

DDAS Accident Report

Accident details

Report date: 15/03/2004	Accident number: 324
Accident time: 11:05	Accident Date: 26/04/2001
Where it occurred: Nr Kraljan, MNB West	Country: Kosovo
Primary cause: Field control inadequacy (?)	Secondary cause: Management/control inadequacy (?)
Class: Missed-mine accident	Date of main report: 03/05/2001
ID original source: MF/CC/JF No.002/2001	Name of source: KMACC
Organisation: Name removed	
Mine/device: PMA-3 AP blast	Ground condition: leaf litter soft woodland (light)
Date record created: 20/02/2004	Date last modified: 20/02/2004
No of victims: 1	No of documents: 3

Map details

Longitude:	Latitude:
Alt. coord. system: GR 34T 59763 08987	Coordinates fixed by:
Map east:	Map north:
Map scale:	Map series:
Map edition:	Map sheet:
Map name:	

Accident Notes

dog missed mine (?)
non injurious accident (?)
mine/device found in "cleared" area (?)
incomplete detonation (?)

Accident report

The following is the accident report provided by the MACC, edited for anonymity.

Introduction

1. In accordance with the Mine Action Co-ordination Centre (MACC) Standard Working Procedure No 4, the MACC Chief Operations Officer (COO), in the absence of the Programme Manager, issued a Convening Order on Friday 27th April 2001, for an accident investigation Board of Inquiry (BOI). Annex A details the Convening Order.
2. This is a comprehensive report by the Board of Inquiry into the Mine accident that occurred on the 26th April 2001. Based on the investigation, [Demining group] internal report, the statements from [Demining group] personnel involved in the accident (see Annex B), visits to the accident site and the photos from the accident site, this can be considered as a preventable mine accident.
3. The information provided by [the demining group] to the MACC Headquarters in the "Mine/UXO Incident/Accident Report", attached as Annex C is confirmed. The accident occurred at approximately 1105 hrs on 26th April 2001 in a minefield located near the village of Kraljan at GR 34T 59763 08987 (seat of explosion). Annex D details a map of the general area and Annex E details an aerial photograph of the general area. Fortunately, because the mine failed to function correctly, the deminer involved did not sustain any injuries as a result of this accident.

Pre- accident events

4. A demining section from demining platoon No 2 were working at the demining site at Kraljan. As the majority of the area had been cleared previously, personnel were involved in getting the site ready for completion. This involved checking the distances and bearings in-between turning points, removing old marking and clearing the loose vegetation. In an area to the North of the accident area, another area had also been boxed off and was awaiting the clearance by Explosive Detection Dogs (EDD) assets the following day.
5. At approximately 1105 hrs there was an uncontrolled explosion after [the Victim] inadvertently stood on a PMA-3 anti-personnel mine, in an area that [another demining group's] EDD assets had previously cleared in 2000.

Post-accident events

6. Following the uncontrolled detonation, all operations were stopped, the Site Supervisor secured the site and cleared up to, and then recovered the mine. The mine was located 55cm forward of the original EDD box marking. All relevant accident information was then passed up through the chain of command to the MACC.



[The accident site. The area up to the trees had been flailed.]



[The hole left by the mine after removal. (Hole 110mm in diameter and 40mm deep).]

7. On the following day the BOI arrived at the accident site, was briefed by the Site Supervisor and shown the accident area. Authorisation was requested by the BOI and subsequently given by the MACC COO for [the demining group's] on-site assets to be used to re-box the original EDD search area and for [a third demining group's] on-site EDD assets to be used to re-check the area that had been originally cleared. The original boundaries of the 3 x search boxes were easily defined by following the paths of the manual clearance teams. Annex F details a schematic diagram of the boxed areas.
8. Once the boundaries had been defined and marked, the EDD assets were then put through the area on two different occasions. The first occasion a "Free Running dog" was used and on the second occasion a "Straight Lane Running dog" was used. The EDDs gave a total of 7 x indications (5 x indications on the first occasion and 2 x indications for the second occasion). In-between the two occasions that the EDDs were used, [the demining group's] manual demining assets checked the indications and the following items were recovered:
 - 51 x PMA-3 Safety clips (in one location).
 - 1 x Piece from a PMA-3 anti-personnel mine body.
 - 1 x Piece from a PMR-2 detonator holder.
9. Once the area had been re-checked by the EDD assets, it was declared clear by the BOI and the investigation then continued.

