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Accident Investigation
Factual Report

Entrapment and Fire Shelter Deployment
Hog Up Mountains, Box Elder County, Utah
Salt Lake Field Office
Bureau of Land Management
Salt Lake City, Utah

June 30,2006

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ACCIDENT INVESTIGATION FACTUAL REPORT

Accident: Entrapment with Shelter Deployment

Location: Scorpio Fire, Salt Lake Field Office, BLM, Utah

Date: June **30.2006**

Investigation Team:

Randy Peterson, Hazmat/Safety Specialist,
Cedar City, Utah BLM

Tracy Dunford, State Fire Management Officer,
Utah Forestry Fire and State Lands,
Salt Lake City, Utah

Paul N. Briggs, Fuels Program Manager,
Cedar City, Utah BLM

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Executive **Summary:**

On June 30.2006 two firefighters from the BLM Salt Lake Helitack Crew were entrapped while conducting burnout operations on the Scorpio Fire in the Hog Up Mountains, Box Elder County, Utah. The incident occurred when downdraft winds from a thunder storm caused the Scorpio Fire to become erratic and extreme. cutting them off from their escape routes and safety zone. One member of the crew felt it necessary to deptoy his shelter for protection and the other sought refuge in a wash from the smoke and embers. The crewmember that deployed his shelter was treated for a second degree bum on his left elbow.

The Scorpio Fire was under the jurisdiction of the Salt Lake Field Office, Bureau of Land Management (BLM). The BLM, Salt Lake Field Office in conjunction with the BLM, Utah State Office initiated the investigation regarding the entrapment. The investigation team collected information from a site visit, data collected, and individual interviews with personnel involved with the incident.

This report will list and detail the factual findings from the Scorpio Fire entrapment and shelter deployment investigation.

Narrative:

Salt Lake Helitack was dispatched to the Scorpio Fire on the afternoon of June 30,2006 with 4 crewmembers and pilot on board Helicopter 1BH. The crew arrived at the advancing fire front. flying from a southern direction and continued north over the fire to the heel. The crew estimated the fire to be over 1,000 acres at that time. Upon arrival, the fire was noted to be making a good run from the northeast to the southwest. Helicopter 1BH sat down on the northeast end of the fire, dropping off two crewmembers which initiated a burnout from the road. They were to burnout along the road which flanked the fire, traveling from north to south. Helicopter 1BH then proceeded with the remaining crewmembers to the heel of the fire where they tied in **with** engines from the Volunteer Fire Department. One crewmember, an ICT4 trainee stayed with the volunteer engines to direct and assist the activities at the heel and west flank of the fire while the ICT4 stayed with helicopter 1BH to continue the recon. Due to low fuel, the helicopter then dropped the IC at the heel of the fire and landed south over the ridge to wait for the fuel truck at about 1530.

At approximately 1800 hours additional resources from the BLM Salt Lake Field Office arrived on scene at the north end of the fire to aid in suppression activities. At this time the fire began exhibiting extreme behavior as the result of strong downdraft winds associated with a thunder cell tracking over the fire. Firing operations were compromised due to the changing weather conditions. Upon arrival, Engine 438 was sent along the east flank in order to aid with the burnout, but was unable to reach the two helitack crewmembers because of the extreme fire behavior and lack of visibility. It was at this time the crewmembers conducting burnout operations on the east flank experienced a strong wind shift and a fire whirl that carried the fire across the road. Firing operations

were suspended and the two crewmembers tried to rendezvous in the black. Due to high wind conditions and reduced visibility, they were unable to meet. Because of the extreme fire behavior and thick smoke, one crewmember took shelter in a small wash within the black and endured the event with his pack turned into the wind and shroud in place. The other crewmember deployed his shelter beside the road in a narrow strip of black created from the burnout operation. While in the shelter, the crewmemher received a bum on his left elbow.

As the front passed, the two helicopter crewmembers located each other and were joined by Engine 438 at the shelter deployment site. At this time an ICT3 arrived on scene to transition and ordered all resources to gather at the heel of the fire.

