U.S. Forest Service

California Department of Forestry and Fire Protection

Accident Investigation: Factual Report

Pine Fire Dozer Entrapment

Descanso Ranger District
Cleveland National Forest
Pacific Southwest Region

Wednesday, September 12, 2007

Accident Investigation Report

Accident: Pine Fire Dozer Entrapment

Location: Descanso Ranger District, off Corte Madera Road in Oak Valley

Date: September 12, 2007

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I. EXECUTIVE SUMMARY

On September 12, 2007, at 1233 hours the Pine Fire, caused by an illegal campfire, started near Corte Madera Road in Oak Valley, in southeastern San Diego County, on the Cleveland National Forest. A *CAL FIRE* dozer was dispatched to the fire and assigned to Division "B". The Dozer Operator was briefed at 1410 hours and began work at a starting point off Corte Madera Road. The dozer was soon moved up an unnamed 4-Wheel Drive (4-WD) road to the east to begin work. The Operator began constructing a line toward the west to the original starting point at 1430 hours.

After working for a short time the Operator noticed flames on the left side of the dozer. The Operator placed the dozer in reverse to back out of the area but the engine stalled. Heat began to build up in the cab and the Operator attempted to deploy the reflective fire curtains. The curtains in the dozer have a snap system and the operator could not get all of them to unsnap and unroll. Heat and fumes in the cab made breathing difficult. The Operator had a total of 4 fire shelters: 2 fire shelters in his fire line pack, 1 in a common dozer pack and 1 under the seat in the dozer cab. The Operator grabbed his fire line pack but was burned by something on the pack and he dropped it. The Operator then exited the dozer, through the right-side door, and sought refuge in a "sandy area" near by.

At approximately 1615 hours, the dozer and Operator were located by the Incident Safety Officer and Dozer Boss approximately 450 feet within the burn. An air ambulance arrived at 1646 hours, and the Operator was transported to a local burn center.

The Operator sustained 2nd and 3rd degree burns to both hands and fingers, the left elbow, the nose, left side of the face, and the left ear. The burns were considered moderate to major in severity.

The dozer sustained moderate fire damage, mostly to the left side and in front of the cab.

II. NARRATIVE

On September 12, 2007 at 1233 hrs, the USFS Cleveland National Forest (CNF) dispatched ground and air resources to a reported vegetation fire. The Pine Fire (CA-CNF-2463) was located south of Interstate 8 near the Pine Valley Bridge west of Pine Valley, CA. At 1239 hrs, the CAL FIRE San Diego Unit Emergency Command Center (ECC) dispatched a first alarm assignment. Both agencies thereafter dispatched numerous additional air and ground resources to the fire. The CNF remained the single ordering point for resource orders.

At 1249 hrs, Pine Air Tactical Group Supervisor (ATGS) arrived and reported the fire as being 7-10 acres, having a moderate rate of spread, moving into an inaccessible area and having the potential to become a major fire. At 1300 hrs, the ATGS reported access in and out of the Corte Madera Road would be cutoff due to the fire burning east at a rapid rate of spread.

At 1254 the local Battalion Chief arrived and assumed command of the incident. At 1302 hrs, the local Division Chief arrived and assumed command of the incident (Pine IC) from the Battalion Chief. The Battalion Chief was re-assigned as the Operations Section Chief (OSC).

The Incident Command Post (ICP) was established on Corte Madera Road in Oak Valley just north of the left flank of the fire (photo 1).

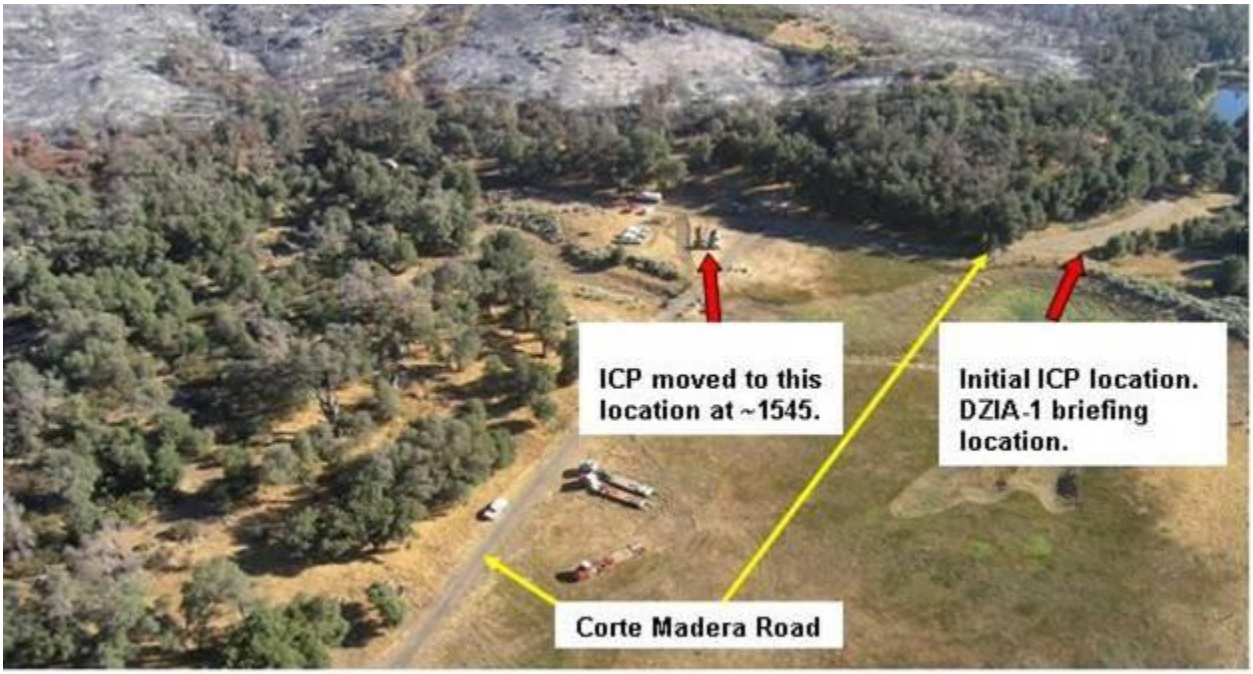


Photo 1 – Incident Command Post locations.

At 1328 hrs, the Pine ATGS reported the fire at 30-40 acres. At 1330 hrs, the OSC reported 40 foot flame lengths, with the fire burning parallel to Interstate 8 and a flanking action was being employed. A second alarm was started a 1343 hrs. At 1402 hrs, the IC reported the fire at 100 acres, with a potential of 8,000 to 10,000 acres.

CAL FIRE dozer operator 1 (DZIA-1) was dispatched at 1251 hrs, drove from the La Cima Camp to the Julian Fire Station where he initiated his response with Transport/Dozer (Maps and Illustrations, Exhibit 2). DZIA-1 arrived at the fire scene just prior to 1400 hrs and was assigned to Division B. DZIA-1 was briefed by dozer boss 1 (DOZB-1) at approximately 1410 hrs. There was no discussion about escape routes or safety zones. Since the dozer would be constructing direct line, DOZB-1 stated he assumed the cut dozer line was the escape route and the blackened area was the safety zone but did not specifically mention this during the briefing.

During the briefing a radio check was conducted. DOZB-1 does not recall whether or not a voice check was done. DZIA-1 states that an audio check was done and was successful.

DOZB-1 directed DZIA-1 to anchor on Corte Madera Road and construct line toward the east. The dozer wasn't able to get to that area because of congestion on the road. At 1420 hours, after doing a reconnaissance of the fire area and adjusting dozer priorities, DOZB-1 found DZIA-1 working his way toward the left flank. DOZB-1 redirected DZIA-1 to an area east, and then south on a 4-WD road leading away from the ICP, and toward the center of the left flank of the fire. After going approximately 1/2 mile, DOZB-1 instructed DZIA-1 to begin constructing a direct line west, along the left flank, towards the heel of the fire at 1430 hours (photo 2).

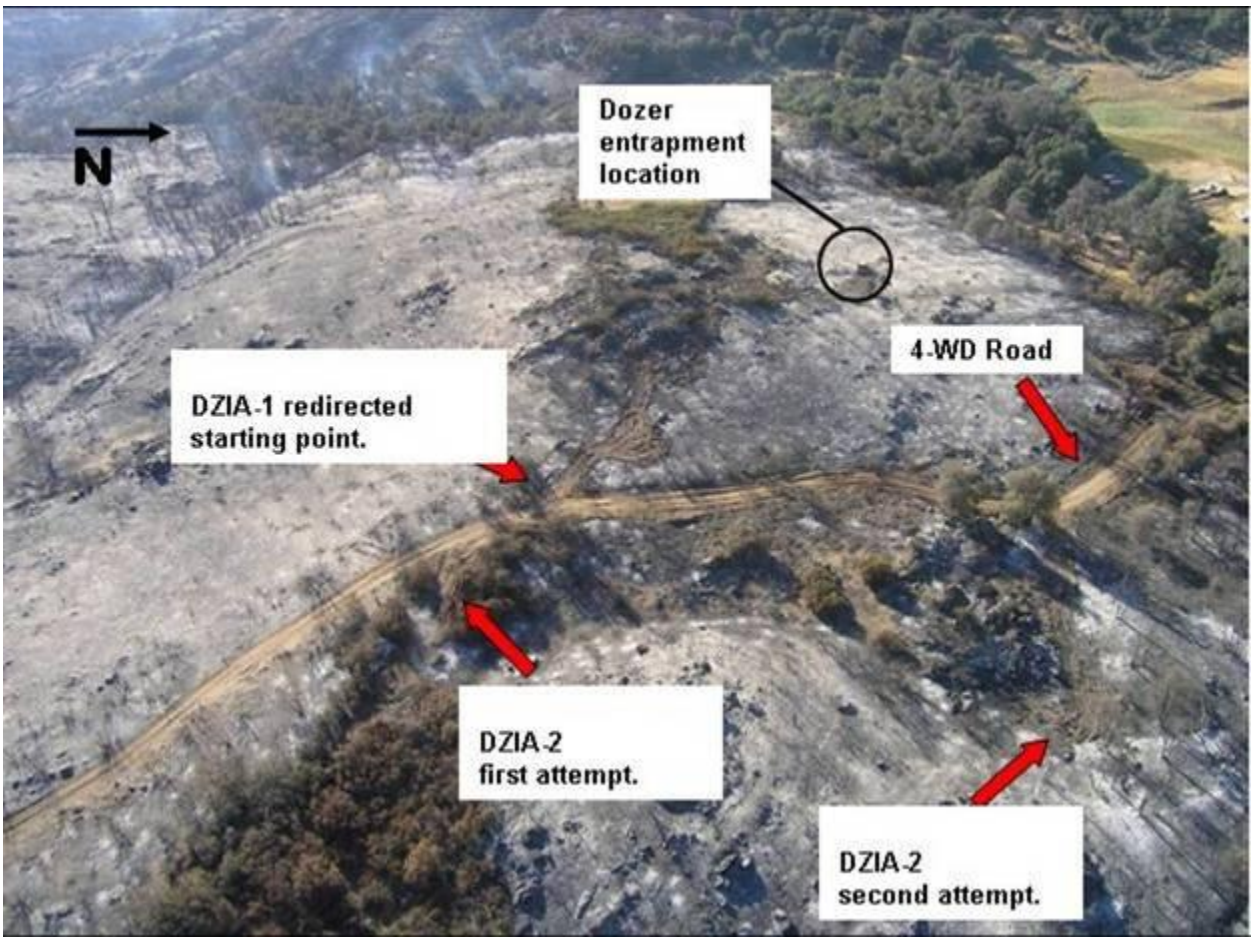


Photo 2 – DZIA-1 and DZIA-2 work off 4-WD Road. View is looking west.