Work History of the Victim

10. [The Victim] had been working for [the demining group] since May 2000 and is considered to be a competent and trustworthy employee; disciplinary action has never had to be taken against him.

Past History of the Area

11. The mine-contaminated area was initially identified during the countrywide survey in 1999. The Ministarstvo Untrasnjih Poslova (MUP) mined the area in May 1999. A mixture of MUP and Vojska Jugoslavije (VJ) had occupied the area for a period of 3 months.
12. Following the withdrawal of Yugoslavian armed forces in June 1999, there was an accident in the area involving a local Kosova Liberation Army (KLA) commander. No further details are available.
13. The MUP mine record details 2 x rows of mines consisting of a row containing 210 x PMR-2A and a second row containing 380 x PMA-3 anti-personnel mines. The report states that both rows of mines extend over a distance of 750m each, with the PMRs spaced at an interval of 14m and the PMAs spaced at an interval of 3m. This in fact is inaccurate and physically impossible as a total distance of 2940m would be required for the PMRs, and a total distance of 1140m would be required for the PMAs. Annex G details the MUP minefield record.

Sequence, Documentation and Procedure of Tasking

14. The task dossier, No W02-01/2 was issued to [the demining group] in March 2000. Work commenced on the site on the 17th April 2000 and the task was suspended on the 24th November 2000. During the clearance operation 19,384 m/sq. of contaminated land was manually cleared resulting in the clearance of 88 x PMA-3, 18 x PMR-2A and 3 x PMR-2AS anti-personnel mines. Annex H details the suspension report.
15. The task dossier was re-issued to [the demining group] on the 16th February 2001. Work re-commenced on the 12th March 2001 and up to the time of the accident 2,141 m/sq. of contaminated land had been manually cleared resulting in the clearance of 6 x PMA-3 anti-personnel mines and 1 x PMR-2A anti-personnel mine fuze. Annex I details the site map.
16. [The demining group] mechanical assets conducted clearance in the area during 2000. The area cleared was in and around the site administration area and in the open area adjacent to the administration area and down towards the wooded area along the lines of mines. A total of 42,550 m/sq of contaminated land was cleared resulting in the clearance of 12 x PMA-3 and 4 x PMR-2A anti-personnel mines. 14 x mines detonated and 2 x broke up during the mechanical clearance.
17. [A second demining group's] EDD also conducted clearance in the area in support of [the demining group's] manual demining teams on 6 different occasions during 2000. A total of 14 hours were spent searching 5,057.5 m/sq. of land resulting in no indications by the dogs and no items found. The same dog handler and 2 x dogs were used on all six occasions. Annex J details the daily work reports for the EDDs.

Geography and Weather

18. The task site is situated in a wooded and open area to the North of the village of Kraljan. Access to the site is via a track from the village of Kraljan, Access to Kraljan is via road/route No 9-1 (Klina – Djakovica main road). The wooded area consists of both deciduous and evergreen trees and bushes. The weather at the time of the accident was fine with a temperature of approximately 15 degrees Celsius.

Site Layout and Marking

19. As mentioned previously, with the exception of the area that had been prepared for dogs, the site was being prepared for completion and a large proportion of the manual demining marking had been taken down. The marking of the area after the accident was as per [the demining group] SOPs.

Management Supervision and Discipline

20. An International Supervisor supervises [the demining group] Kraljan demining site along with a National Trainee Site Supervisor who works directly alongside the international. During the clearance that was conducted last year, 2 x demining platoons worked on the site. This year the number had been reduced to 1 x demining platoon (platoon no 3). Each demining platoon consists of 3 x sections, each supervised by a Section Leader and 2I/C and supported by a medical team. Overall discipline on the site was good.

Quality Assurance and Quality Control

21. [The demining group] Internal Quality Control (QC) and Quality Assurance (QA) is achieved through a system of on-site checks by both National and International staff to ensure adherence to demining SOPs. The MACC QA teams conduct external QA. The last MACC QA visit was conducted on the 03rd April 2001 where Setting Up and Manual clearance was evaluated, both the evaluation results were good.
22. The EED team was accredited on the 06th July 2000, and no External QA evaluations had been conducted since the accreditation date. No Internal QC records for the EDD team were available from [the relevant demining group].

Communications and Reporting

23. Communications in-between the Kraljan demining site and [the demining group] base location in Pec is maintained via VHF vehicle mounted and hand-held radios using the Kosovo wide channel and MNB(W) channel. On the day of the accident, communications between the site and [the demining group] base location were good, and all accident information was passed to the relevant [the demining group] personnel.