Investigation Process:

Upon notification of the incident, an investigation team was ordered by Field Office Manager (FOM), Salt Lake Field Office, BLM. The team convened on July 1,2006 at the Salt Lake Field Office and received a briefing and Delegation of Authority from FOM.

Field Office Manager arrived at the Salt Lake Field Office from the Scorpio Fire with the deployed shelter and line gear in plastic bags. The team was briefed on the situation and series of events ascertained by FOM while visiting the fire site. The briefing was conducted by FOM, Duty Officer, FMO, and AFMO. A video of the fire behavior containing radio transmissions was viewed and written statements from individuals on the fire were delivered to the investigation team.

Following the briefing, the team was escorted to the fire and the site of the deployment/entrapment by the FMO. The team met with and interviewed the was in route back to Salt Lake City, at Lake Point, Utah. This interview was ICT3, who conducted at this time to conform with work/rest guidelines as the IC had been on duty for 14 days. Once arriving on the fire, the team surveyed the area, took photos, and evaluated the terrain, fuels, and weather conditions on site. The team discussed in detail what happened at what times and determined the location and assignments of all resources on the fire.

The team evaluated the current environmental and weather conditions on the site carefully as resources on the fire relayed the similarity to the time and weather conditions during the previous day when the entrapment occurred.

The team then returned to the Salt Lake Field Office and reviewed the written statements of the personnel. The team acquired dispatch logs, qualification records, weather reports, and other documentation for later review. The team developed a list of persons to interview based on the site visit, the written statements, and the information obtained in the video and briefing. The team then scheduled interviews with the individuals involved for the next day.

Interviews were conducted throughout the day on July 2, 2006 at the Salt Lake Field Office and at the Tooele Airport, Helitack Base.

Individuals Interviewed for Scorpio Fire

Type III IC Scorpio Fire
Type IV IC Scorpio Fire and Crewmember, Salt Lake Helitack
Type IV IC (T) and Crewmember, Salt Lake Helitack
Crewmember, Detail from Salt Lake County Unified Fire
Crewmember, Salt Lake Helitack
Helicopter Pilot IBH

This investigation was conducted to ensure that human, material, and environmental factors were all considered in this investigation.

Following the interviews, the team returned to the Salt Lake Field Office and compared notes from the interviews, written statements and information from the site visit. Interview notes were compared to the written statements provided earlier by involved personnel. After team deliberation on the gathered information, a list of findings and factors that led to the entrapment and deployment were developed.

Following the deliberations, the team prepared and delivered the 72 hour report to Glen Carpenter. Present at the close out meeting and review for the 72 hour report were:

Salt Lake Field Office Manager
Salt Lake BLM FMO
Salt Lake BLM AFMO
Utah BLM FMO
Utah BLM AFMO
Acting National Safety Director BLM
Acting Associate State Director Utah BLM

Findings:

The following findings were noted as contributing factors and causes leading up to and determining the outcome of the entrapment on the Scorpio Fire. The following factors have been categorized into 3 groups; Environmental, Human, and Material.

Environmental Factors:

Fire experienced extreme wind event from passing thunder cell

- As a large thunder cell passed over the fire, the wind became erratic and stronger. The wind shifted to push the burnout towards the road or line and the unstable air produced fire whirls compromising the firing operations and causing the fire to jump the line.

Human Factors:

Training and firefighter qualifications

- From review of the training and fire experience records, the investigation team found this to not be a factor.

Work/Rest guidelines

- **All** personnel on the Scorpio Fire were in compliance with the work/rest guidelines. This was not a contributing factor.

Crew cohesion and attitude

- Through the interview process the team found the crew to have a good working relationship and attitude towards each other. Crew cohesion was not a factor.