DOZB-1 was coordinating the actions of two dozers on the Pine Fire, DZIA-1 and dozer operator 2 (DZIA-2.) After starting DZIA-1 on the line off the 4-WD road, DOZB-1 met with the OSC near the ICP. At 1440 hours DOZB-1 returned to check on DZIA-1 but couldn't make visual contact because DZIA-1 had worked past a rock outcropping and was out of DOZB-1's view. DOZB-1 then returned to the ICP to brief DZIA-2.

After constructing approximately 100 yards of direct line, DZIA-1 dropped below a rock outcropping to pick up the fire's edge. Initially, the burning conditions did not alarm DZIA-1. Due to the density and height of the brush, visibility was impaired and DZIA-1 could not see the main fire at all times. DZIA-1 was sheltered from the prevailing westerly wind. DZIA-1 was north of the main fire and began constructing a direct line on the left flank around the north side of a knoll, working from east to west.

The slope at the site was 5% with a north aspect. The age class of brush fuels was 37 years of growth with an average height of 12 feet and a height range of 10-16 feet. The fuels within the area are native California chaparral and grass with light duff. The fuels are heavy with Sage, Mahogany, Manzanita, Scrub Oak and annual grass species. Fuels are best defined by Fuel Model-4, Native California Chaparral, for older decadent stands with average height of 6 feet or greater.

As DZIA-1 was widening the initial single pass line, brush that was piled near the left side of the dozer caught fire. Piled brush in front of the blade also ignited. Fire then began to spot to the right side of the dozer. DZIA-1 tried to reverse up his line but was unable to do so, as the engine stalled during the backing attempt after backing approximately 40 feet (photo 3).

Photo 3 – DZIA-1 was widening the initial line when the dozer stalled.

DZIA-1 did not attempt to restart the dozer.

DZIA-1 began to experience rapid heat build-up in the cab of the dozer. DZIA-1 placed a radio call announcing "Emergency traffic. Dozer in trouble. Need air support." to notify others that he was "in trouble". DZIA-1 did not receive any response. DZIA-1 then deployed the rear fire curtains, but was not able to fully deploy the front curtains. DZIA-1 had problems opening the snaps on the side curtains, so the left and right curtains were never deployed. DZIA-1 activated the dozer emergency strobe warning light but did not activate the dozer emergency audio warning signal.

DZIA-1 then radioed for help a second time. "Emergency traffic. Dozer on fire. Need air drop." DZIA-1 did not receive a radio reply. An after-incident radio operations check discovered the dozer radio microphone was transmitting carrier, but only transmitted voice audio intermittently. The radio functioned properly when the microphone was exchanged (Appendix D: Automotive - Supplemental Report).

DZIA-1 reported an increase in fumes in the cab making it difficult to breathe. The heat build-up, inability to deploy the fire curtains and difficulty breathing led to DZIA-1's decision to exit through the right-side door of the dozer. While exiting, DZIA-1 grabbed his fire line pack but was burned by something on the pack. He dropped it and left it in the cab. When DZIA-1 exited the dozer, he was wearing Nomex shirt and pants, leather boots, helmet, shroud and goggles. DZIA-1 was not wearing gloves, did not have a fire shelter, portable radio or water. DZIA-1 jumped off the right side of the dozer, retreated behind the dozer and headed south up the dozer trail that had just been constructed. DZIA-1 took refuge in a "sandy area" approximately 190 feet from the dozer at 1445 hours (photo 3).

Concurrently, DOZB-1 returned to the ICP to meet DZIA-2. DOZB-1 met and briefed DZIA-2 at 1500 hours. At 1515 hours, DOZB-1 directed DZIA-2 to start direct line construction, to the east, from the 4-WD road, working the opposite direction from where DZIA-1 initiated his line (photo 2). DZIA-2 constructed approximately 100 feet of direct fireline when localized fire activity increased. DOZB-1 then took DZIA-2 back downhill to the bottom of the 4-WD road and had him stage there. DOZB-1 then went to the ICP and asked the OSC for air support. After a retardant drop, DOZB-1 was joined by dozer boss 2 (DOZB-2). They walked back up the 4-WD road and began constructing another line, east from the 4-WD road, on the left flank towards the head of the fire (photo 2).

At approximately 1545 hours, localized fire activity again worsened and DOZB-2 radioed DZIA-2 and advised him to withdraw. Because of heavy radio traffic, DOZB-1 was uncertain if DZIA-2 had heard DOZB-2's radio transmission. DOZB-1 walked into DZIA-2's location and signaled him to withdraw. DOZB-1 then looked to the west and saw a "wall of flame" between him and the 4-WD road. Recognizing that he was in a precarious situation, DOZB-1 joined DZIA-2 in the dozer cab and they withdrew to the ICP area. At this point in time DOZB-1 recognized that dozers were not being effective in this fuel type and fire activity.

Soon after returning to the ICP area, DOZB-1 became increasingly concerned about the location of DZIA-1. At 1550 hours, DOZB-1 met Division B (DIV B) and asked if he had heard from DZIA-1. DOZB-1 also discussed radio traffic issues with DIV B. DOZB-1 walked to the OSC to report radio communication issues. The OSC advised DOZB-1 to switch all resources on Division B to CDF Tac 5. DOZB-1 walked to DIV B and advised him to switch Division B resources to CDF Tac 5. DOZB-1 then walked to DZIA-2 and DOZB 2 and advised them of the frequency change. At this time the ICP was moved to the east and was relocated to the intersection of Corte Madera Road and the 4-WD road (photo 1).

At 1555 hours DOZB-1 went back to the OSC and reported that DZIA-1 could not be located. The OSC contacted the ATGS and requested help in locating DZIA-1. At 1600 hours, the ATGS reported seeing a dozer parked in the burn due south of the ICP. DOZB-1, with the aid of the Incident Safety Officer (SOFR), who had arrived on scene at 1545 hours, began looking for DZIA-1 at 1605 hours.

DOZB-1 and the SOFR walked south of the ICP into the burned area. At 1610 hours DOZB-1 spotted the burned over dozer, and the SOFR spotted DZIA-1 sitting on a rock approximately 80' from the dozer (photo 3, photo 4).

Photo 4 – Location, and position, that DZIA-1 was found in (re-creation).

The SOFR went to DZIA-1's location, made contact, and then called back to DOZB-1 that DZIA-1 was alive and that medical assistance was needed. DOZB-1 tried unsuccessful to make radio contact with the IC to request medical aid. DOZB-1 ran down to the ICP, reported the entrapment, requested medical assistance, and then returned to DZIA-1's location with medical personnel from a local engine company. At 1620 hours, the IC alerted the CNF ECC that DZIA-1 had been burned-over on Division B, requested an air ambulance and ground based EMS to the scene. At 1622 hours, the CNF ECC determined the responding air ambulance would have an ETA of 18 minutes (1640 hrs).

Engine medical personnel did an initial assessment and determined the injuries to be non-life threatening. They did initial treatment of DZIA-1's injuries. At 1630 hours, with DZIA-1's concurrence, DZIA-1 was walked about 500' downhill to the ICP.

At 1644 hours, the IC advised the CNF ECC that DZIA-1 had burns to the hands and maybe to the face and that DZIA-1 would be air lifted to the nearest burn center. The air ambulance landed at 1646 hours, loaded DZIA-1, and took off at 1655 hours en-route to an approved burn center.

DZIA-1 arrived at the burn center at 1715 hours.

Burn Center medical specialists diagnosed DZIA-1 with 2nd and 3rd degree burns to both hands and fingers, the left elbow, the nose, left side of the face, and the left ear. The burns were considered moderate to major in severity.

The dozer sustained moderate damage.

III. FINDINGS

Finding 01 – Direct flame impingement starved the dozer engine of air causing it to stall thus leading to the entrapment.

FACT(S):

72) DZIA-1 immediately tried to reverse, up the line, but was unable to do so as the engine stalled during the backing attempt.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

134) The primary air filter had a large area (20-30%) burned on the side of the filter facing up toward the inlet.
(Appendix D: Automotive-Supp Report, Pictures 15, 16, 17)

135) Secondary engine air filter was scorched but not burned through.
(Appendix D: Automotive-Supp Report, Picture 18)

Finding 02 - DZIA-1 constructed line direct, parallel, and indirect, which at times put unburned fuel between the dozer and the fire.

FACT(S):

66) DZIA-1 established an anchor off the 4-WD road and started working west at ~1430 hours.
(Statements: DZIA-1 9/13/07, DOZB-1 9/19/07)

67) DZIA-1 temporarily lost sight of the main fire while constructing line below the rocks in tall (10-16 foot) brush.
(Statement: DZIA-1 9/13/07)

68) After constructing approximately 100 yards of direct line, DZIA-1 dropped below a rock pile to pick up the fire edge.
(Statements: DZIA-1 9/13/07, DZIA-1 9/16/07)

Finding 03 – The High Efficiency Particulate Air (HEPA) filter to the cab air intake system was not properly sealing thus allowing dust to get into the cab when the air conditioning was turned on. The dust problem had never been officially reported. Operators had placed cardboard in the fresh air inlet to minimize the dust getting into the cab. The air conditioning system shut down once the engine stalled.

FACT(S):

146) The HEPA filter system cab inlet was blocked off by a piece of corrugated paper fiber board (cardboard).
(Appendix D: Automotive-Supp Report, Pictures 20a, 20b, 21)

147) DZIA-2 stated that cardboard was placed in the cab air system inlet to block off dust that was being blown into the cab when the system was turned on.
(Statements: DZIA-1 9/16/07, DZIA-2)

148) DZIA-1 had been informed by DZIA-2 of the cardboard being in place in the cabin air inlet system.
(Statements: DZIA-1 9/16/07, DZIA-2)

149) Dust and dirt were located within the cab air intake system beyond the HEPA filter element.
(Appendix D: Automotive-Supp Report; SAIT Observation)

150) DZIA-2 stated that dust was being blown into the dozer cabin when the cabin air system was turned on.
(Statement: DZIA-2)

151) There was no Faulty Equipment Report (ME 14) on record reporting the dust coming through the cabin air conditioning system.
(Record: SAIT Observation)

Finding 04 – DZIA-1 did not activate the audible alarm system consistent with training that this system was not part of the protocol for sheltering in place in the event of an entrapment. Current dozer operator training states that the audible alarm system is to be used in "falling rock" situations.

FACT(S):

77) DZIA-1 activated the dozer strobe warning light but did not activate the dozer emergency audio warning system (siren).
(Statement: DZIA-1 9/16/07)

156) CAL FIRE training in using a dozer as a refuge does not mention the use of the audible alarm system as part of the entrapment response.
(Record: CDF Training Handbook – Dozer as a Refuge)

Finding 05 – DZIA-1 was not prepared to immediately exit the dozer with all required PPE.

