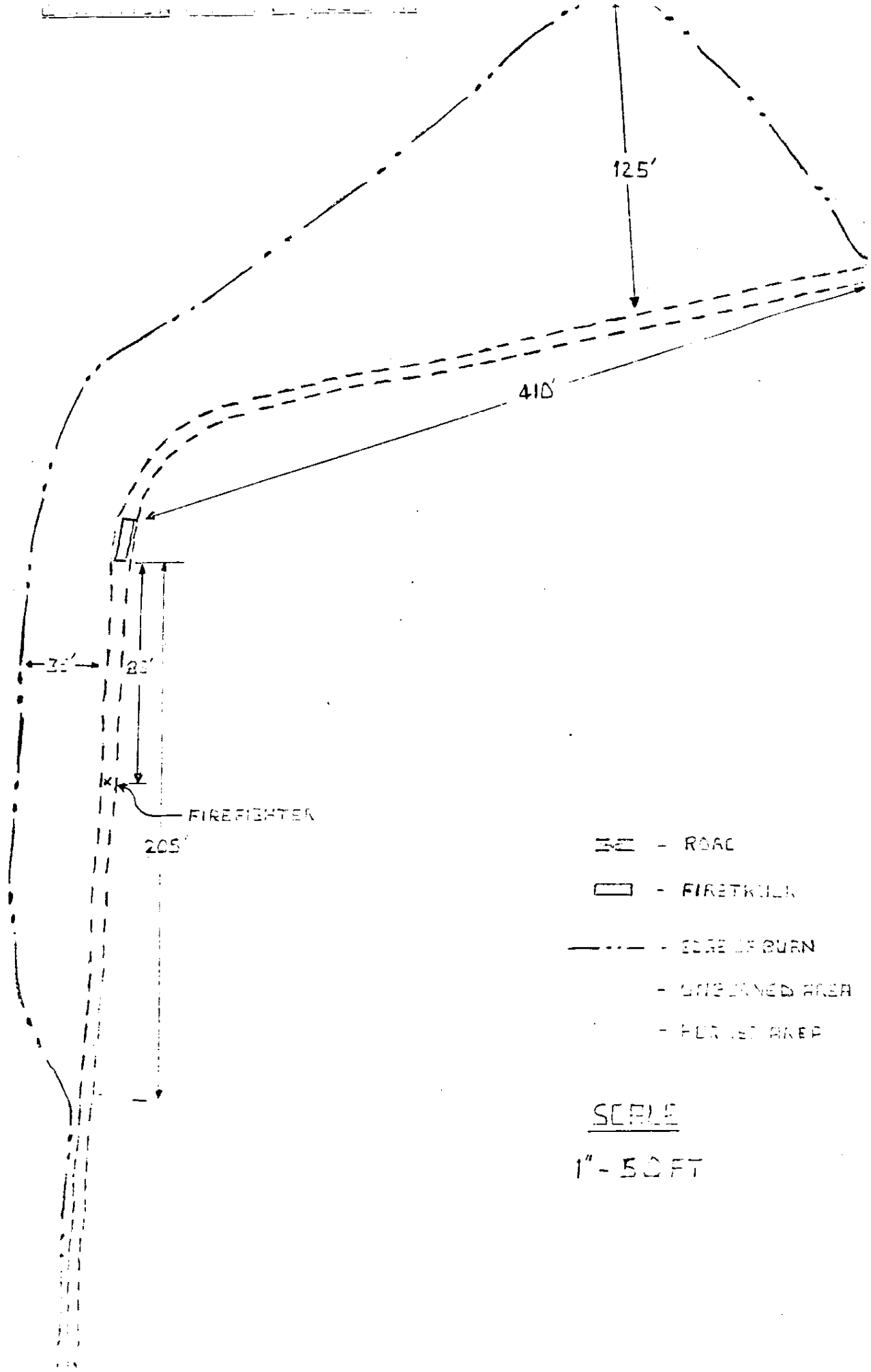


REPORT OF INVESTIGATION

Fatality

Steve Mark Arrollado

Firefighter



Type of Investigation:

Accident  
Steve Mark Arrollado  
Firefighter  
Fatality

Investigation by:

Inquiry Board  
Joseph Springer  
Assistant Deputy State Forester  
Robert Paulus  
Division Training Officer  
Pressley Kent  
Law Enforcement Coordinator, District VI

Date of Report:

August 22, 1973

### RESULT OF THE ACCIDENT

On Saturday, August 11, 1973 at approximately 1635 hours Firefighter Steve Mark Arrollado (D.O.B. 6-30-55, SSN 568-92-0124) received third degree burns over approximately 40 per cent of his body and second degree burns over 20 per cent for a total burn area of 60 per cent. The burns were received while Arrollado was engaged in fire control activity on the Bell Valley Fire.