Medical Details

24. No injuries were sustained to Deminer after he inadvertently stood on the PMA-3 anti-personnel mine. Proper and appropriate medical cover was however at the demining site at the time of the accident.

Personnel

25. A list of all personnel and their duties has been previously detailed at Annex B. Written statements from [the demining group] personnel directly involved in the accident and [the demining group] internal report form Appendices to this Annex.

Dress and Personal Protective Equipment (PPE)

26. At the time of the accident all personnel working in the mined area were wearing PPE. No damage was sustained to any item of PPE following the accident. [By inference from the PPE used by the demining group and recorded in other accidents, the victim was wearing helmet, short visor and frontal apron.]

Tools and Equipment

27. No tools or equipment were being used at the time of the accident.

Details of Mine Involved

28. The PMA-3 is a small anti-personnel mine, which consists of a two part flat cylindrical body. The upper and lower body parts are sealed with a black synthetic rubber cover. The upper body part is a rotating pressure plate, which contains the 35g pressed TNT main explosive charge and fuze housing. A spring safety ring is retained by plastic clip with a lanyard attached. The lanyard is wound around the circumference of the mine and secured with a length of adhesive tape.
29. The UPMAH-3 fuze with chemical friction igniter is almost entirely made from plastic, with the only metal components being a small metal firing pin encased in a plastic nipple, which protrudes from the bottom of the fuze and an aluminium cover on the detonator cap. The low explosive chemical friction igniter contains potassium chlorate, red phosphorus and a binder. The primary high explosive detonator consists of a M-17 P2 detonator which contains Tetryl, lead azide and lead styphnate.
30. The PMA-3 is designed to function only when the upper pressure plate rotates within the lower housing. The emplacement directions recommend a cover of 2-4mm and horizontal placement of the pressure plate to take advantage of the pressure hardened or blasts resistant design. Additionally the design for a non-axial load means that the necessary pressure to function the mine decreases, as the load is placed closer to the edge. The normal operating pressure ranges from 8kg to 20 kg. However, it is possible that when pressure is applied right at the very edge of the upper body part, as little as 3kg could function the mine.
31. Pressure on the top of the mine causes the upper pressure plate to rotate within the lower housing. The fuze nipple, which fits tightly in the fuze cap, breaks igniting the low explosive friction igniter. The resulting explosion is transferred to the primary high explosive detonator. The detonating wave is then transferred into the main secondary high explosive charge.

[Pictures of mine removed.]

Account of Activities

32. The following is a description of the events leading up to and following the accident. The information from the investigation forms the basis of the description of events.

26/04/01.

- 1105 hrs – Uncontrolled explosion at Kraljan demining site.
- 1115 hrs – Site supervisor informs [the demining group] base location.
- 1120 hrs – Site supervisor secures the area as per [the demining group]'s SOP's.
- 1300 hrs – Site supervisor clears up to and removes the mine.
- 1315 hrs – [the demining group] Programme Manager and Project Manager arrive at accident site.
- 1430 hrs – All [the demining group] personnel move to base location at Pec.
- 1500 hrs – MACC informed of accident and a site visit is scheduled.
- 1600 hrs – MACC COO convenes BOI.

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- 0715 hrs – BOI leaves MACC to the Kraljan accident site.
- 0730 hrs – Confirmation in-between BOI and [the demining group] Project Manager of accident site visit.
- 0845 hrs – Arrival of BOI at accident site.
- 0845 hrs – Site accident brief by site supervisor.
- 0945 hrs – Authority given from MACC COO for [the demining group] to re-box the area and to use [another group's] EDD assets to re-check area.
- 0950 hrs – [the demining group] demining team start to re-box the area.
- 1040 hrs – [the demining group] demining team complete re-boxing the area.
- 1050 hrs – [Third demining group's] EDD "Free Running dog" starts to check the area.
- 1125 hrs – [Third demining group's] EDD "Free Running dog" complete checking the area (5 x indications).
- 1135 hrs – [the demining group] demining team start to check indications.
- 1245 hrs – [the demining group] demining team complete checking the indications (51 x PMA-3 safety clips and 1 x small piece from a PMA-3 mine body were located).
- 1255 hrs – [Third demining group's] EDD "Lane dog" starts to check the same area.
- 1330 hrs – [Third demining group's] EDD "Lane dog" complete checking the area (2 x indications).
- 1335 hrs – [the demining group] demining team start to check indications.
- 1355 hrs – [the demining group] demining team complete checking the indications (detonator holder from a PMR-3 was located).
- 1400 hrs – Area clear given by BOI.
- 1500 hrs – BOI leave accident area and move to [the demining group] base location at Pec.
- 1530 hrs – Arrival at [the demining group] base location.
- 1545 hrs – Brief given to [the demining group] Programme Manager.
- 1600 hrs – Request to [the original EDD team] Programme Manager for the EDD daily work sheets and QC check sheets.
- 1615 hrs – Leave [the demining group] base location and move to MACC.
- 1630 hrs – Confirm with [the original EDD team's] Programme Manager for visit on the 28th April 2001.
- 1815 hrs – Arrival at MACC.