FACT(S):

78) DZIA-1 grabbed the fireline pack, got burned by something on the pack, dropped the pack and exited through the right side of the dozer because of the heat and flames on the left side of the unit.
(Statement: DZIA-1 9/13/07)

79) At the time DZIA-1 exited the dozer DZIA-1 was wearing Nomex pants and shirt, boots, a helmet with shroud and goggles. DZIA-1 did not take gloves, a fire shelter, water or the handheld radio from the cab.
(Statement: SOFR 9/12/07**,** SOFR 9/14/07, DZIA-1 9/13/07; Record: Physical Evidence Log & Chain of Custody, Physical Evidence Inventory**,** DZIA-1's PPE Inventory)

80) There were 4 fire shelters in the cab of the dozer. Two old generation fire shelters were in DZIA-1's fireline pack. The fire line pack weighed 32 pounds. One new generation fire shelter was located under the seat. One new generation fire shelter was in a common dozer pack. (common dozer pack = a pack that stays with the dozer)
(Record: Physical Evidence Inventory**,** DZIA-1's PPE Inventory)

81) There were five sets of gloves in the cab of the dozer. One pair of CAL FIRE gloves was located in the side pocket of DZIA-1's fireline pack. One pair of CAL FIRE and one pair of USFS gloves were located in a canteen pouch of the web belt of the fireline pack. One pair of CAL FIRE structure gloves was located in the main compartment of DZIA-1's fire line pack. One pair of USFS gloves was in the common dozer pack.
(Record: Physical Evidence Inventory**,** DZIA-1's PPE Inventory)

Finding 06 – A dozer entrapment occurred and was not known, or discovered, for approximately 90 minutes.

FACT(S):

58) During the briefing a radio check was conducted. DOZB-1 does not recall whether or not a voice check was done. DZIA-1 states that an audio check was done and was successful.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, DZIA-1 9/16/07, DZIA-1 11/15/07)

59) DZIA-1 tried the headset microphone to the mobile radio in the dozer and couldn't get it to work.
(Statement: DZIA-1 9/13/07)

70) As DZIA-1 is cleaning the line, brush, which has been pushed into piles, catches fire to the left of the dozer. Piled brush in front of the blade also catches fire.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

71) DZIA-1 stated there was fire on the left, front and right sides of the dozer.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

72) DZIA-1 immediately tried to reverse, up the line, but was unable to do so as the engine stalled during the backing attempt.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

73) DZIA-1 radioed for help stating "Emergency Traffic. Dozer in trouble. Need air support." Did not receive a response.
(Statement: DZIA-1 9/16/07, DZIA-1 11/15/07)

74) DZIA-1 tried to deploy the heat protective curtains but was only able to drop the front and rear curtains.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07; Appendix D: Automotive-Supp Report)

75) Due to problems opening the snaps on the side curtains, the left and right curtains were never deployed.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07, Appendix D: Automotive-Supp Report, Photos 2, 4b, 6)

76) DZIA-1 radioed for help a second time. "Emergency traffic. Dozer on fire. Need air drop." DZIA-1 did not receive a response.
(Statement: DZIA-1 9/16/07, DZIA-1 11/15/07)

77) DZIA-1 activated the dozer strobe warning light but did not activate the dozer emergency audio warning system (siren).
(Statement: DZIA-1 9/16/07)

82) DZIA-1 retreated behind the dozer and headed south up the dozer trail that had just been constructed. Took refuge in a sandy area ~ 190 feet south of the dozer.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

100) DOZB-1 and SOFR spotted the burned dozer.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/13/07, DOZB-1 9/19/07)

101) The burned dozer was found approximately 515 feet due south of the ICP at NAD 27, 32 degree 48.246 minutes N, 116 degrees 32.840 minutes W.
(Record: SAIT Observation with Garmin 12)

102) SOFR spotted DZIA-1 sitting in a "rocky area." SOFR went to DZIA-1's location and checked on injury status.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/13/07, DOZB-1 9/19/07)

142) The dash-mounted radio was tested by Department of General Services Radio Tech. The microphone was found to be defective. The defect prevented the microphone from transmitting audio. The defect was at the connection to the radio head. The center locating pin on the connector appeared to have been cut or damaged. The microphone could be made to work intermittently if the cord was wiggled during transmission.
(Appendix D: Automotive-Supp Report, Appendix E: Radio Technician-Supp Report)

163) DZIA-1 abandoned the dozer because of difficulty breathing after the dozer engine stalled allowing heat and fumes to build up in the cab.
(Statements: DIAZ-1 9/13/07, DZIA-1 9/16/07)

164) Four separate individuals assigned to, or near the incident, heard radio traffic "my dozer is on fire" [*sic*]. None of the individuals took any action to report the radio traffic to their fire line supervisors.
(Statements: Crew-3 9/17/07, Crew-3 9/18/07; Crew-2 9/15/07; Engine 9/15/07; DDO 9/15/07)

Finding 07 – There were no indicators, or knowledge, of a possible entrapment of DZIA-1 until DZIA-2 and DOZB-1 got into a localized, intensified fire behavior situation.

FACT(S):

93) DOZB-1 spoke to both the OSC and DIV B, in person, and asked if they knew the location of DZIA-1.
(Statements: DIV B, OSC, DOZB-1 9/13/07**,** DOZB-1**.**

96) The OSC asked DIV B if he knew the location of DZIA-1.
(Statement: OSC, DIV B)

97) The OSC called the ATGS requesting help in locating DZIA-1.
(Statement: OSC, ATGS)

98) The ATGS reported to the OSC "there's a dozer in the black due south of the crew bus."
(Statement: OSC, ATGS)

Finding 08 – There was a loss of resource accountability on the incident by DOZB-1 and DIV B.

FACT(S):

52) DZIA-1 was met and briefed by DOZB-1 upon arrival at the scene 1410 hours.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007, DOZB-1 9/15/07, DOZB-1 9/19/07)

58) During the briefing a radio check was conducted. DOZB-1 does not recall whether or not a voice check was done. DZIA-1 states that an audio check was done and was successful.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, DZIA-1 9/16/07, DZIA-1 11/15/07)

59) DZIA-1 tried the headset microphone to the mobile radio in the dozer and couldn't get it to work.
(Statement: DZIA-1 9/13/07)

60) Initially, The DOZB-1 was coordinating the actions of two dozers, DZIA-1 and DZIA-2.
(Statements: IC, DOZB-1 9/15/07, DOZB-1 9/19/07)

83) DOZB-1 gave a briefing to DZIA-2 before his dozer was unloaded from the transport. DOZB-1 instructed DZIA-2 to unload and meet DOZB-1 at the log deck.
(Statements: DOZB-1 9/19/07, DZIA-2)

85) DOZB-1 pulled DZIA-2 away from his assignment and they returned to the log deck due to an increase in fire activity.
(Statements: DOZB-1 9/19/07, DZIA-2)

93) DOZB-1 spoke to both the OSC and DIV B, in person, and asked if they knew the location of DZIA-1.
(Statements: DIV B, OSC, DOZB-1 9/13/07**,** DOZB-1.)

96) The OSC asked DIV B if he knew the location of DZIA-1.
(Statement: OSC, DIV B)

Finding 09 – Once DOZB-1 realized that DZIA-1 was unaccounted for a rapid mobilization was made to locate the dozer and operator.

FACT(S):

93) DOZB-1 spoke to both the OSC and DIV B, in person, and asked if they knew the location of DZIA-1.
(Statements: DIV B, OSC, DOZB-1 9/13/07**,** DOZB-1.)

96) The OSC asked DIV B if he knew the location of DZIA-1.
Statement: OSC, DIV B)

97) The OSC called the ATGS requesting help in locating DZIA-1.
(Statement: OSC, ATGS)

98) The ATGS reported to the OSC "there's a dozer in the black due south of the crew bus."
(Statement: OSC, ATGS)

99) The SOFR was asked by DOZB-1 to assist in locating DZIA-1 and they walked into the burned area looking for DZIA-1.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

100) DOZB-1 and the SOFR spotted the burned dozer.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

101) The burned dozer (DZIA-1) was found approximately 515 feet due south of the ICP at NAD 27, 32 degree 48.246 minutes N, 116 degrees 32.840 minutes W.
(Record: SAIT Observation with Garmin 12)

102) The SOFR spotted DZIA-1 sitting in a "rocky area." The SOFR went to DZIA-1's location and checked on injury status.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

Finding 10 – Once DZIA-1 was located, triage, treatment and transport were appropriate, effective and timely.

FACT(S):

103) The SOFR yelled to DOZB-1 to get medical assistance.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

104) DOZB-1 tried unsuccessfully to clear the radio channel to announce the emergency. DOZB-1 ran down to the OSC and reported the entrapment and requested medical assistance.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, OSC)

105) The SOFR waited with DZIA-1 for medical assistance to arrive.
(Statements: DOZB-1 9/15/07, SOFR 9/12/07**,** SOFR 9/14/07)

106) The IC reported the entrapment to CNF dispatch. Requested air Medevac and ground-based EMS.
(Statement: IC, Record: WildCAD Incident Card)

107) DOZB-1 took medical personnel to DZIA-1.
(Record: DOZB-1 9/15/07**,** SOFR 9/12/07)

108) CNF determined that air ambulance had an estimated arrival time of 1640.
(Record: WildCAD Incident Card)

109) The IC reported DZIA-1 had burns to the ears, felt weak, but was able to walk.
(Record: WildCAD Incident Card)

110) DZIA-1 was escorted out of the burned area, to the staging area, by the SOFR, DOZB-1 and medical personnel.
(Statements: SOFR 9/12/07**,** SOFR 9/14/07, DOZB-1 9/15/07)

111) DZIA-1 and group stopped by the burned dozer on the way to the staging area. They turned off the battery master switch. DZIA-1 had his personal fire line pack removed from the dozer.
(Statement: DOZB-1 9/19/07**,** SOFR 9/14/07)

114) The IC updated that DZIA-1 had burns to the hands, and maybe to the face, and that DZIA-1 would be transported by air to a burn center.
(Record: WildCAD Incident Card)

115) Air ambulance departed to burn center with DZIA-1 on board at 1655 and arrived at burn center at 1715 hours.
(Record: Medevac Time Line)

Finding 11 - IC had a Communication Plan that was effective and had a single ordering point.

FACT(S):

26) The CNF remained the single ordering point for resource orders.
(Record: WildCAD Incident Card)

44) Initial tactical radio assignments were Division A – R5 Tac 6; Division B – R5 Tac 6; Division Y – NIFC Tac 2; Division Z – NIFC Tac 2.
(Statement: OSC; Record: OSC ICS 201 Notes)

Finding 12 – On this interagency incident, radio frequency names caused confusion. Not all employees were familiar with, or able to locate, the appropriate frequency/channel.

FACT(S):

45) The IC was informed by a CAL FIRE Battalion Chief that none of the CAL FIRE radios had R5 Tac 6.
(Statement: IC, OSC)

46) Division B resources were later switched (@ ~1600) to CDF Tac 5.
(Statement: OSC; Record: OSC ICS 201 Notes)

94) DOZB-1 talks to Div B about radio communications problems.
(Statements: DIV B, DOZB-1 9/15/07, DOZB-1 9/19/07)

95) The OSC switched all Division B resources to "CDF Tac 5".
(Statements: OSC, DIV B, DOZB-1 9/19/07)

Finding 13 – Pine Fire Incident strategy was appropriate.

FACT(S):

161) The firefighting tactics employed were to anchor Divisions A and Z, then start a flanking action in Divisions B and Y by working toward the east.
(Statement: OSC)

162) The overall firefighting strategy was: 1st Priority – keep fire out of the wilderness; 2nd Priority – keep fire out of Pine Valley, and 3rd Priority – keep fire off Corte Madera Ranch.
(Statement: IC)

Finding 14 - Initial suppression actions were based on current and expected fire behavior.