As a result of the injuries, the injured died at approximately 0210 hours on August 23, 1973. (See autopsy report, exhibit 1.)

### THE ACCIDENT

At approximately 1430 hours on 8-11-73 a fire occurred in the SW $\frac{1}{4}$  S22 T18S R4E San Bernardino EM in the County of San Diego. The fire, which became known as the Bell Valley Fire, San Diego Fire Number 315, started alongside a dirt ranch road approximately one mile south of Highway 94. (see exhibit 2.) The fire was reported by Fire Captain Herbert Drumm, who was traveling on Highway 94 enroute to another fire. Captain Drumm radioed his report to the San Diego Ranger Unit Headquarters at approximately 1433 hours.

The origin of the fire was in gently rolling, somewhat broken country about one quarter to one half mile from the international border between United States and Mexico. (See photograph 22.) The fire burned generally in a northerly direction from the point of origin toward Highway 94. The terrain at the scene of the accident was made up of moderate to steep slopes in broken and rocky country characterized by a narrow, steeply sided gully or wash running generally from north to south and bounded on the east by a narrow, winding dirt ranch road. (See photograph 23.)

The cover type in the vicinity of the accident scene was light brush with scattered chamise and a few manzanita and scrub oak interspersed with the patches of grass and buckwheat.

The weather at the time the fire occurred, and continuing to a point in time well past the accident, was clear and hot with a 10 to 15 mile per hour wind blowing generally from southwest to northeast. The wind direction

was modified somewhat by topography. Relative humidity was approximately 20 per cent (see exhibit 3). Temperature was approximately 94 degrees.

The burning conditions during the fire were considered to be normal for this area at this time of year. At no time throughout the course of the fire, which attained a final acreage of 222, was there erratic or blowup type of fire behavior observed by personnel on the fire lines.

Just prior to the occurrence of the accident Ranger Leroy Rockwell, who was in charge of the portion of the fire in which the accident occurred, assigned Fire Apparatus Engineer Michael Linton, his fire truck, and a crew consisting of Steve Arrollado to work the portion of fire along the dirt ranch road, designated as point A on exhibit 2, and encompassing the area delineated on exhibit 4. At the same time Ranger Rockwell instructed Engineer Eberhardt, his fire truck, crewed by a single firefighter to assist Engineer Linton in his assignment along the road. He also instructed a conservation camp crew with Fire Crew Foreman Martin in charge, to park their bus in the burn. These instructions were given to Martin by radio. Rockwell further instructed Martin to unload his crew and assist the fire truck in their assignment along the road.

A few minutes prior to the accident Ranger Rockwell received a radio communication indicating that the main body of the fire had proceeded well beyond the accident scene and was, at that time, posing a threat to a ranch house near Highway 94. Ranger Rockwell immediately left the area bound for the location of the ranch house. The Fire Boss, Ranger Glen Snyder, also overheard the radio communication from the fire truck at the ranch house to Ranger Rockwell. At this time Snyder was in the vicinity of the point of origin of the fire and immediately began to drive along the dirt road toward Highway 94. Within a few moments Ranger Snyder arrived at the location of Linton's and Eberhardt's fire trucks.

In assessing the situation at the location of Linton's fire truck Fire Boss Snyder saw no problem at that time. The west side of the dry wash had burned over completely and the main fire was well beyond that location. Snyder saw that there was a small area of unburned fuel on the east slope of the gully between its bottom and the road.

As Ranger Snyder continued north on the dirt road he came across Eberhardt who had several lengths of hose out working the fire line. Snyder advised Eberhardt to go to Mobil pumping and to utilize Martin's hand crew in continuing to work the fire line.

Following the reassignment of Eberhardt, the situation was then as is shown on exhibit 4a with the fire truck commanded by Linton spotted as shown and a single length of 1-1/2 inch hose laid from the fire truck to a point between figures 5 and 6 on exhibit 4. Photograph 1 is the hose lay as seen shortly after the accident. Photograph 2 is a reenactment of the hose lay as it looked to Engineer Linton at the time of the accident. Photograph 3 is a reenactment showing where Arrollado stood as he sprayed the unburned fuel. The hose line was charged with 125 pounds of pressure supplied by the mid-ship pump on the fire truck. The nozzle was equipped with a 3/8's inch tip.

When the 100 feet length of 1½ inch hose was initially placed into service along the road Engineer Linton accompanied Firefighter Arrollado explaining the purpose and what Arrollado's duties were in manning the nozzle. The basic plan of action was to wet down the relatively small area of unburned fuel between the scrub oak bush, as shown on exhibit 4, and an area between the fire truck and the bottom of the dry wash, which varied in width from approximately 35 to 50 feet. The idea was to prevent the fire from running up the road and then jumping to the unburned fuel on the other side.

At the time being discussed, the area west of the dry wash had already burned. It should be kept in mind that throughout the period during which the accident occurred the burnt over area still contained considerable heat and smoke.