LCES was not in place at the time of the entrapment

- Lookouts were not in place at the time of the entrapment. Personnel conducting the burnout on the east side of the fire were not being observed by anyone else once the helicopter left for refueling. The timeframe between the helicopter leaving up to the entrapment was 2.5 hrs.
- There was a lack of communication between personnel on the fire.
  - Communication between the IC and the two crewmembers on the east flank was lost when terrain prevented line-of-site or simplex frequency communication.
    It was also determined through interviews that there was an interpersonal communication problem between the IC and his trainee. The Trainee stated that he believed the IC to be directing **and** in communication with

the firing operation. The only confirmed communication between the IC and the firing operation was a brief exchange when drip torches were delivered by the helicopter prior to the entrapment.
    - No communication regarding the approaching thunder cell was transmitted to resources on the fire, even though many people recalled noticing the cell's presence up to 20 minutes before the wind event.
- Escape routes and safety zones were identified and thought to be obvious (the safety zone being the black they were creating with the burnout). However, due to the rapid fire spread and sudden wind shift, the firing personnel on the east **flank** of the fire were too far from their safety zone when the wind event occurred. Because of the rapid burnout pace, the fire whirls and strong wind change compromised the escape routes, cutting off the two individuals. The black along the line was not cool enough to be used for an escape route or safety zone when conditions changed.

Incomplete briefing of resources prior to taking suppression action

- Briefing consisted primarily of a discussion on tactics and failed to address weather conditions and safety factors. This briefing was conducted in the air while arriving on the fire and did not adequately cover all necessary topics for providing for firefighter safety.
- No weather observations were taken on site and no current or expected weather information was relayed to resources on the fire.
- Firing operations were discussed and initiated with no clear tie in or ending point ever established or conununicated.

Ineffective use of resources

- Several volunteer engines were on scene at the heel of the fire. When communication was established and the Box Elder County Fire Warden arrived on scene, none of these resources were placed to help with the burnout on the east flank. The two crewmembers were left to conduct the burnout without any additional support.

Interagency communication and coordination needs improving

- It was stated by the IC and the IC(T) that there is a lack of familiarity (confidence) in non-federal resources in the area which caused them to devote a large amount of time working with the local engines because of incompatible communications. They stated that the volunteer resources were an "unknown" as far as training, experience, capabilities, etc, and that they were not comfortable deploying them anywhere but the heel of the fire where they could keep an eye on them. This also tied up the IC and IC(T) working with these resources on an area of the fire that they both stated was of little concern and prevented them from managing other aspects with the fire. Both

IC and IC(T) felt that these problems and concerns had a large part in the tactical decisions made with resources on the fire and they would have placed them differently if they were agency engines.

***Overhead engaged in suppression activities** neglected primary **oversight** duties*

- The IC and Trainee were actively engaged with fire operations at the heel of the fire. This further compromised LCES by focusing attention on only one section of the fire, leaving the two helitack crewmembers on the east side without overhead support.

Inadequate** weather **information obtained** and **distributed during suppression activities

- The helitack crew was briefed on the weather at the beginning of the day, but failed to obtain or take any weather observations while on the fire.
- The storm tracking over the fire was noted by some of the personnel on the Scorpio Fire, i.e., the Type III IC and also his trainee, but no transmission of this information was given to the resources throughout the incident. Because storms were present throughout the day, personnel became complacent with the weather activity.

Effective ***use of shelter training and PPE during deployment***

- When the need for deployment occurred, the individual fell back on his training and responded to the situation exactly as trained. This led to a successful shelter deployment and minimized potential injuries. The team felt the decision to deploy was the correct action and if not done at that point in time, serious injury or worse could have occurred.