FACT(S):

27) At 1249 hrs, ATGS arrived and reported the fire as being 7-10 acres, having a moderate rate of spread, moving into an inaccessible area and having the potential for a major fire.
(Record: WildCAD Incident Card; Statements: ATGS, OSC)

42) At 1330 hrs, the OSC reported 40 foot flame lengths, the fire burning parallel to Interstate 8, and a flanking action was being employed.
(Record: WildCAD Incident Card)

43) No firing operations were being conducted except for approximately 100 feet along the east side of Corte Madera Road .
(Statements: OSC, ATGS, DIV B, IC)

161) The firefighting tactics employed were to anchor Divisions A and Z, then start a flanking action in Divisions B and Y by working toward the east.
(Statement: OSC)

162) The overall firefighting strategy was: 1st Priority – keep fire out of the wilderness; 2nd Priority – keep fire out of Pine Valley, and 3rd Priority – keep fire off Corte Madera Ranch.
(Statement: IC)

Finding 15 - Orders were conveyed and acted on accordingly between DZIA-1 and DOZB-1.

FACT(S):

52) DZIA-1 was met and briefed by DOZB-1 upon arrival at the scene at 1410 hours.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007**,** DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

61) DOZB-1 instructed DZIA-1 to anchor at the left flank of the fire where the fire crossed Corte Madera Road, and work to the east.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007**,** DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

63) DOZB-1 returns to DZIA-1 and instructs him to relocate to a new area off the 4-WD road at 1420 hours.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007**,** DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

65) After going approximately 1/2 mile on the 4-WD road, DOZB-1 instructed DZIA-1 to begin constructing a direct line west, along the left flank, towards the origin.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007**,** DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

Finding 16 - Dozer operations were adjusted based on the fire progression.

FACT(S):

61) DOZB-1 instructed DZIA-1 to anchor at the left flank of the fire where the fire crossed Corte Madera Road, and work to the east.
(Statements: DZIA-1 9/13/07, DOZB-1 9/15/07)

62) DZIA-1 could not get up Corte Madera Road due to congestion and started the first attempt near the intersection of Corte Madera Road and the 4-WD road.
(Statements: DZIA-1 9/13/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

63) DOZB-1 returns to DZIA-1 and instructs him to relocate DZIA-1 to a new area off the 4-WD road at 1420 hours.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007**,** DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

65) After going approximately 1/2 mile on the 4-WD road, DOZB-1 instructed DZIA-1 to begin constructing a direct line west, along the left flank, towards the origin.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007**,** DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

84) DZIA-2 makes a first attempt, working opposite direction from where DZIA-1 initiated his line.
(Statements: DOZB-1 9/19/07, DZIA-2)

85) DOZB-1 pulled DZIA-2 away from his assignment and they returned to the log deck due to an increase in fire activity.
(Statements: DOZB-1 9/19/07, DZIA-2)

87) DZIA-2 started a second push to the east as directed by DOZB-1.
(Statements: DOZB-1 9/19/07, DZIA-2)

89) DZIA-2 completed second attempt. Localized fire activity increased. DOZB-2 called DZIA-2 on R5 Tac 6 and advised to retreat. Did not receive a response.
(Statements: DOZB-2, DOZB-1 9/15/07, DOZB-1 9/19/07)

90) DOZB-1 suspected DZIA-2 did not hear DZOB-2's transmission and entered area on foot to get the dozer out.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07)

Finding 17 - Because of heavy radio traffic on Tac Net, DOZB-1 elected to communicate face-to-face with Div B, OSC and DZIA-1 which involved foot travel time delays.

FACT(S):

86) DOZB-1 requested air support from OSC (in person)
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, OSC)

93) DOZB-1 spoke to both OSC and DIV B, in person, and asked if they knew the location of DZIA-1.
(Statements: DIV B, OSC, DOZB-1.)

94) DOZB-1 talks to DIV B about radio communications problems.
(Statements: DIV B, DOZB-1 9/15/07, DOZB-1 9/19/07)

104) DOZB-1 tried unsuccessfully to clear the radio channel to announce the emergency. DOZB-1 ran down to the OSC and reported the entrapment and requested medical assistance.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, OSC)

Finding 18 – DZIA-1 had 30+ years dozer operating experience (private and CAL FIRE combined) with 4 months temporary experience and 11 months permanent with CAL FIRE.

FACT(S):

12) DZIA-1 has 30+ years dozer operating experience, both private and CAL FIRE combined.
(Reference: Personal and Professional Background)

13) DZIA-1's CAL FIRE experience included 4 months as a temporary employee and 11 months as a permanent hire.
(Record: CAL FIRE Employment History)

14) DZIA-1 had previous experience as a dozer operator in fire situations.
(Record: Letters of Recommendation; Incident Training Assignments and Performance Ratings)

48) DZIA-1 was new to the area (11 months in MVU).
(Record: CAL FIRE Employment History, Personal and Professional Background)

Finding 19 – DOZB-1 has 30 years of fire experience on the CNF and is very familiar with the Pine Fire area. DOZB-1 is currently working as a Wilderness Patrol with knowledge of cultural resources and is qualified as a Dozer Boss.

FACT(S):

49) DOZB-1 is a USFS retired annuitant with 30 years of fire experience on the CNF. DOZB-1 is a qualified DIVS.
(Record: IQCS Training Summary-DOZB-1; Statement: DOZB-1 9/15/07)

50) DOZB-1 currently works as a USFS Wilderness Patrol in the Pine Fire area and was very familiar with the area and location of cultural resources.
(Statement: DOZB-1 9/15/07; IC)

Finding 20 – The dash mounted radio in the dozer was malfunctioning (intermittently failing to transmit audio) but the malfunction was not detected in the radio check that DZIA-1 and DOZB-1 did at the initial briefing.

FACT(S):

58) During the briefing a radio check was conducted. DOZB-1 does not recall whether or not a voice check was done. DZIA-1 states that an audio check was done and was successful.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, DZIA-1 9/16/07, DZIA-1 11/15/07)

59) DZIA-1 tried the headset microphone to the mobile radio in the dozer and couldn't get it to work.
(Statement: DZIA-1 9/13/07)

73) DZIA-1 radioed for help stating "Emergency Traffic. Dozer in trouble." Did not receive a response.
(Statement: DZIA-1 9/16/07, DZIA-1 11/15/07)

76) DZIA-1 radioed for help a second time. DZIA-1 did not receive a response.
(Statement: DZIA-1 9/16/07, DZIA-1 11/15/07)

142) The dash-mounted radio was tested by Department of General Services Radio Technician. The microphone was found to be defective. The defect prevented the microphone from transmitting audio. The defect was at the connection to the radio head. The center locating pin on the connector appeared to have been cut or damaged. The microphone could be made to work intermittently if the cord was wiggled during transmission.
(Appendix D: Automotive-Supp Report; Appendix E: Radio Technician-Supp Report)

Finding 21 – The engine air intake system had been modified with an incorrect pre-cleaner.

FACT(S):

6) On 5/30/2007 equipment maintenance was done on the Dozer including: Strobe light replacement. Headset equipment installation. Engine air supply pre-cleaner was replaced with a Turbo II, Model 24. Work was done at hour meter reading 2069.
(Appendix D: Automotive-Supp. Report, Photos 8a, 8b, 21; Record: Service/Repair Records for Dozer)

7) Turbo II, Model 24 air supply pre-cleaner has a CFM operating range of 100-250.
(Record: Maradyne Turbo Pre-Cleaner Application Guide)

8) A Caterpillar D333C engine requires 650 CFM under maximum load (2200 RPM).
(Record: Maradyne Turbo Pre-Cleaner Application Guide)

9) Turbo II manufacturer recommends a Model 46 with a CFM operating range of 350-700 CFM for a Caterpillar D333C engine.
(Record: Maradyne Turbo Pre-Cleaner Application Guide)

151) There was no Faulty Equipment Report (ME 14) on record reporting the dust coming through the cabin air conditioning system.
(Record: SAIT Observation)

Finding 22 – Fire curtains were held in place with 18 snaps that were difficult to deploy due to the absence of pull tabs or handles. Fully deployed side window fire curtains did not completely cover the width of the windows.

FACT(S):

74) DZIA-1 tried to deploy the heat protective curtains but was only able to drop the front and rear curtains.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07, DZIA-1 11/15/07; Appendix D: Automotive-Supp Report)

75) Due to problems opening the snaps on the side curtains, the left and right curtains were never deployed.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07, DZIA-1 11/15/07; Appendix D: Automotive-Supp Report)

141) After the incident the fire curtains in the cab were fully deployed and inspected. To deploy all curtains 18 retaining strap snaps were required to be unsnapped. The snaps were difficult to unsnap. There were very short or no tabs or handles on the retaining straps to pull on to unsnap the retaining straps.
(Appendix D: Automotive-Supp Report)

145) The left and right side curtains were found to be undersized and did not cover the full width of the windows when fully deployed.
(Appendix D: Automotive-Supp Report, Picture 19)

Finding 23 – CAL FIRE does not currently have work/rest guidelines.

FACT(S):

158) DZIA-1 was "on duty" from August 1 through September 12 for a total of 43 straight days.
(Record: Timecards)

159) All other personnel related to the entrapment met acceptable current work/rest guidelines.
(Record: Timecards)

Finding 24 – All USFS and CAL FIRE personnel associated with the incident met current training requirements.

FACT(S):

19) DZIA-1 attended the Heavy Fire Equipment Operators Academy from April 24, 2007 through May 26, 2007. DZIA-1 graduated on May 26, 2007 with an overall rating of 92.2%, and a rank of 6 out of 20 in the class. DZIA-1 spent 15 hours on Dozer 3346 at the Academy.
(Record: HFEO Academy Training Records April/May 2007)

154) All CAL FIRE personnel associated with the entrapment met the training requirements and qualifications for their assigned positions.
(Records: CAL FIRE Employment History, Personal and Professional Background, Tailgate Safety Signup Sheets, Training Certificates and Records**,** DZIA-1 Training Records Summary)

155) All USFS personnel associated with the entrapment met the training requirements and qualifications for their assigned positions on a Type III incident.
(Records: IQCS Training Summaries)

IV. FACTORS

Causal

Factor 01 – DZIA-1's Dozer experienced direct flame impingement causing the engine air filters to ignite stopping air flow and causing the engine to stall.
(Finding – 01)

Factor 02 – DZIA-1's failure to wear all required, and available, PPE contributed to the burn injury severity.
(Finding – 05)

Factor 03 - After the dozer engine stalled conditions in the dozer cab, heat and fumes, became intolerable leading to DZIA-1's decision to leave the dozer.
(Findings – 06, 22)

Contributing

Factor 04 - Constructing the line in rocky terrain led to DZIA-1's decision to go indirect, putting unburned fuel between the dozer and the fire.
(Finding – 02)

Factor 05 – A faulty communication device, abandonment of handheld radio, loss of resource accountability and failure of personnel to react to a possible distress call all contributed to delayed discovery and delivery of medical treatment to DZIA-1.
(Findings – 06, 07, 08)

Factor 06 – An unapproved, incorrect engine air intake pre-cleaner, capable of supplying less than half the air flow required under maximum load, was installed on Dozer 3346.
(Finding – 21)