Engineer Linton worked with Firefighter Arrollado on the nozzle for approximately 20 minutes after the hose was laid out. During this time he observed no cause for concern. The only fire activity in the immediate vicinity of the unburned fuel occurred in the scrub oak shown in exhibit 4. This consisted of a flareup which consumed most of the growth of the bush which then died down almost immediately.

Linton did not feel that the fire posed any threat to either the men or equipment, but the wind was carrying large amounts of smoke across their position. He, therefore, decided to move the fire truck from its location, south along the road, to a point where the fire had already burned up to the road and gone out. This would then place the truck below the unburned fuel and in a position relatively free from smoke and allow them to work from a cooler, more smoke free location, if and when the fire burned through the unburned area to the road.

In order to accomplish the move of the fire truck, as outlined above, Engineer Linton left Arrollado's location at the end of the hose line and walked to the fire truck. Upon arriving Linton proceeded to switch from the midship pump mode to the auxiliary pump so that the fire truck could be moved. In making the switch Linton did not disengage the midship pump until the auxiliary pump was running and had attained a pressure of 150 pounds so as to assure no loss of pressure or water flow to the hose manned by Firefighter Arrollado.

Engineer Linton then entered the cab of the fire truck for the purpose of disengaging the midship pump and preparing to move the vehicle. While so engaged he noticed that the fire had begun a run on the east side of the gully opposite the scrub oak tree and that it was moving toward the position occupied by Firefighter Arrollado. For a few moments Arrollado continued to spray water from his nozzle at the on coming flames. After a brief period Linton observed Arrollado back away across the road, shut off his nozzle, and lay down, in a location shown as point 7 on exhibit 4. Photograph 4 is a reenactment of Arrollado lying in the road at point 7. As can be seen from photograph 4, only minor scorching occurred to the vegetation adjacent to Arrollado's position as he lay in the road.

The position of the fire hose and nozzle, as shown in the photograph, are as Engineer Linton remembers Arrollado having placed it as he layed down.

At this point Linton saw the flames were beginning to sweep over the road behind and south of Arrollado's position. With the fire truck's public address system, Linton ordered Arrollado to turn on the water. Arrollado complied, turning on the nozzle with his left hand. A few

seconds later Linton observed Arrollado get up on one knee, face the fire, and begin spraying water toward the fire.

By know flames were crossing the road south of Arrollado with a height of five to six feet and were beginning their sweep to the road directly in front of him. With the public address system on the truck Linton ordered Arrollado, "Get out of there, come to the truck. Get out of there, come to the truck." One or two seconds later Arrollado rose to a crouching position, shut off the nozzle, dropped it, ran over the edge of the road, roughly between points 5 and 6 on exhibit 4, directly into the on coming flames. Footprints and other evidence gathered after the accident show that Arrollado ran down the slope from point 28 on exhibit 4 to the bottom of the gully between points 24 and 25. Photograph number 5 is a reenactment of Arrollado leaving the roadway and beginning his run into the fire. Photograph number 6 is a reenactment of him running down the steep slope below the roadway. During this time, Arrollado covered a linear distance of approximately 30 to 40 feet, traveling through heavy flames. Upon reaching the bottom of the gully Arrollado climbed up the very steep western bank of the dry wash, passing the rock located near point 22. This area is characterized by loose, very rocky soil. Photograph 7 is a reenactment of Arrollado traveling up the western slope of the gully. At the time Arrollado was in this location, the area was still very hot as a result of the fire which had earlier burned through this location. At a location near point 22 pieces of burned cloth from Arrollado's clothing were found. (Photograph 8 and exhibit 4.)

After Arrollado ran over the edge of the roadway he disappeared completely from Engineer Linton's view. Linton immediately tried to make radio contact with Rockwell, Snyder and then Monte Vista without success. By this time the fire was impinging upon the road at the fire trucks location and Engineer Linton stopped trying to use the radio and attempted to use both the pre-connected truck protection line as well as one of the live reel lines with a plan to cool down the fire around the truck. Although Linton was successful in getting water there was only limited pressure and it was at this time that he observed that pressure was being lost because of a break in the 1-1/2 inch line which had been earlier manned by Arrollado.

Rather than continue with his efforts, and feeling that there was no real danger to the fire truck, Linton decided he would go look for Arrollado. He then traveled in a direction roughly northwest, crossing the gully and coming out into the burn on the ridge top in a position roughly north and west of point 9 on exhibit 4, marked with an "X" on the drawing. Linton could not locate any sign of Arrollado due to relatively heavy smoke. During this short period of time the fire had moved through the sparse fuel in the location of the fire truck and Linton returned to the unit with the intention of using the radio to secure assistance in his search for Arrollado.