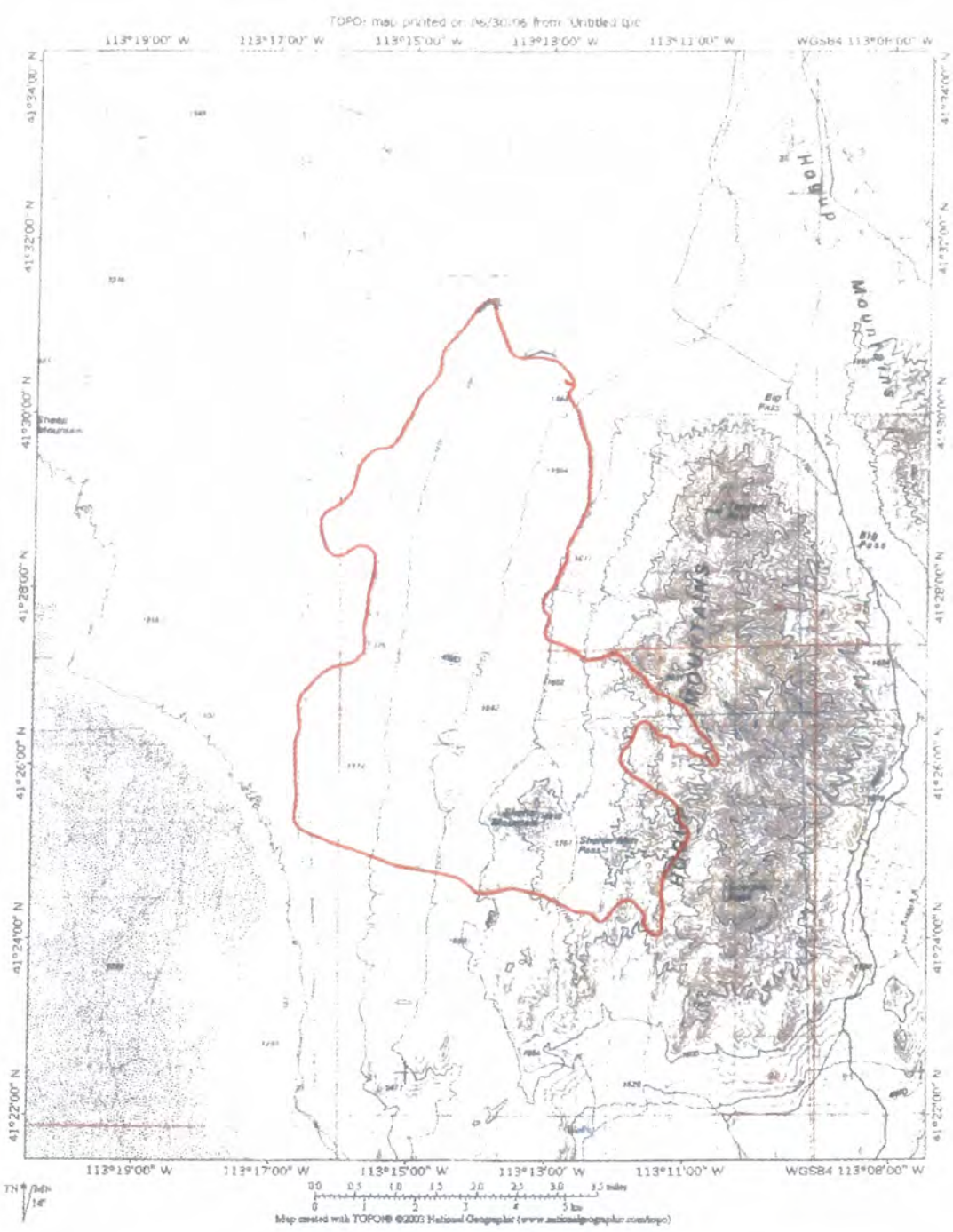
Equipment or Mechanical Factors

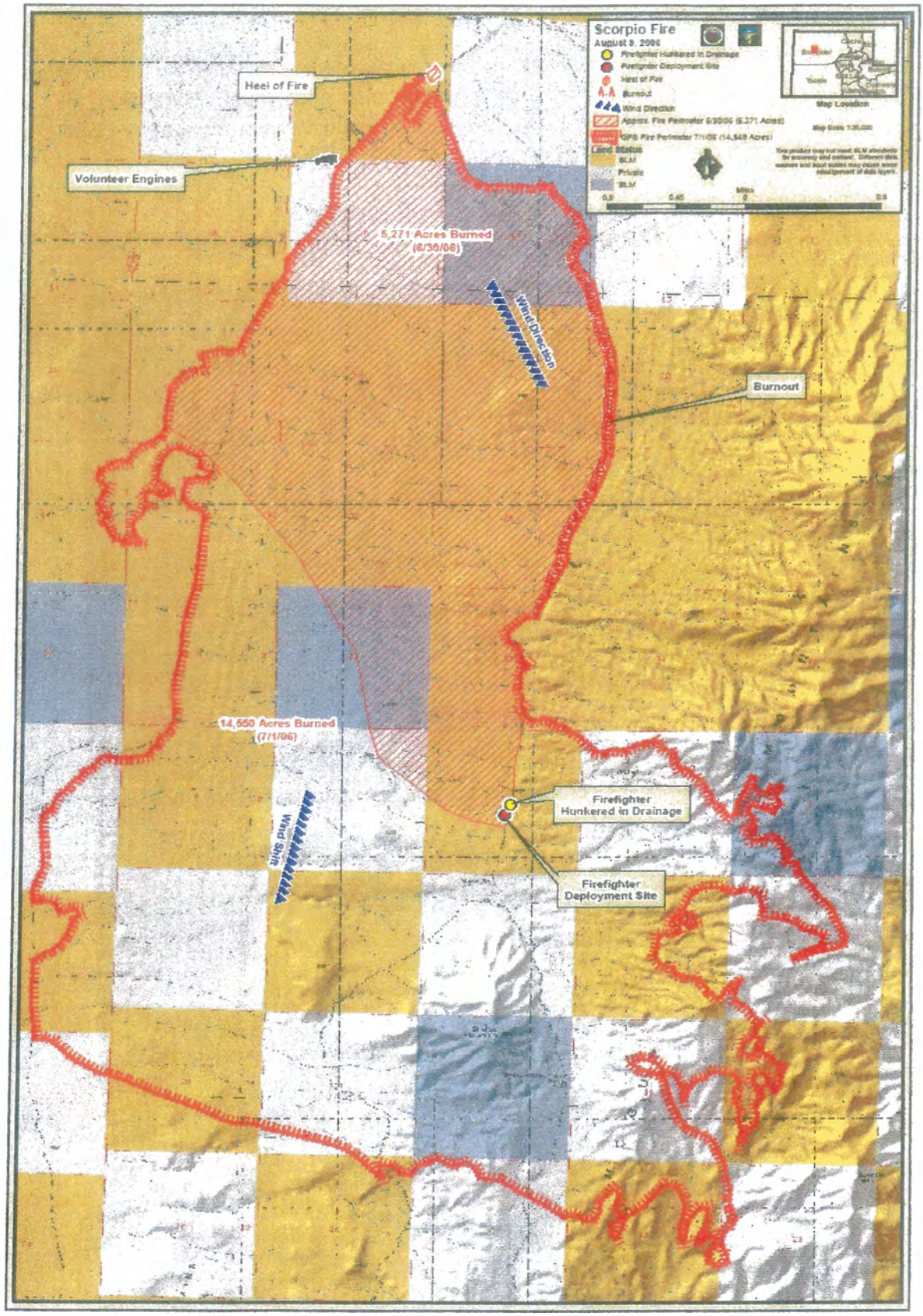
***Fire** shelter withsrood the heat and flame*

- The team examined the fire shelter and found it to be in good condition following the deployment. The only noted physical stress was a small black spot on the under lip where the shelter came in contact with a hot spot on the ground. The shelter did the task of keeping flame off the firefighter during the period inside. The only area of the firefighters body with injury was a second degree bum on the elbow/forearm.

Maps of Fire:

Post deployment map of the fire obtained by the investigation team on July 1, 2006.