V. MAPS AND ILLUSTRATIONS

EXHIBIT 1 - Location Map (overview)
Pine Fire Dozer Entrapment

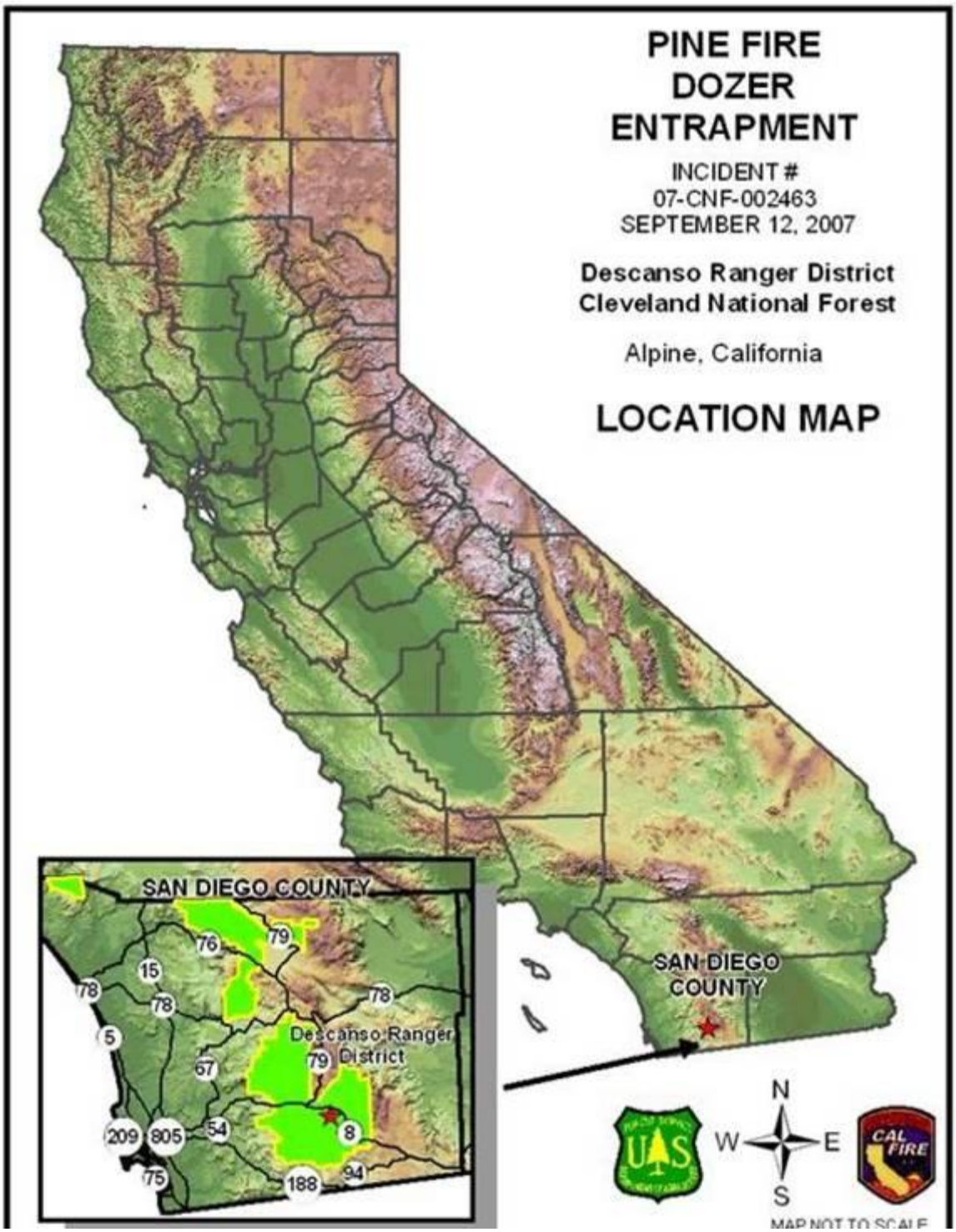


EXHIBIT 2 - Vicinity Map (local) and Travel Route
Pine Fire Dozer Entrapment

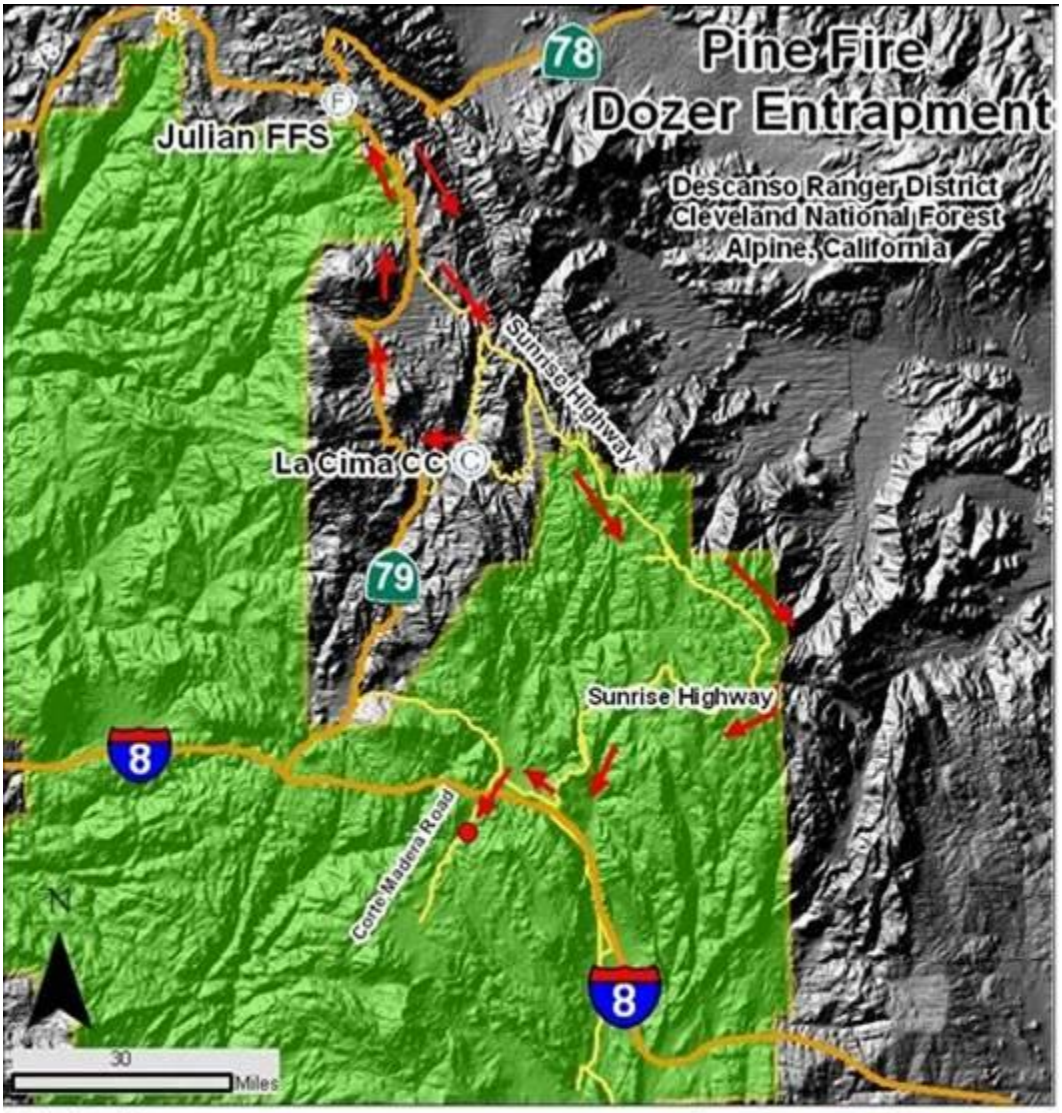


EXHIBIT 3 - Site Map (close-up)
Pine Fire Dozer Entrapment

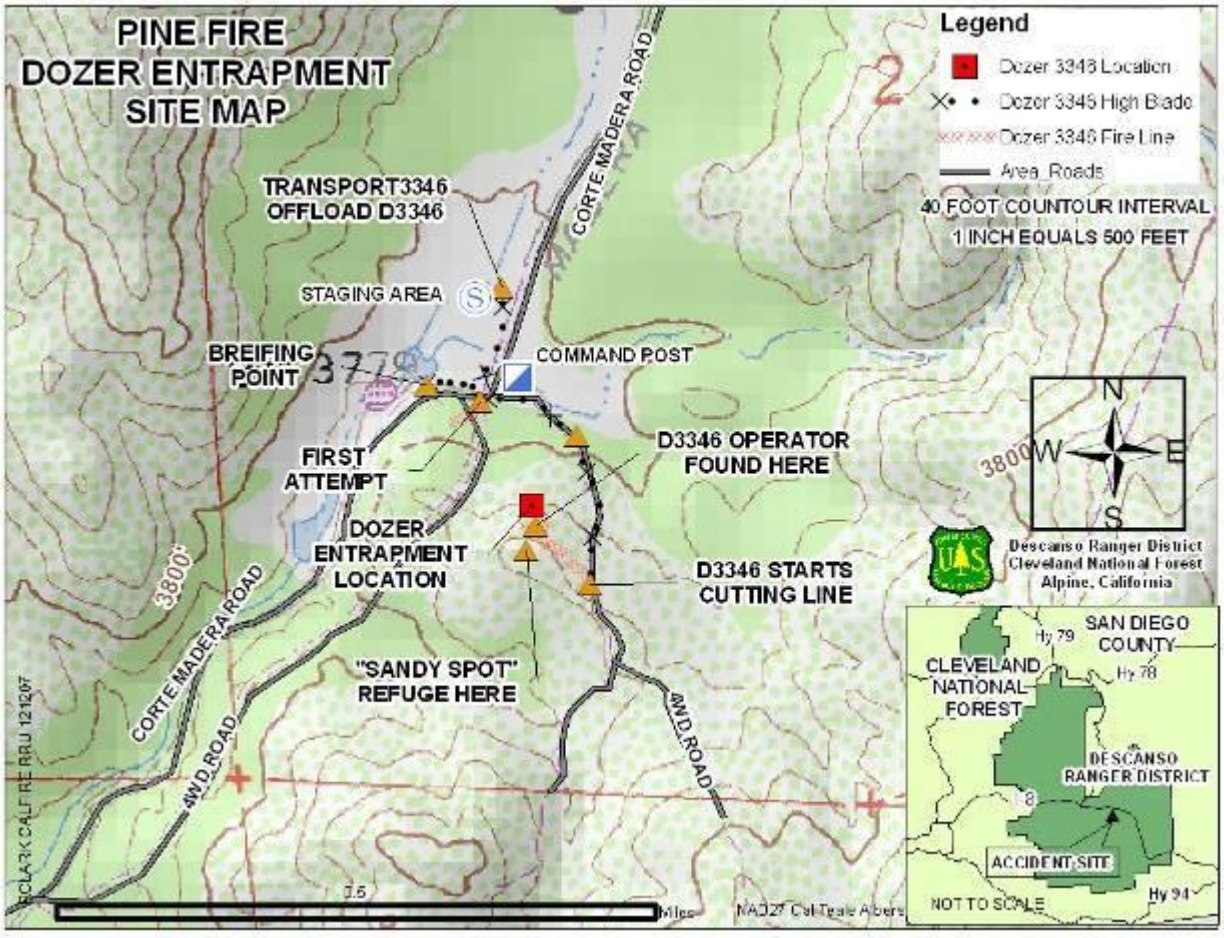
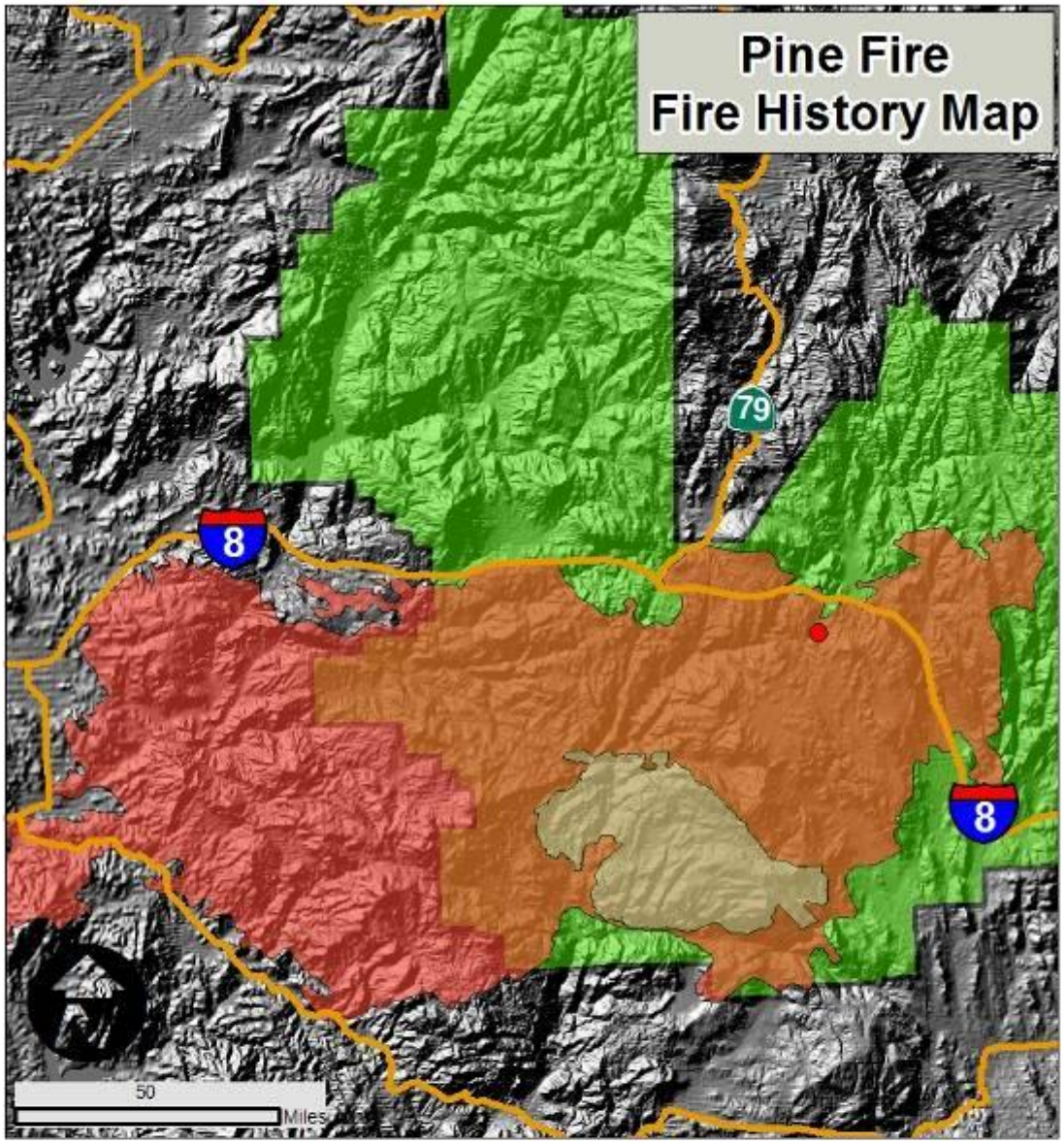