Meanwhile, it is presumed that Arrollado continued to travel from point 22 on exhibit 4 to point 19. Upon his arrival at point 19 Arrollado leaned on a large rock at point 19. (See photograph 9.) An imprint of one knee and one large piece of cloth and three small pieces were found in this immediate vicinity after the accident. Photograph 10 shows the large piece of cloth. Photograph 11 and 12 show the three smaller pieces of cloth found in the same vicinity. Point

30 on exhibit 4 is a smaller rock located adjacent to the larger rock on which Arrollado leaned. Drops of hardened material were found on the east face of this rock. (See photograph 13.) The drops of material at point 30 and shown in photograph 13 are believed to be residue from melted polyester material which made up the clothing worn by Arrollado.

Upon his arrival back at the fire truck Linton was in the process of attempting to make radio contact with any unit when he heard Arrollado calling and saw him leaning against the rock at point 19. Arrollado shouted, "Mike, help me." Linton yelled to Arrollado to come to the truck and that he would meet him. Arrollado started walking slowly through the burn area from point 19, around the rock at point 30, and from point 29 to point 13 at the bottom of the draw, as shown in exhibit 4. Photographs 14, 15, and 16 are a reenactment showing Arrollado as he traveled, walking slowly as outlined above, to the bottom of the gully. Photograph 17 shows a broken limb on a chamise bush and point 14 on exhibit 4 where Arrollado walked directly through the bush as he traveled to the gully bottom. Linton, in the meantime, traveled from point 8 to point 13 in the bottom of gully to meet Arrollado. The roundabout route of travel used by Linton was because the area in and around the manzanita bush, shown on exhibit 4 near point 11, was still quite hot. Photograph 18 is a reenactment of Linton meeting Arrollado in the gully bottom and grasping his hand to pull him up the steep slope back to the fire truck.

The terrain from point 11 to point 13 is very nearly vertical. (See photograph 19.) Linton met Arrollado at the bottom of the draw and used an "Indian grip" as shown in the reenactment (photograph 19) because Linton observed that the backs of Arrollado's hands were too badly burned to use any other type of grip. Linton assisted Arrollado up the steep bank to point 11 where both men walked to point 1 at the fire truck.

Photograph 20 is a montage showing the general area, as viewed from the roadway, just south of the point at which the fire truck was parked. Photograph 21 was taken approximately two hours after the accident and shows the gully, looking from a point near where Arrollado left the road on his fatal run southward; and shows, in the lower left quadrant, the scrub oak bush, as mentioned previously in this report. The important feature of this photograph is the fact that two hours after the accident considerable smoke was still present in the burned over area.

Photograph 24 is a picture of the charred remains of a rabbit, which was found in the bottom of the gully approximately 10 feet north of point 14 in exhibit 4. The significance of this photograph is to illustrate the intense heat present in the gully at about the time Arrollado was traveling through the flames.

Upon arriving at the fire truck and getting Arrollado inside the cab Linton, after several attempts to obtain radio contact, finally was successful in contacting Ranger Rockwell and advised him of his situation. Rockwell requested an ambulance. Fire Boss Snyder overheard parts of the conversation and requested Linton to restate his problem. Linton advised Snyder that a firefighter was burned over 90% of his body. Snyder immediately made contact with San Diego Ranger Unit Headquarters and requested a helicopter.

Linton backed the fire truck from its location northward, approximately 200 yards, along the dirt road until he reached an area where he could turn around. He then began to drive back to Highway 94.

A U.S. Forest Service helicopter, manned by Myron Lee, Fire Control Officer, Cleveland National Forest was engaged in Fire Control activities on the Buckman Springs Fire, a short distance from the Bell Valley Fire. During this activity Officer Lee had occasion to fly to the Bell Valley Fire on a reconnaissance trip. As a routine matter, when the helicopter approached the Bell Valley Fire Officer Lee made contact with the Division of Forestry Airco aircraft, reporting his presence in the area. He was requested by Airco to stay in the area that one of our units on the fire was in trouble and that a helicopter might be needed.

At about that time Linton arrived at the intersection of the ranch road and Highway 94 with the injured firefighter. Lee, in the helicopter, was advised to land at that location for the purpose of taking an injured man to the hospital.

Arrollado was removed from the fire truck and placed on the ground on the south side of Highway 94 near the intersection with the ranch road. At about the time the helicopter was landing in the field on the north side of Highway 94, Linton, together with an unidentified individual, got Arrollado up and walked him across the road to the north side. At this time he was placed on a stretcher which was covered with a sleeping bag.

Due to the heavy brush cover between the Highway and the location of the helicopter Arrollado could not be moved to that location. Several pieces of fire equipment were then moved from the immediate vicinity of Arrollado to provide a clear spot for the helicopter to land on the highway and operations began to load Arrollado aboard.