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- 0725 hrs – BOI leave MACC and move to [the demining group] base location.

- 0945 hrs – Arrival at [the demining group] base location.
- 1000 hrs – 1445 hrs – Accident investigation (site statistics, witness statements, interviews etc).
- 1445 hrs – BOI move to [the original EDD team's] base location.
- 1515 hrs – BOI arrival at [the original EDD team's] base location.
- 1530 hrs – 1600 hrs – Accident brief given to [the original EDD team's] Programme Manager and the Dog Team Leader. EDD daily work sheets were obtained but no internal QC check sheets were available.
- 1610 hrs – BOI leave [the original EDD team's] base location and move to MACC.
- 1820 hrs – BOI arrival at MACC.

Insurance Details

33. All [the demining group] staff involved in UXO/mine clearance activities in Kosova are covered by the standard [the demining group] insurance through Lyberg and Partners AS. As there were no injuries sustained to any [the demining group] staff during the accident, no insurance claims will be necessary.

Conclusions

34. Based on the accident investigation, the statements and visit to the site, the BOI conclude the following:

- Confusion exists in the MACC Guidelines and Technical Standards for Mine/UXO clearance regarding the definition of an “Accident” and the definition of an “Incident”. Under the current wording, this could be described as being either, however, the intent of document is such that this is classified by the MACC as a mine accident.
- There was an explosion as opposed to a detonation of the PMA-3 anti-personnel mine when [the demining group] deminer stood on it. The low explosive chemical igniter exploded, but the “flash” was not transferred to the high explosive detonator. Explosions occur in low explosive compounds, whereas a detonation occurs in high explosive compounds.
- Visual inspection of the UPMA-3 fuze showed that the chemical igniter had functioned, but the detonator was still in place. Should the detonator have functioned and the detonating wave been transferred into the main secondary high explosive fill then the resulting injuries to the deminer would have been very serious.
- The accident occurred as a result of a [the original EDD team's] failing to indicate the presence of a PMA-3 anti-personnel mine during clearance operations that took place in 2000.
- The mine had not been re-laid following the [the original EDD team's] clearance, as evidence shows that the mine had been in the ground for a considerable period of time and it is in the line of the other PMA-3s previously cleared.
- The EDD team had covered a large number of different tasks in a relatively short period of time, therefore not allowing any time for the establishment and calibration of the EDD assets in those areas.
- There is insufficient communication and dialogue existing in-between clearance organisations regarding EDD team asset use.
- No information (diagrams/maps) detailing the areas that the EDD assets had cleared was available to the BOI.
- EDD assets were tasked to work in a unsuitable area that contained a high level of explosive contamination and a high amount of vegetation.
- No Internal QC or External QA evaluation reports were made available to the BOI.
- Insufficient information is recorded in EDD daily work reports.
- There is no evidence to suggest that [the demining group] SOPs were infringed or that work procedures were not adhered to.
- The marking of the accident site was in accordance with current [demining group] SOPs.
- The BOI agrees with [the demining group] internal accident report.

- The suggestion that the same [the original EDD team's] assets had previously missed a PMR-2 anti-personnel mine at the same task site as detailed in some of the [the demining group] witness statements, is discredited.
- The other area that has been prepared for EDD asset clearance is unsuitable.

Recommendations

35. The following are recommendations based on the BOI conclusions:

- An amendment is made to Chapter 17 of the MACC Guidelines and Technical Standards for Mine/UXO clearance, to better define the terminology of what constitutes an "Accident" and what constitutes an "Incident".
- All organisations are to immediately report all accidents to the MACC in order that a full and detailed investigation may be conducted. Without a full and detailed investigation, conducted by a properly constituted and appointed BOI, subsequent reference to previously undocumented accidents may be considered invalid.
- The area that has been prepared for EDD clearance now be cleared by [the demining group's] manual assets, as there is too much loose vegetation littering the area.