EXHIBIT 4 – Fire History Map

Pine Fire Dozer Entrapment



Fire History Map

Accident Location

Major Roads

Cleveland National Forest

Pine_Fire_Hx

FIRE NAME, ACRES, YEAR

HORSE, 16,678 ACRES, 2006

LAGUNA, 174,162 ACRES, 1970

RClark CALFIRE RRU 100307
NAD_1927_California_Teale_Albers

EXHIBIT 5 – Pine Fire Final Perimeter Map
Pine Fire Dozer Entrapment

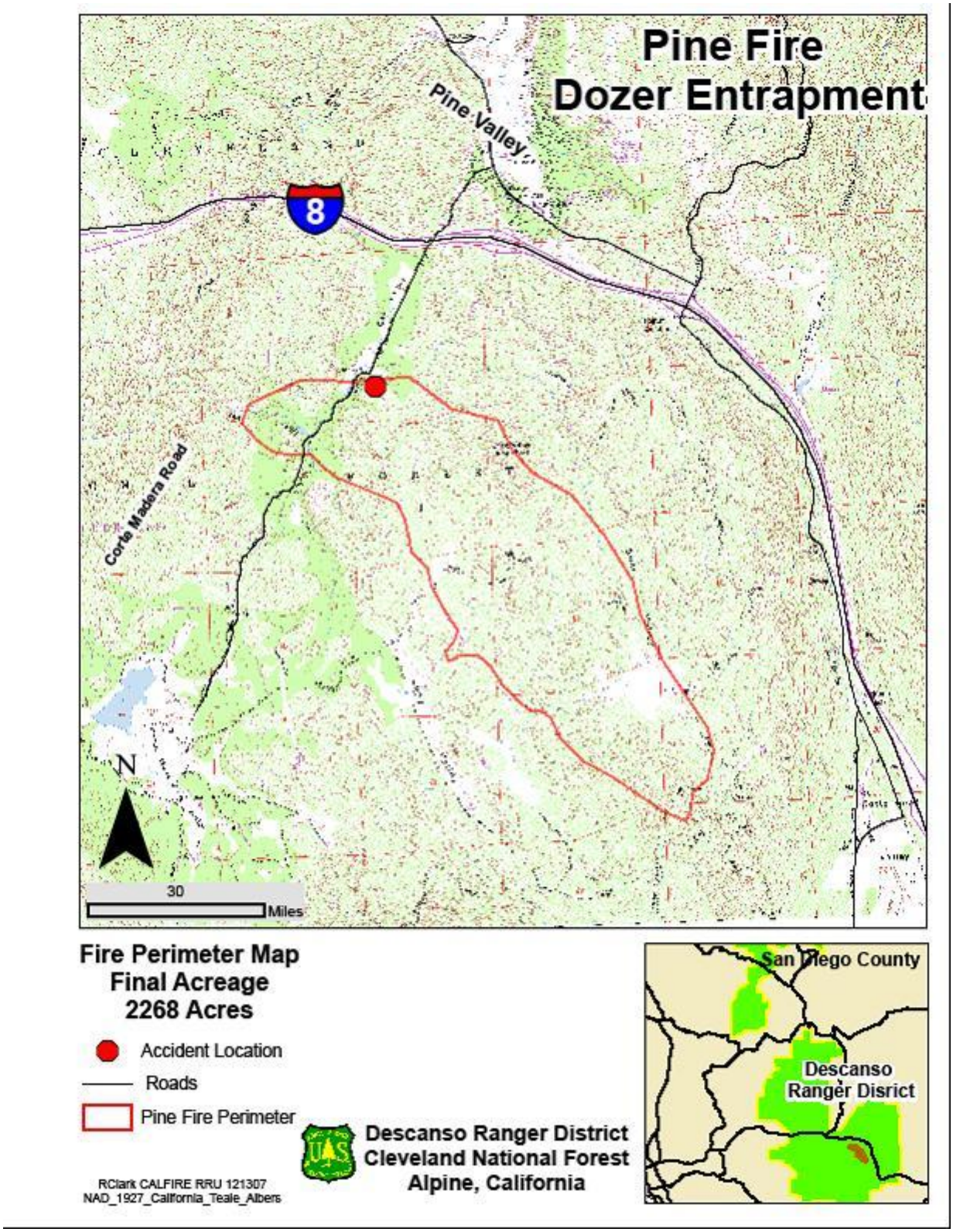
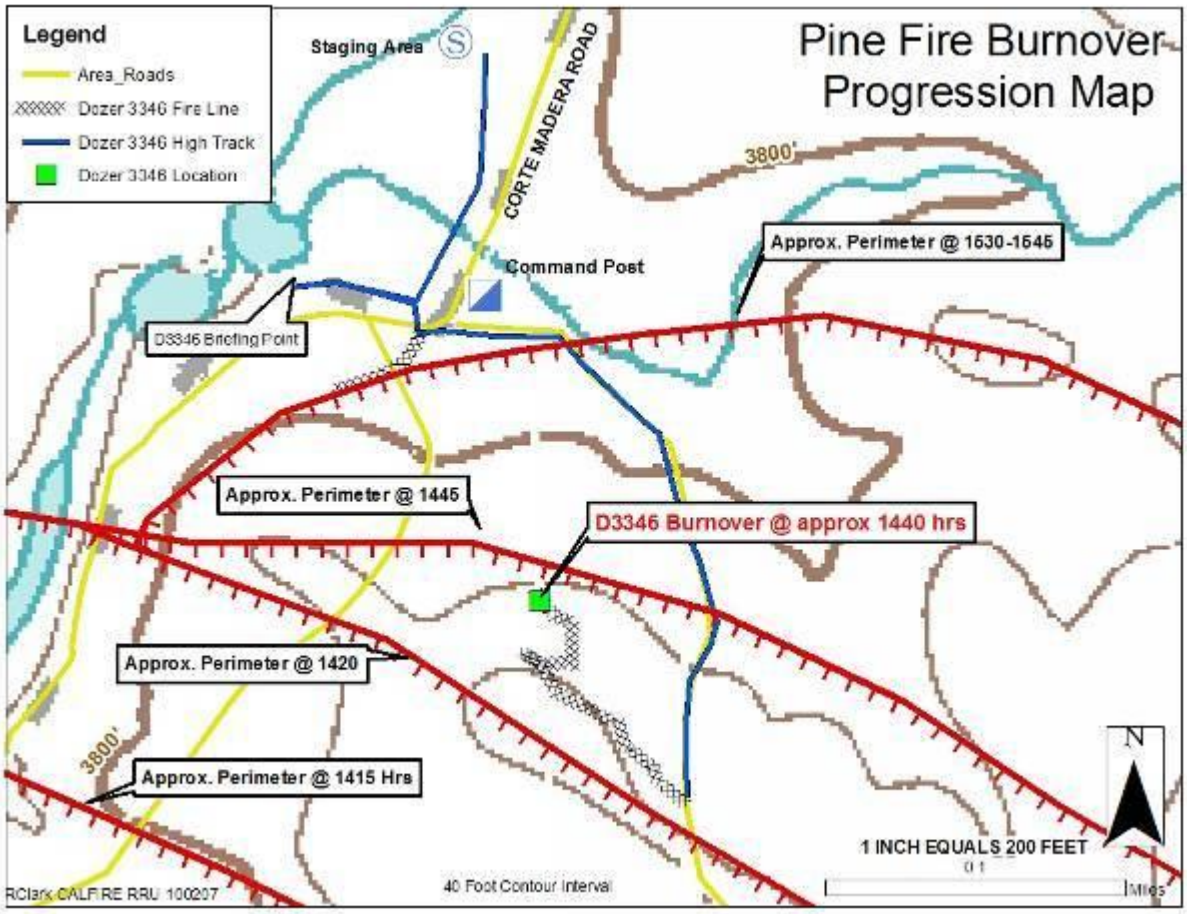


EXHIBIT 6 – Pine Fire Timed Site Fire Perimeter Map

Pine Fire Dozer Entrapment



VI. PHOTOGRAPHS

PHOTOGRAPHIC EVIDENCE

Photographs for this report are contained in the narrative (Section II) and supplemental Automotive Report (Section VIII, Appendix E).

Photographs in the narrative section were taken by Mort Allen, CAL FIRE, Fire Captain Specialist, Riverside Unit and Peter Tolosano, Chief Investigator, USFS.

