a biological daughter of R. Vujasinovic and T.N. Vujasinovic. This is in agreement with the information that the felt wads [AAHJ2633NL] and the pellets [AAHJ2634NL] were retrieved from the body/clothing of the victim.

No DNA profiles were obtained from the pellets retrieved from the apartment [AAHJ2640NL and AAHJ2641NL] and from the cotton pieces to clean the left barrel [AAHJ2638NL].

The findings of the biological traces and DNA analysis cannot discriminate between murder, suicide or accidental death of R. Vujasinovic.

Pathology

Conclusions with regard to the **manner of death** cannot be drawn on the basis of the findings described in the report of the post mortem examination. The injuries as described in the autopsy report can be the result of murder, suicide or accident.

Firearms and ammunition examination

Conclusions with regard to the **manner of death** cannot be drawn on the basis of the findings described in chapter 6.

In this examination there were only indications found to one shot being fired. The indication to murder based on the suggestion of two shots being fired because of the two wad-parts [AAHJ2633NL] can be refuted.

Shooting distance estimation

In the case of a murder

In the case of a murder any shooting distance is possible. Therefore based on the results of the shooting distance estimation murder can not be excluded.

In the case of a suicide/accidental

In the case of a suicide/self inflicted accident only short shooting distances are possible.

During a suicide the state of mind of a person is known to be important. This can have influence to his/her body position. Although we are no experts in the field of human behaviour due to the dimensions of this firearms (large shotgun), experiments were performed with stand-ins to determine average relevant shooting distances. Based on this arguments the following can be concluded.

Under the assumption that the discolorations on the skin and the clothing consist of deposited gunshot residue, the following conclusion for the frontal wound and the shooting distance can be drawn:

The findings are *more probable*⁶ if the shooting distance was not 0 cm.
The findings using gunshot residue examination are *far more probable*⁶ if the shooting distance lies in the range between 13 and 80 cm than another shooting distance range.

Note: 13 cm is the maximum distance for possible shooting distance within the group of stand-ins for a possible suicide is when trigger was pulled using the finger or thumb.

Under the assumption that the discoloration on the skin and the clothing do not consist of deposited gunshot residue, the following conclusion for the frontal wound and the shooting distance can be drawn:

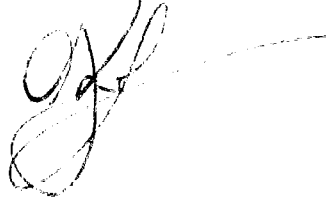
The findings are *more probable*⁶ if the shooting distance was not 0 cm.
The findings using gunshot residue examination are *far more probable*⁶ if the shooting distance is larger than 80 cm than lower than 80 cm.

One needs to stress that the last conclusion has a low evidential value. With this examination it was not possible to exclude one of the two scenario's (murder or suicide).

Signing

Drawn up and signed as NFI reporting officer on forensic investigation of biological traces and DNA, registered by the Netherlands Register of Court Experts in Criminal Cases (www.nrgd.nl).

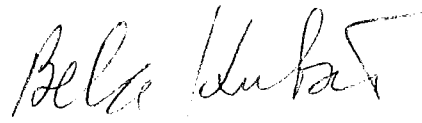
Location The Hague
Date 10 June 2016



Name A.J. Kal, PhD

Drawn up and signed as NFI expert in forensic pathology registered by the Netherlands Register of Court Experts in Criminal Cases (www.nrgd.nl).

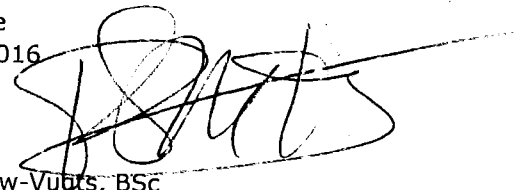
Location The Hague
Date 10 June 2016



Name prof. dr. B. Kubat

Drawn up and signed as NFI reporting officer on forensic investigation of Firearms and Ammunition, registered by the Netherlands Register of Court Experts in Criminal Cases (www.nrgd.nl).

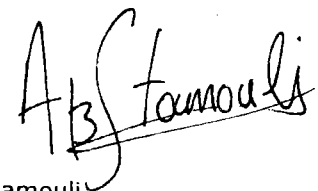
Location The Hague
Date 10 June 2016



Name P.J.M. Pauw-Vuurs, BSc

This report was formulated truthful, completely, and to the best of my knowledge as a GSR expert⁹

Location The Hague
Date 10 June 2016



Name dr. A. Brouwer-Stamouli

⁹ An NFI expert has been trained and confirmed by the NFI. The NFI authorizes him/her to formulate and sign expert reports. During the investigation, he/she uses the NFI infrastructure, standard operation procedures and quality assurance system.