At about this point in time the fire made a run directly at Highway 94 at the point where the helicopter was loading, necessitating fire control action by two fire trucks to prevent damage to the helicopter and interference with the rescue operation. Photograph 25 was taken from the approximate location of the helicopter during the rescue operation and shows where the fire approached the road at this point.

The helicopter proceeded to the Grossmont Hospital in the city of La Mesa, arriving at approximately 1715. It is estimated that the injury to Arrollado occurred at roughly 1635 hours. It can be seen, due to the quick action on the part of Linton in getting Arrollado out of the gully, into the truck, and out to the highway; coupled with the unbelievably good fortune of coincidentally having a U.S. Forest Service helicopter in the area at the time of need resulted in a lapsed time from injury to initial hospitalization of approximately 40 minutes. From the nearest ambulance service location to the scene at the intersection of the ranch road and Highway 94 is a minimum travel time of one hour.

Arrangements were made by Ranger Unit Dispatch Office for a fire truck from the La Mesa Fire Department to proceed to the Grossmont Hospital to stand by while the helicopter landed at that location. At the same time Ranger Robert Taylor was dispatched to the Grossmont Hospital with instructions to make certain everything was handled properly with respect to the injured firefighter.

Arrollado's stay at Grossmont Hospital was approximately one hour at which time he was transferred by ambulance to the University Hospital which was better equipped to handle that type of injury. Ranger Taylor generally over saw the treatment of Firefighter Arrollado. Taylor indicated that the treatment given at Grossmont was confined to stabilizing the injured man's condition. Services performed by the hospital staff included removal of the clothing from the injured man's body, cleansing him, providing intravenous solution, and injecting pain reducing medication.

Meanwhile, Fire Prevention Officer Donald Stacy proceeded to Arrollado's home. Upon arrival Stacy discovered that the mother, Mrs. Kay Ruiz was not at home. After a short wait Mrs. Ruiz arrived and was advised by Officer Stacy of her son's injury. Stacy then provided transportation for Mrs. Ruiz to the University Hospital to which, by this time, Arrollado had been transferred.

Ranger Taylor obtained the clothing worn by Arrollado from the hospital staff and returned it to Ranger Unit Headquarters, turning it over to Ranger Ealmforth.

FPO Stacy remained with Mrs. Ruiz at the hospital until 2330 hours. Mr. Stacy's daily assignment from that moment until the death of Arrollado was to remain at the hospital daily to provide liaison with the doctor and the family. Additionally his function was to provide whatever aid as might be necessary to Mrs. Ruiz and the family.

Respectfully submitted,

Joseph C. Springer  
Assistant Deputy State Forester

DAILY WEATHER

MORNING 0800 radio to Los Angeles weather service OES 2+2

Tecate

1	2	3	4	5	6	

AFTERNOON 1430 DST 1330 PST

Call into D.O.

Rainbow

1	2	3	4	5	6	7*

Julian

1	2	3	4	5	6	7*	
0	88	31	11	6 M	7	19	I.C. 22

Airport

1	2	3	4	5	6	7*	
1	90	43	5	ST 5	12	26	I.C. 23

Morena

1	2	3	4	5	6	7*	
1	94	20	3	ST 5	6	24	I.C. 73

EVENING 1600: Ignition component actual & Predicted

to D.O.	Act.	Pred.	Julian	Act.	Pred.	Act.	Pred.