Scorpio Fire
August 9, 2006
Firefighter Hunkered in Drainage
Firefighter Deployment Site
Heel of Fire
Burnout
Wind Direction
Approx. Fire Perimeter 6/30/06 (5,271 Acres)
GPS Fire Perimeter 7/1/06 (14,549 Acres)
Land Status
BLM
Private
State BLM
Miles
Map Location
Heel of Fire
Volunteer Engines
5,271 Acres Burned
(6/30/06)
Wind Direction
Burnout
14,550 Acres Burned
(7/1/06)
Wind Shift
Firefighter
Hunkered in Drainage
Firefighter
Deployment Site

Photographs:

The photographs of the deployment area and entrapment were taken by the investigation team at the Scorpio Fire on July 1,2006. Fire shelter photographs were taken the following day at the Salt Lake Field Office. Fire shelter was brought in by Glen Carpenter, Salt Lake Field Office Manager on July 1,2006.

Fire shelter devlovment area
Photographs taken from road looking to the west

Photographs of case for fire shelter located on road

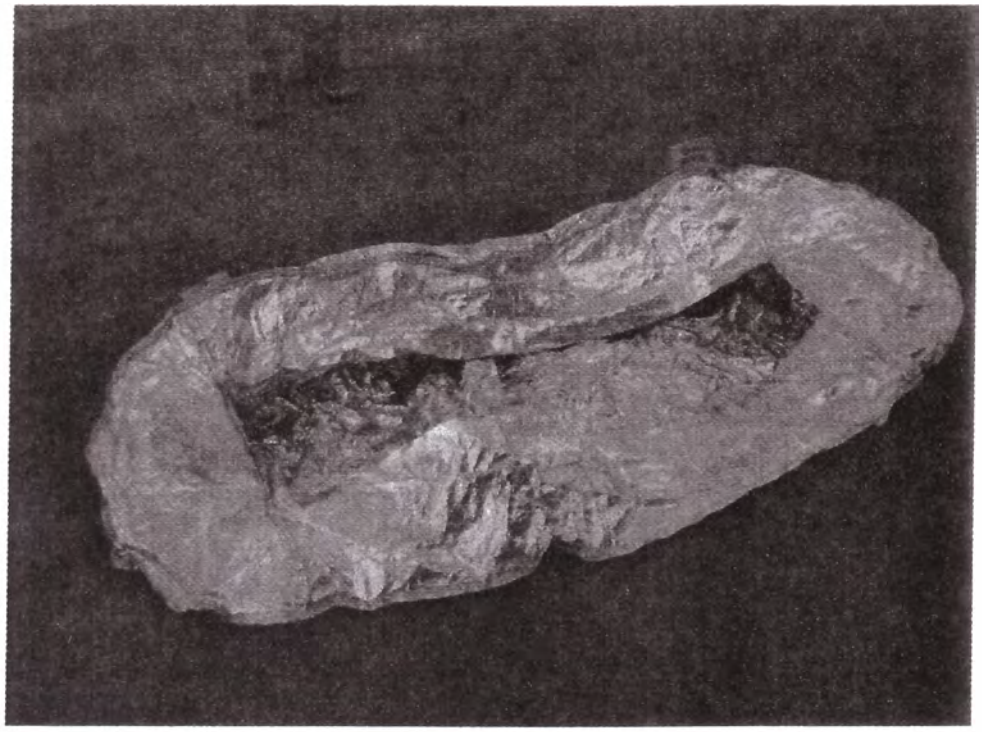
Looking back to the south over the devlovment area
Road used for burnout operations

Looking back to the north over the deployment area
Road used for burnout operations

Location of entrapment where firefighter took shelter in wash
No deployment
Photographs taken looking from road across fire to the west

Wash used for cover by second firefighter
Photograph taken looking across wash back to the south/southeast

Photograph of fire shelter after deployment
Bottom side of shelter



Top side of fire shelter

Small burn mark on left underside lip
Burn is in the area that the head was facing and on the side fold