Photographs in the supplemental Automotive Report were taken by Gordon Gholson, CAL FIRE, Southern Region Fleet Manager, Riverside, CA; and John Dell 'Orto, CAL FIRE, Fire Captain Automotive Battalion, CAL FIRE Academy.

VII. APPENDICES

Appendix A: TIMELINE

8/1/2007

0800 – DZIA-1 begins work shift. Works 16 days on staffing pattern, followed by 9 days on the Zaca 2 fire.

9/9/2007

0800 – DZIA-1 was assigned Dozer 3346. DZIA-1 was given an orientation to Dozer 3346 by DZIA-2 on that day

9/12/2007

1233 – Time of initial dispatch by CNF to the Pine Fire.

1239 – Time of initial dispatch by CAL FIRE to the Pine Fire.

1249 – ATGS arrived on scene. Reported: Fire at 7-10 acres. Moderate rate of spread. Potential for major fire.

1251 – DZIA-1 dispatched drove from the La Cima Camp to the Julian Fire Station where DZIA-1 initiated a response with Transport/Dozer 3346.

1254 – OSC arrived at scene. Assumed Pine Incident Commander assignment.

1300 –ATGS reported that access to Corte Madera road would be cut off shortly. Fire was heading east at a rapid rate of spread.

1300 – Crew 1 arrived on scene.

1302 – IC arrived at scene. Assumed Pine Incident Commander assignment. OSC reassigned to Operations.

1314 – Div B arrives on scene with an engine.

1328 –ATGS reported fire at 30-40 acres.

1330 – OSC reported 40 foot flame lengths, fire burning parallel to Interstate 8. A flanking action was being employed.

1343 – Second alarm started.

~1345 – OSC assigns Div B to left flank of the fire, east of Corte Madera Road.

1356 – DZIA-1 arrived on scene and was assigned to Division B.

1400 – Crew 2 reported fire was south of the knob, pushing east and north

1402 – IC reported Pine Valley Bridge closed. Fire size was at 100 acres. Potential for 8,000-10,000 acres.

1402 – Crew 2 arrived at scene.

1410 – DZIA-1 was briefed by DOZB-1.

~1415 – Crew 3 observed DZIA-1 passing by on the road.

1415 – DZIA-1 made first attempt.

1420 – DOZB-1 talked to DZIA-1 about relocating off the 4-WD road**.**

~1430 –DZIA-1 started on a direct line off the 4-WD road.

1434 – DOZB-2 arrived on scene as unassigned overhead.

1435 – DZIA-1 reroutes around a rock pile. Makes a long push, 240 feet to the north. DZIA-1 then makes 3 short pushes to the north to clean and widen the line.

1440 – DOZB-1 attempted to check on DZIA-1 but DZIA-1 had worked past "pretty good rock" outcropping and DOZB-1 could not see the DZIA-1 from the road.

1435 to 1445 – DZIA-1 was constructing line in 10-16 foot high brush. Brush ignited on the left side of dozer.

DZIA-1 attempted to back out of the area. The dozer engine stalled.

DZIA-1 radioed for help. "Emergency traffic. Dozer in trouble. Need air support." Did not receive a radio response.

Deployed front and rear curtains. Attempted to deploy side curtains, but couldn't get snaps to unsnap. Radioed for help again. "Emergency Traffic. Dozer on fire. Need air drop." Did not receive a radio response.

DZIA-1 grabbed the fireline pack, got burned by something on the pack, and dropped it. DZIA-1 exited the dozer through the right door. DZIA-1 left with a helmet, goggles and shroud, but without a pack, gloves, fire shelter, water, or handheld radio.

DZIA-1 retreated behind the dozer and headed (south) up the dozer trail that had just been constructed.

1445 – DZIA-1 took refuge in "sandy area" approximately 190 feet from the dozer.

1458 – DZIA-3 arrived at scene.

1500 – DOZB-1 met DZIA-2 and conducted briefing before dozer was unloaded from the transport.

1501 – OSC asked DZIA-3 if DZIA-3 was still heading to the south side of the fire.

1509 – OSC called DZIA-3 inquiring as to whether DZIA-3 had contact with DIV B ("Bravo"). OSC recommended DZIA-3 switch to Freq R5, Tac 6, and try to reach Bravo on that Tac. (Dispatch tape)

1515 – DZIA-2 made first attempt at going direct, to the east, from the 4-WD trail.

1515 – While sitting in the sandy area DZIA-1 heard a dozer working to the west.

~1520 – Fire activity increased and DZIA-2 pulled back to the staging area.

~1525 – DOZB-1 requested air support from OSC (in person).

1535 – DZIA-2 started a second push to the east as directed by DOZB-1.

1545 – SOFR arrived on scene.

1545 – DZIA-2 completed second attempt. Localized fire activity increased. DOZB-2 called DZIA-2 on R5 Tac 6 and advised to withdraw.

1545 to 1550 - DOZB-1 suspected DZIA-2 did not hear the transmission regarding withdrawal, so he entered the area on foot to get the dozer out.

DOZB-1 reported seeing a "wall of flame to the west" behind him as DZIA-2 was located. DOZB-1 entered the cab of DZIA-2's dozer to withdraw.

DZIA-2 transported DOZB-1 to the staging area at the bottom of the 4-WD trail

1550 – DOZB-1 began to inquire about the location of DZIA-1. DOZB-1 spoke to both OSC and Div B, in person, and asked if they knew the location of DZIA-1. DOZB-1 talks to Div B about radio communications problems.

1551 – OSC switched all Division B resources to "CDF Tac 5."

1555 – OSC called ATGS requesting help in locating DZIA-1.

1600 – ATGS reported to OSC "there's a dozer in the black due south of the crew bus."

1605 – SOFR was asked by DOZB-1 to assist in locating DZIA-1 and they begin walking into the burned area.

1609 – OSC asked Div B if he knew the location of DZIA-1. Div B reports change to CDF Tac 5.

~1610 –DOZB-1 spotted the burned dozer.

~1610 – SOFR spotted DZIA-1 sitting in a "rocky area." SOFR went to DZIA-1's location and checked on injury status. SOFR yelled to DOZB-1 to get medical assistance. DOZB-1 tried unsuccessfully to clear the radio channel to announce the emergency. DOZB-1 ran down to OSC and reported the entrapment and requested medical assistance.

1617 – SOFR continued to wait with DZIA-1 for medical assistance to arrive.

1620 – IC reported entrapment. Requested air Medivac and ground-based EMS.

~1620 – DOZB-1 took on-site medical personnel to DZIA-1.

1622 – CNF determined that air ambulance had an ETA of 18 minutes (arrival at 1640).

1623 – IC reported DZIA-1 had burns to the ears, felt weak, but was able to walk.

~1630 – DZIA-1 was escorted out of the burn area to the staging area by SOFR and medical personnel.

~1633 – DZIA-1 and group stopped by the burned dozer on the way to the staging area. They turned off the battery master switch. DZIA-1 had the yellow fireline pack removed from the dozer.

~1638 – DZIA-1 was seated on the tailgate of DOZB-1's truck and was driven to the air ambulance landing area.

1644 – IC updated that DZIA-1 had burns to the hands, and maybe to the face, and that DZIA-1 would be transported by helicopter to a local burn center.

1646 – Air ambulance arrived.

1655 – Air ambulance was in route to burn center with DZIA-1 on board.

1715 – DZIA-1 arrived at burn center via air ambulance.

Appendix B: FACTS

1. Dozer 3346 is a 1965 Caterpillar Bulldozer, Model D6C, License Number E38736, and Serial Number 76A2001. It was assigned CAL FIRE Equipment Number 06X055. It has a D333C engine.
   (Appendix D: Automotive-Supp. Report)

2. All four fire curtains were replaced in Dozer 3346 on 1/3/2001 at hour meter reading 1360.
   (Record: Service/Repair Records for D3346)

3. The last recorded Mobile Equipment Administrative Inspection was performed and documented on 1/16/2002.
   (Record: Service/Repair Records for D3346)

4. Last recorded Unit Safety Inspection of Dozer 3346 was conducted by Bill Renner, Forestry Equipment Manager 1, on March 1, 2006 at hour meter reading 1899. No record found for March 2007.
   (Record: Service/Repair Records for D3346)

5. Both "B" and "C" schedule service maintenance were done on Dozer 3346 on 3/26/2007 at hour meter reading 2008.
   (Appendix D: Automotive-Supp. Report; Record: Service/Repair Records for D3346)

6. On 5/30/2007 equipment maintenance was done on Dozer 3346 including: Strobe light replacement. Headset equipment installation. Engine air supply pre-cleaner was replaced with a Turbo II, Model 24. Work was done at hour meter reading 2069.
   (Appendix D: Automotive-Supp. Report, Photos 8a, 8b, 21; Record: Service/Repair Records for D3346)

7. Turbo II, Model 24 air supply pre-cleaner has a CFM operating range of 100-250.
   (Record: Maradyne Turbo Pre-Cleaner Application Guide)

8. A Caterpillar D333C engine requires 650 CFM under maximum load (2200 RPM).
   (Record: Maradyne Turbo Pre-Cleaner Application Guide)

9. Turbo II manufacturer recommends a Model 46 with a CFM operating range of 350-700 CFM for a Caterpillar D333C engine.
   (Record: Maradyne Turbo Pre-Cleaner Application Guide)

10. On 6/30/2007 at hour meter reading 2110 a safety inspection noted a "cracked window." No documentation located to indicate that the window was replaced.
    (Record: Service/Repair Records for D3346)

11. DZIA-2 had been operating Dozer 3346 in previous suppression activities when the engine had stalled. Once was on a manure fire, the other was on the Esperanza Fire (started Oct. 26, 2006).
    (Statement: DZIA-2)

12. DZIA-1 has 30+ years dozer operating experience, both private and CAL FIRE combined.
(Reference: Personal and Professional Background)

13. DZIA-1's CAL FIRE experience included 4 months as a temporary employee and 11 months as a permanent hire.
(Record: CAL FIRE Employment History)

14. DZIA-1 had previous experience as a dozer operator in fire situations.
(Record: Letters of Recommendation; Incident Training Assignments and Performance Ratings)

15. Exit Performance Record for DZIA-1's temporary time during 7/4/2005-11/6/2005 was done on 11/4/2005 showing and overall rating of 7.5 out of a possible rating of 10.
(Record: Incident Training Assignments and Performance Ratings)

16. DZIA-1 was hired by CAL FIRE on probationary status on 10/2/2006.
(Record: Personal and Professional Background; CAL FIRE Employment History)

17. DZIA-1's Probationary Performance Reports of 01/13/2007 and 09/16/2007 show satisfactory ratings with no notable concerns.
(Record: Probationary Employee Performance Reports)

18. DZIA-1 had met all the Heavy Fire Equipment Operator job training requirements (CAL FIRE 4300 Handbook).
(Records: Personal and Professional Background; Training Certificates and Records)

19. DZIA-1 attended the Heavy Fire Equipment Operators Academy from April 24, 2007 through May 26, 2007. DZIA-1 graduated on May 26, 2007 with an overall rating of 92.2%, and a rank of 6 out of 20 in the class. DZIA-1 spent 15 hours on Dozer 3346 at the Academy.
(Record: HFEO Academy Training Records April/May 2007)

20. DZIA-1 signed Tailgate Safety briefing regarding Fire Behavior Alert (Red Sheet) at Campo FFS on 8/2/07.
(Record: Tailgate Safety Sign-up Sheets)