Further recommendations that have previously been identified following investigations last year are detailed below. Amendments have also been made to the MACC Guidelines and Technical Standards for Mine/UXO clearance and consequently EDD clearance organisations SOPs have also been amended. However, for the purpose of this accident investigation they are reiterated again below:

- The inter-agency tasking of EDD assets has to be strictly controlled by MACC Operations in consultation with the MACC QA EDD Officer.
- Inter-agency communication and reporting between clearance organisations, regarding EDD assets is essential and must occur during all stages of the clearance operation. This is to include the appropriate marking, mapping and reporting of all areas that have been cleared by EDD teams, to the organisation that has overall responsibility of that particular site. The information is then to be recorded in the task dossier, and in any suspension or completion report that is subsequently prepared.
- EDD team should not be tasked to areas that contain high levels of explosive contamination, or to areas with dense vegetation. Annex K details a photograph showing the dense vegetation within the EDD boxes.
- Internal QC and External QA evaluations should be conducted on each EDD team on a weekly basis and all relevant information reported and recorded.
- More information should be included in the EDD daily work reports, the recorded information analysed and any queries acted on.

Signed: QA Team Leader.

Annexes:

- A. MACC convening order for accident investigation Board of Inquiry.
- B. List of personnel involved with attached statements as Appendices.
- C. IMSMA Mine/UXO Incident/Accident report.
- D. Map of the general area.
- E. Aerial photograph of the general area.
- F. Schematic diagram of the accident area/scene.
- G. MUP minefield record.
- H. Suspension Report.
- I. [the demining group] current site map.
- J. [The original EDD group's] daily work reports for the MDD Handler.

K. Photograph showing dense vegetation in EDD boxes.

Comments by the MACC Chief Operations Officer.

This accident serves to highlight and validate the checks and balances now incorporated within Chapter 11 of the 2001 MACC Technical Guidelines and Standards. These amendments were based on a number of "lessons learnt" during 2000 and if they had been in place at the time of the cause of this accident it is unlikely that it would have occurred.

The conclusions and recommendations of the BOI are agreed and fully concurred with.

The MACC QA EDD Officer is to ensure that Chapter 11 of the MACC Technical Guidelines and Standards is fully complied with, at all times. He is also to oversee the deployment of EDD assets to ensure that they are used correctly and in suitable terrain.

Signed: Chief of Operations

Comments by the MACC Programme Manager.

The conclusions and recommendations of the BOI are concurred with.

The accident was due to the fact that a mine was missed by an EDD clearance team during activities conducted in 2000. [The demining group involved in the accident] are not held responsible for the cause of the accident, which, fortunately did not result in injury to the person involved. Both [the demining group] and [the original EDD group] are to be fully debriefed on the findings of this BOI.

I am satisfied that changes to procedures have already been implemented to reduce the likelihood of this type of accident occurring again. However, MACC Operations/QA personnel are to systematically evaluate all future EDD activities to ensure that these procedures are being adhered to. There is particular cause for extra vigilance when the EDD teams are assigned to support other organisations on rapid tasks, and this is to be closely monitored by the QA Officer (EDD).

Signed: Programme Manager

Victim Report

Victim number: 408	Name: Name removed
Age:	Gender: Male
Status: deminer	Fit for work: yes
Compensation: not appropriate	Time to hospital: not appropriate
Protection issued: Frontal apron Helmet Short visor	Protection used: Frontal apron, Helmet, Short visor

Summary of injuries:

COMMENT

The victim suffered no injuries. No medical report was made.

Analysis

The primary cause of this accident is listed as "*Field control inadequacy*" because it seems likely that the EDD team that missed the mine were working in an area where dog use was not suitable. This was either a failing of "field" supervision or higher in the management chain. If it was the EDD group's policy that their dogs could clear "anywhere", and this may indicate a lack of realism among their management.

The secondary cause is listed as a "*Management/control inadequacy*" which the MACC had already taken measures to overcome.

The demining group that suffered the accident was clearly not at any fault.

The mine casing was not damaged, and even the brittle plastic of the UPMAH fuze was not broken – as shown in the picture below.