- 1. State of weather
- 2. Temperature
- 3. Humidity

- 4. Fuel Moisture
- 5. Wind direction
- 6. Wind speed
- \*7. Burning index

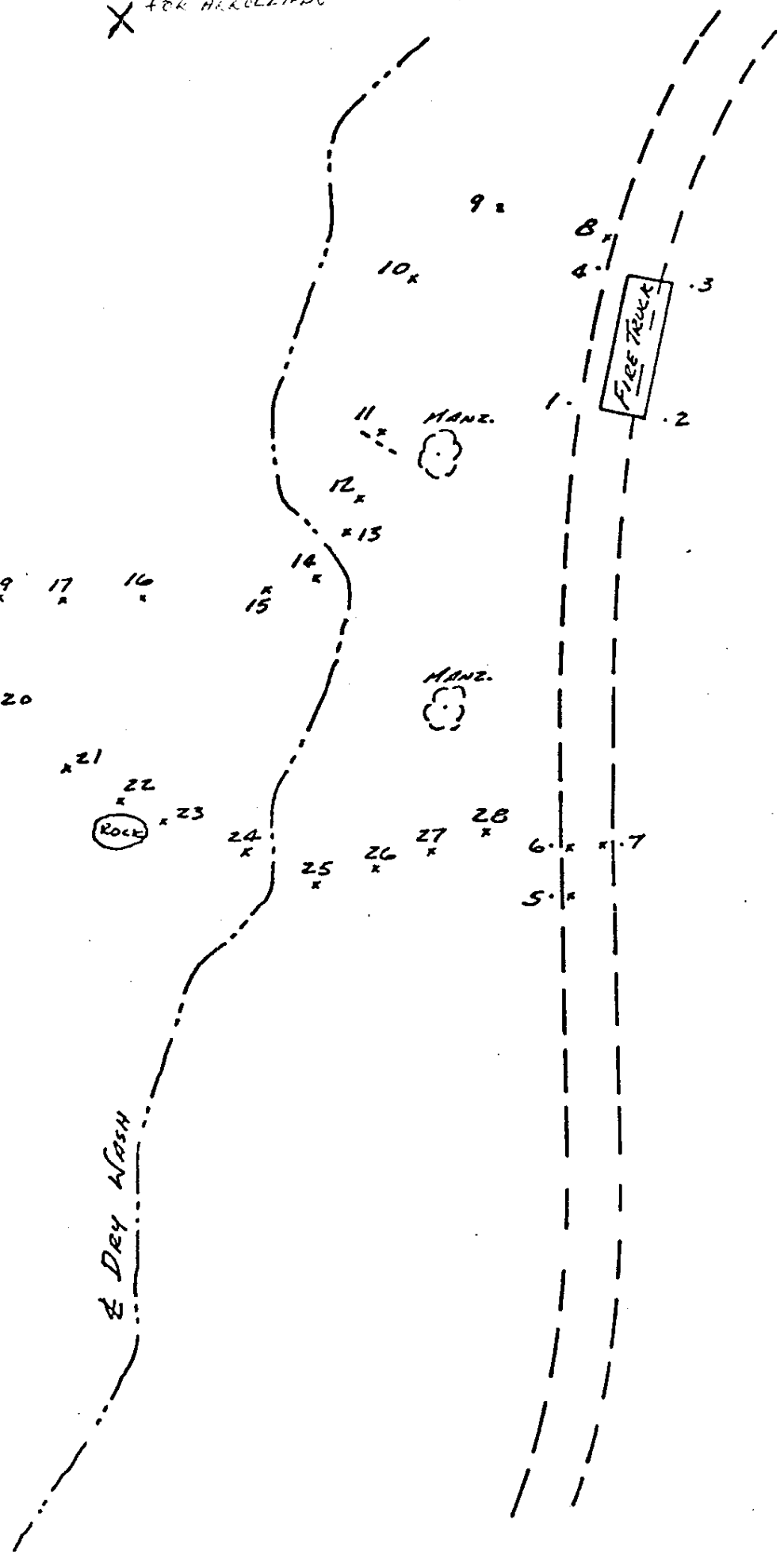
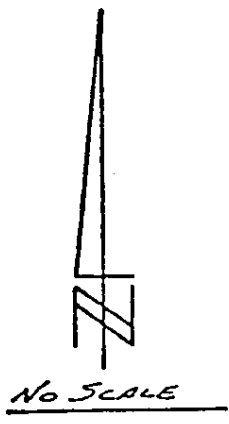
\*Give to U.S.F.S.

8/11/73

Copy of 1430 weather - 8/11/73

Ignition component Low 0 - 19  
 Medium 20 - 65  
 High 66 - 100

ENTERED HIS SYSTEM FOR HIKOLEMPO



SCRUB OAK

DRY WASH

FIRE TRUCK

MANZ.

MANZ.