Attachment 1: Used shotshells [AAHO8122NL]

All used shotshells have a cardboard case hull bearing a print of the brand logo of Krušik, the text 'VALJEVO' and the text '-70mm-'. The differences were the color hull, a draft of an animal or the text 'STANDARD', the color and print on the top end covers and the mass. Also the text 'STANDARD' is printed with clean-type letters or scribe-type letters. Table 10 shows all specifications for the used shotshells [AAHO8122NL] and table 11 of the 4 shotshells [AAHJ2628NL and -31NL]. Not all numbered shotshells [AAHO8122NL] were used during the test firing, these will not be described.

Table 10 Specifications the used shotshells [AAHO8122NL]

shotgun cartridge #	mass (gram)	drawn animal or text 'STANDARD' in <i>clean-type</i> or <i>scribe-type</i> letters	color hull	color top end cover	text top end cover (load)	load / wad checked
1 to 7 (7)	41.5 to 41.8	seagull	green	red	2 5m/m	√
8, 9 (2)	40.5 and 40.3	'STANDARD' <i>clean-type</i>	blue	purple	2 5m/m	-
10	40.0	'STANDARD' <i>clean-type</i>	orange	purple	2 5m/m	-
11, 12 (2)	37.7 and 37.4	'STANDARD' <i>scribe-type</i>	yellow	orange	6 4m/m	-
13	40.6	'STANDARD' <i>clean-type</i>	black	yellow	6 4m/m	-
14, 15 (2)	not used					
16, 17 (2)	41.3 and 41.3	hare	yellow	red	8 3.7m/m	√
18, 19 (2)	41.5 and 41.5	hare	orange	orange	8 3.7m/m	-
20 to 23 (4)	38.7 to 39.4	crane (2), seagull (1), duck (1)	green	blue	8 3.5m/m	√
24 to 26 (3)	41.6 to 41.7	hare	blue	blue	8 3.5m/m	√
27	43.7	crane	red	blue	8 3.5m/m	√
28	39.8	'STANDARD' <i>clean-type</i>	black	red	10 3m/m	plastic wad
29 to 31 (3)	not used					
32 to 36 (5)	39.4 to 39.7	hare	blue	white	P8	√
37 to 39 (3)	39.4 and 39.6	crane (2), hare (1)	green	orange	p 8m/m	√
40	39.6	owl	yellow	orange	p 8m/m	-
41	not used					
42	39.1	'STANDARD' <i>scribe-type</i>	yellow	orange	p 8m/m	√
43 to 45 (3)	not used					

Table 11 Specifications the shotshells [AAHJ2628NL and -31NL]

shotgun cartridge #	mass (gram)	drawn animal or text 'STANDARD'	color hull	color top end cover	text load
AAHJ2628NL	41.4	hare	green	red	2 5m/m
AAHJ2631NL	40.7	goose	green	orange	2
	40.8	goose	green	orange	2
	40.6	hare	green	orange	2

From different shotshells loads were captured, the wad included, to determine what type of load and wad were fired. Loads and wads from the shotshells #1 to #3 were captured in ballistic gelatin. Loads and wads from the shotshells #17, #20, #21, #24, #27, #32, #33, #38 and #39 were captured in Kevlar sheets. All these shotshells consisted of the load mentioned in the column "Text load" and the same type of wad as wad-parts [AAHJ2633NL] and the wad from the disassembled shotshell [AAHJ2637NL].

After test firing the shotshells mentioned in table 10, 4 plastic wads were retrieved from the shooting range (amongst several more felt wads). The type of wad (felt or plastic) is considered of some amount of influence on the distribution of gunshot residue particles and pellets. To determine where these plastic wads came from two unfired shotshells #28 and #42 were disassembled. This was done to determine if there is a difference in composition between shotshells bearing the text 'STANDARD' printed with clean-type letters or scribe-type letters. Shotshell #28 bearing the text 'STANDARD' in the clean-type letters has a plastic wad. Shotshell #42 bearing the text 'STANDARD' in the scribe-type letters has a felt wad the same type of wad as wad-parts [AAHJ2633NL] and the wad from the disassembled shotshell [AAHJ2637NL]. As a result of this, shotshells #8 to #10 and #13 were most likely equipped with plastic wads and should be used in further examinations with extra caution because of this.

Also of course all other shotshells, except for #1 to #7, were equipped with different type of loads. Using results of these test firings in further examinations should also be done with extra caution.

The 7 shotshells #1 to #7 are considered as same type and load as shotshell [AAHJ2628NL], retrieved from left barrel shotgun [AAHJ2630NL].

There is no information about the storage conditions of these shotshells and as the ammunition is somewhat dated this could affect the results.