As with most reports from the Kosovo MACC, the accident report demonstrates an unusually thorough and critical approach to accident investigation. The Mine Action Co-ordination Centre that carried out the investigation was not engaged in demining, and this may (in part) explain the unusually objective nature of their investigations.

Related papers

Sample Board of Inquiry convening order

CONVENING ORDER FOR ACCIDENT INVESTIGATION BOARD OF INQUIRY.

- 1) The Chief Operations Officer of the Mine Action Co-ordination Centre hereby appoints the following members to form a Board of Inquiry to investigate a UXO accident that occurred on the 26th April 2001
 - a. President MACC QA Team Leader.
 - b. Member MACC QA EDD Officer..
- 2) [Demining group involved's] Programme Manager is requested to provide an observer and assistance to the Board of Inquiry.
- 3) The Board of Inquiry is to carry out a full investigation and provide a written report to the MACC by 0800 Friday 04th May 2001. The report is to be written in the English language.
- 4) The Report of the Board of Inquiry is to consider the details attached at Appendix 1 to this Annex.
- 5) The Board of Inquiry is to issue an information bulletin to members of the mine/UXO clearance community in Kosova, to inform them of the accident and any relevant information and actions that should be taken by them immediately.

Signed: Chief Operations Officer, 26th April 2001

ANNEX B:

List of demining group personnel – omitted for anonymity.

ANNEX C:

IMSMA MINE/UXO INCIDENT/ACCIDENT REPORT DATED 26/04/01 – not in file [not digitized].

ANNEX D:

Map of the general area – see Maps.

ANNEX E:

AERIAL PHOTOGRAPH OF THE GENERAL AREA – omitted to conserve data space.

ANNEX F:

SCHEMATIC DIAGRAM OF THE ACCIDENT SCENE – not in file [not digitized].

ANNEX G:

MUP MINEFIELD RECORD – reproduced below to show limited detail.



ANNEX H:

Demining group's current site map – omitted to conserve data space.

ANNEX I:

Work W02-01 SUSPENSION REPORT – not in file [not digitized].

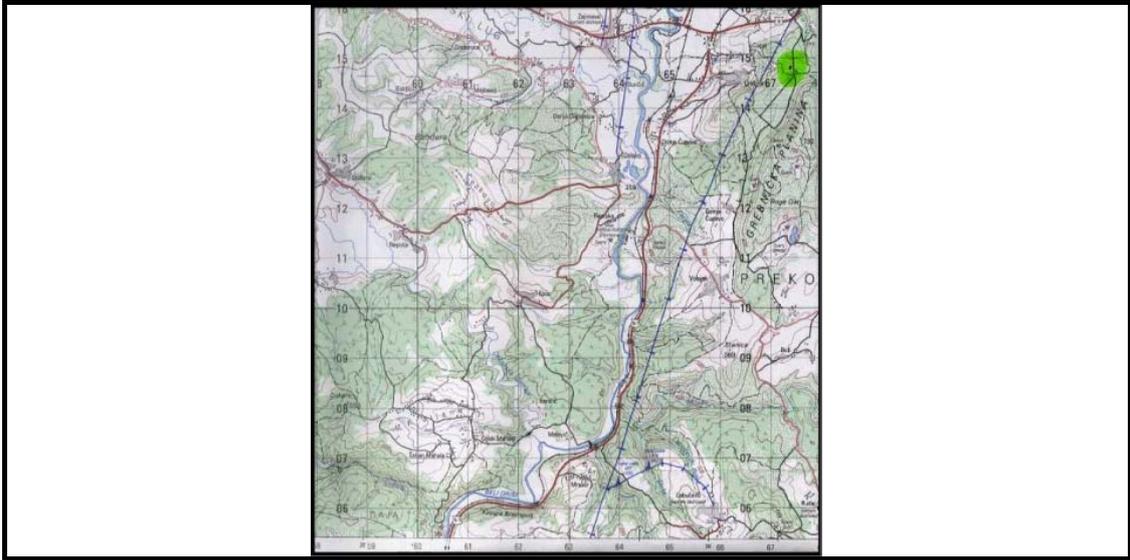
ANNEX J:

DAILY WORK REPORTS FOR MDD HANDLER – not in file [not digitized].

ANNEX K:

PHOTOGRAPH DETAILING THE DENSE VEGETATION WITHIN THE EDD BOXES – omitted to conserve data space.

MAP OF THE GENERAL AREA



Accident site GR 34T 59763 08987 (Seat of explosion).