Rock

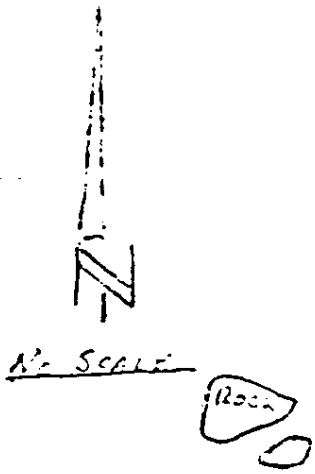
Rock

19x 18x 17x 16x 15x 14x 13x 12x 11x 10x 9x

20x 21x 22x 23x 24x 25x 26x 27x 28x

1x 2x 3x 4x 5x 6x 7x

50



Tree



HOSE LINES



ARROLLADO  
&  
LINTON

LEGEND  
BROWN - BURNED BEFORE ACCIDENT  
GREEN - BURNED AT TIME OF ACCIDENT



Photograph 1

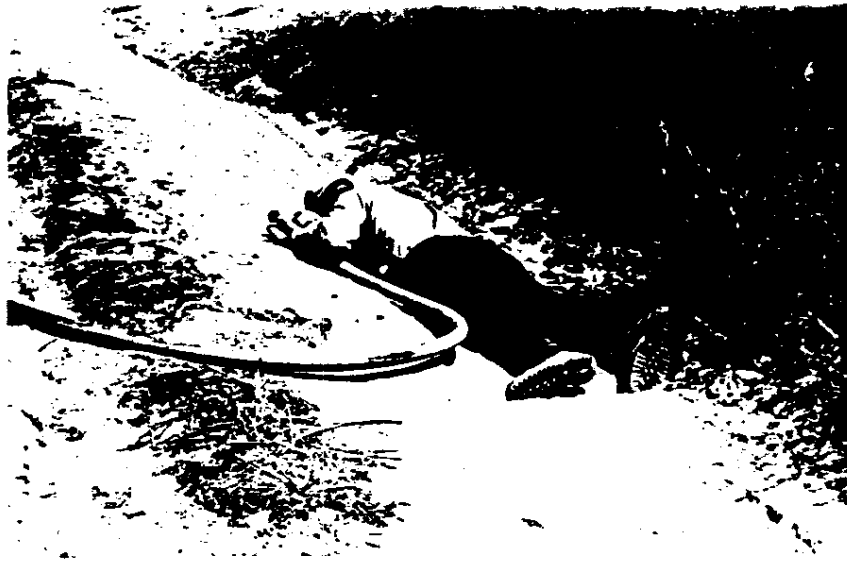


Photograph 2

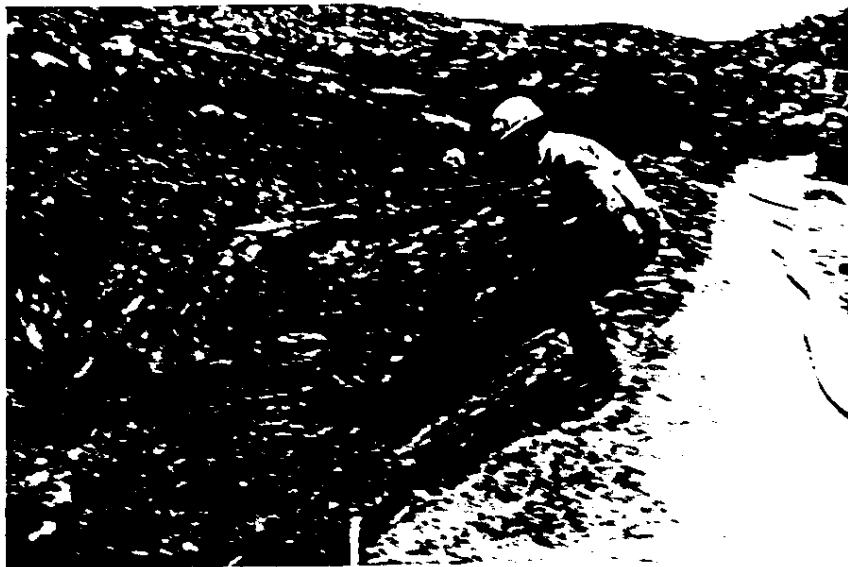


Photograph 3

Photograph 4



Photograph 5

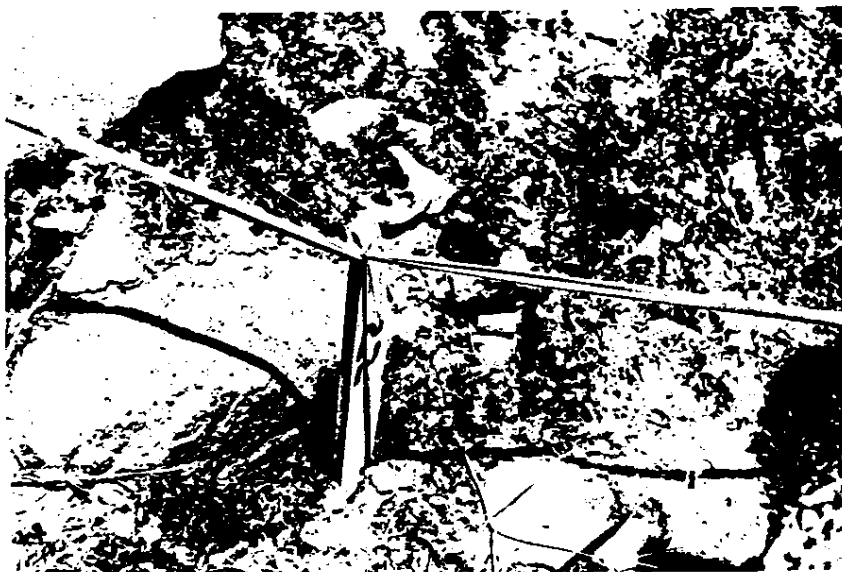


Photograph 6





Photograph 7



Photograph 8



Photograph 9

Photograph 10

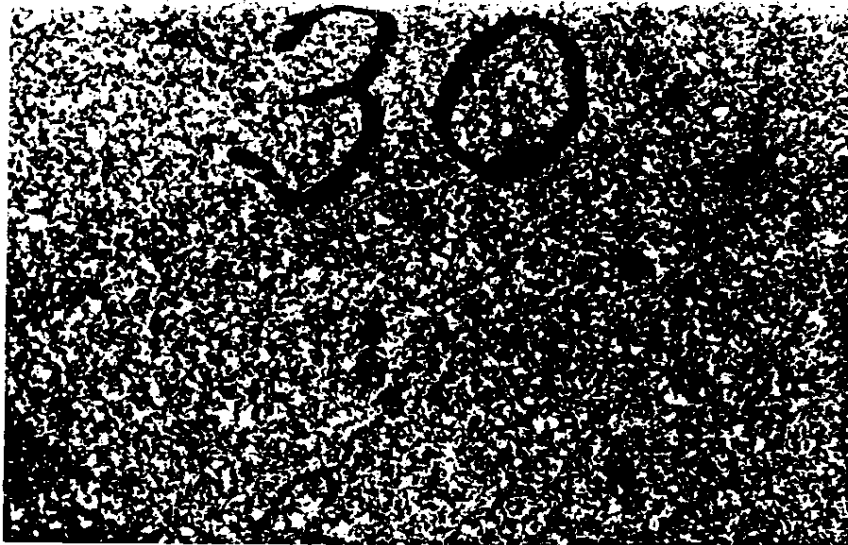


Photograph 11

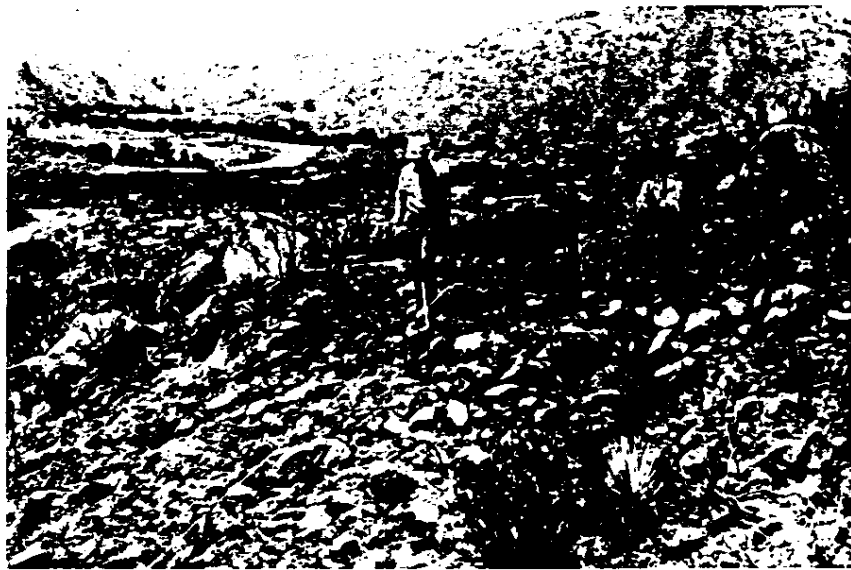


Photograph 12





■ Photograph 13



Photograph 14.



Photograph 15

Photograph 16



Photograph 17



Photograph 18





Photograph 19



Photograph 20



Photograph 21

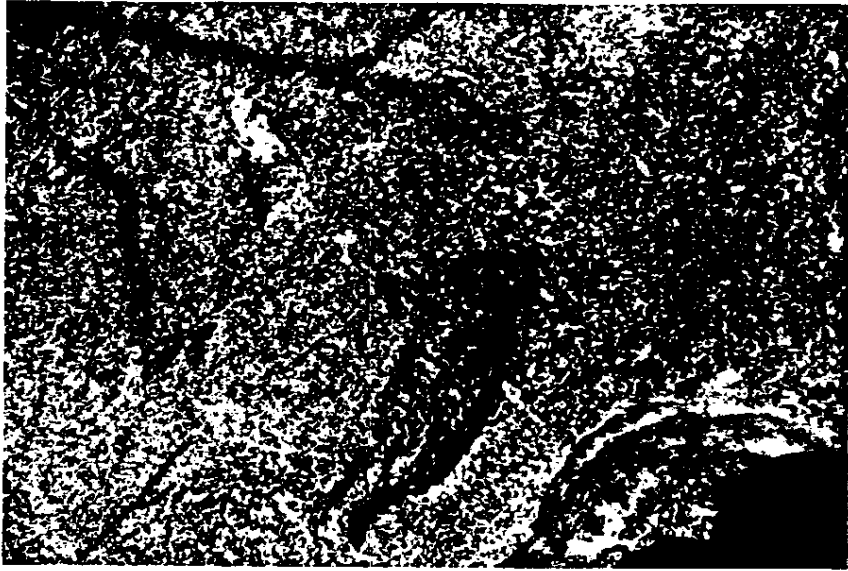


Photograph 22



Photograph 23

■ Photograph 24 ■



Photograph 25