21. DZIA-1 was transferred to La Cima from Campo on 9/3/2007.
(Records: CAL FIRE Employment History; Personal and Professional Background)

22. DZIA-1 given an orientation to Dozer 3346 on 9/9/2007 by DZIA-2.
(Statement: DZIA-2)

23. Dozer 3346 was mated with Transport 3346 and was staged at Julian, CA.
(Statement: DZIA-1)

24. On September 12, 2007 at 1233 hrs, the USFS Cleveland National Forest (CNF) dispatched ground and air resources to a reported vegetation fire (CA-CNF-002463) south of Interstate 8 near the Pine Valley Bridge west of Pine Valley, CA in southeastern San Diego County.
(Record: CDF Interagency Report of Incident and Dispatch; WildCAD Incident Card)

25. At 1239 hrs, the CAL FIRE San Diego Unit ECC dispatched a first alarm assignment. Both agencies thereafter dispatched numerous additional air and ground resources to the fire.
(Record: CDF Interagency Report of Incident and Dispatch Action)

26. The CNF remained the single ordering point for resource orders.
(Record: WildCAD Incident Card)

27. At 1249 hrs, ATGS arrived and reported the fire as being 7-10 acres, having a moderate rate of spread, moving into an inaccessible area and having the potential for a major fire.
(Record: WildCAD Incident Card; Statements: ATGS, OSC)

28. The area was last burned in 1970 and had 37 years of fuel build-up.
(Appendix C: Fire Behavior-Supp Report)

29. Fuel type for the Pine Fire was best described as Fuel Model 4, Native California Chaparral for older, decadent stands with average height of 6' or greater. Consisting primarily of sage, mahogany, manzanita, live oak and scrub oak. There was a light duff component and intermixed grasses.
(Appendix C: Fire Behavior-Supp Report)

30. The average fuel height was 12 feet with a height range of 10-16 feet. The fuel load was 45-50 tons per acre. The fuels were continuous as part of a very dense brush stand which was 80% closed canopy.
(Appendix C: Fire Behavior-Supp Report)

31. The moisture contents were: live - 45%, 1 hour dry - 3%, 10 hour dry – 4 %, 100 hour = 7%
(Appendix C: Fire Behavior-Supp Report)

32. The temperature on 9/12/2007 was 95 degrees F. The relative humidity was 13%. There were light and variable westerly winds to 7 mph (eye level).
(Appendix C: Fire Behavior-Supp Report)

33. The Burn Index for 9/12/2007 was 119. The average Burn Index for that day/time of year is 70 and the Burn Index high is 150.
(Appendix C: Fire Behavior-Supp Report)

34. No special fire weather forecasts were in effect on 9/12/2007.
(Appendix C: Fire Behavior-Supp Report)

35. The slope at the accident site was 5% with a north aspect. The terrain was rocky and difficult to travel due to heavy fuel loading.
(Appendix C: Fire Behavior-Supp Report)

36. The Pine Fire was a flanking and backing fire moving at a slow rate of spread (4.5 chains/hour).
(Appendix C: Fire Behavior-Supp Report)

37. Average flame lengths were 20 feet.
(Appendix C: Fire Behavior-Supp Report)

38. At 1249 hrs, ATGS reported access in and out of the Corte Madera Road would be cutoff "in about 10 minutes" due to the fire burning east at a rapid rate of spread.
(Record: WildCAD Incident Card)

39. At 1302 hrs, CNF Division 4 arrived, took command (IC) of the incident and advised that CNF Battalion 42 would be the Operations Section Chief (OSC).
(Record: WildCAD Incident Card; Statements: OSC, IC)

40. The Incident Command Post (ICP) was established on Corte Madera Road in Oak Valley just north of the left flank of the fire.
(Statements: OSC, DOZB-1 9/13/2007, DOZB-1 9/19/07)

41. At 1328 hrs, ATGS reported fire at 30-40 acres.
(Record: WildCAD Incident Card)

42. At 1330 hrs, the OSC reported 40' flame lengths, the fire burning parallel to Interstate 8, and a flanking action was being employed.
(Record: WildCAD Incident Card)

43. No firing operations were being conducted except for approximately 100 feet along the east side of Corte Madera Road .
(Statements: OSC, ATGS, DIV B, IC)

44. Initial tactical radio assignments were Division A – R5 Tac 6; Division B – R5 Tac 6; Division Y – NIFC Tac 2; Division Z – NIFC Tac 2.
(Statement: OSC; Record: OSC ICS 201 Notes)

45. IC was informed by a CAL FIRE Battalion Chief that none of the CAL FIRE radios had R5 Tac 6.
(Statement: IC, OSC)

46. Division B resources were later switched (@ ~1600) to CDF Tac 5.
(Statement: OSC; Record: OSC ICS 201 Notes)

47. DZIA-1 was dispatched at 1251 hrs. DZIA-1 drove from the La Cima Camp to the Julian Fire Station where he initiated a response with Transport/Dozer 3346. DZIA-1 arrived at the fire scene just prior 1400 hrs and was assigned to Division B.
(Statements: OSC, DZIA-1, DOZB-1 9/13/07; Record: IC ICS 201 Notes)

48. DZIA-1 was new to the area (11 months in MVU).
(Record: CAL FIRE Employment History, Personal and Professional Background)

49. DOZB-1 is a USFS retired annuitant with 30 year of fire experience on the CNF. DOZB-1 is a qualified DIVS.
(Record: IQCS Training Summary_DOZB-1; Statement: DOZB-1 9/15/07)

50. DOZB-1 currently works as a USFS Wilderness Patrol in the Pine Fire area and was very familiar with the area and location of cultural resources.
(Statement: DOZB-1 9/15/07; IC)

51. DOZB-1 had scouted the area off the 4 WD road.
(Statements: DOZB-1 9/13/07, DOZB-1 9/19/07)

52. DZIA-1 was met and briefed by DOZB-1 upon arrival at the scene 1410 hours.
(Statements: DZIA-1 9/13/2007, DZIA-1 9/16/2007, DOZB-1 9/15/07, DOZB-1 9/19/07)

53. No lookouts were established for DZIA-1.
(Statements: DOZB-1 9/19/07, DZIA-1 9/16/07, IC)

54. No discussion of lookouts was included in DZIA-1's briefing with DOZB-1.
(Statements: DOZB-1 9/19/07, DZIA-1 9/16/07)

55. There was a roving lookout (scout) for Division B.
(Statement: DIV B)

56. No escape routes were discussed between DOZB-1 and DZIA-1.
(Statement: DOZB-1 9/15/07)

57. DOZB-1 assumed the blackened area was the safety zone.
(Statement: DOZB-1 9/15/07)

58. During the briefing a radio check was conducted. DOZB-1 does not recall whether or not a voice check was done. DZIA-1 states that an audio check was done and was successful.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, DZIA-1 9/16/07, DZIA-1 11/15/07)

59. DZIA-1 tried the headset microphone to the mobile radio in the dozer and couldn't get it to work.
(Statement: DZIA-1 9/13/07)

60. The DOZB-1 was coordinating the actions of two dozers, DZIA-1 and DZIA-2.
(Statements: IC, DOZB-1 9/15/07, DOZB-1 9/19/07)

61. Initially, DOZB-1 instructed DZIA-1 to anchor at the left flank of the fire where the fire crossed Corte Madera Road, and work to the east.
(Statements: DZIA-1 9/13/07, DZIA-1 9/16/07, DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

62. DZIA-1 could not get up Corte Madera Road due to congestion and started the first attempt near the intersection of Corte Madera Road and the 4-WD road.
(Statements: DZIA-1 9/13/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

63. DOZB-1 returned to DZIA-1 and instructed him to relocate to a new area off the 4-WD road at 1420 hours.
(Statements: DZIA-1 9/13/07, DZIA-1 9/16/07, DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

64. DOZB-1 and DIV B walk DZIA-1 up the 4-WD road to the new starting point.
(Statements: DZIA-1 9/13/07, DOZB-1 9/19/07)

65. After going approximately 1/2 mile on the 4-WD road, the DOZB-1 instructed DZIA-1 to begin constructing a direct line west, along the left flank, towards the origin.
(Statements: DZIA-1 9/13/07, DZIA-1 9/16/07, DZIA-1 11/15/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

66. DZIA-1 established an anchor off the 4-WD road and started working west at ~1430 hours.
(Statements: DZIA-1 9/13/07, DOZB-1 9/19/07)

67. DZIA-1 temporarily lost sight of the main fire while constructing line below the rocks in tall (10-16 foot) brush.
(Statement: DZIA-1 9/13/07)

68. After constructing approximately 100 yards of direct line, DZIA-1 dropped below a rock pile to pick up the fire edge.
(Statements: DZIA-1 9/13/07, DZIA-1 9/16/07)

69. DZIA-1 makes a long push, 240 feet to the north. DZIA-1 then makes 3 short pushes to the north to clean and widen the line.
(Record: DZIA-1; Photo 3)

70. As DZIA-1 is cleaning the line brush, which has been pushed into piles, catches fire to the left of the dozer. Piled brush in front of the blade also catches fire.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07, DZIA-1 11/15/2007)

71. DZIA-1 stated there was fire on the left, front and right sides of the dozer.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

72. DZIA-1 immediately tried to reverse, up the line, but was unable to do so as the engine stalled during the backing attempt.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

73. DZIA-1 radioed for help stating "Emergency Traffic. Dozer in trouble. Air support needed." Did not receive a response.
(Statement: DZIA-1 9/16/07, DZIA-1 11/15/2007)

74. DZIA-1 tried to deploy the heat protective curtains but was only able to drop the front and rear curtains.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07; Appendix D: Automotive-Supp Report)

75. Due to problems opening the snaps on the side curtains, the left and right curtains were never deployed.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07; Appendix D: Automotive-Supp Report)

76. DZIA-1 radioed for help a second time. "Emergency traffic. Dozer on fire. Need air drop." DZIA-1 did not receive a response.
(Statement: DZIA-1 9/16/07, DZIA-1 11/15/07)

77. DZIA-1 activated the dozer strobe warning light but did not activate the dozer emergency audio warning system (siren).
(Statement: DZIA-1 9/16/07)

78. DZIA-1 grabbed the fireline pack, got burned by something on the pack, dropped the pack and exited through the right side of the dozer because of the heat and flames on the left side of the unit.
(Statement: DZIA-1 9/13/07)

79. At the time DZIA-1 exited the dozer DZIA-1 was wearing Nomex pants and shirt, boots, a helmet with shroud and goggles. DZIA-1 did not take gloves, a fire shelter, water or the handheld radio from the cab.
(Statement: SOFR 9/12/07, SOFR 9/14/07, DZIA-1 9/13/07; Records: Physical Evidence Log & Chain of Custody, Physical Evidence Inventory; DZIA-1's PPE Inventory)

80. There were 4 fire shelters in the cab of the dozer. Two old generation fire shelters were in DZIA-1's fireline pack, which weighed 32 pounds. One new generation fire shelter was located under the seat. One new generation fire shelter was in a common dozer pack. (common dozer pack = a pack that stays with the dozer)
(Record: Physical Evidence Inventory; DZIA-1's PPE Inventory)

81. There were five sets of gloves in the cab of the dozer. One pair of CAL FIRE gloves was located in the side pocket of DZIA-1's fireline pack. One pair of CAL FIRE and one pair of USFS gloves were located in a canteen pouch of the web belt of the fireline pack. One pair of CAL FIRE structure gloves was located in the main compartment of DZIA-1's fireline pack. One pair of USFS gloves was in the common dozer pack.
(Record: Physical Evidence Inventory; DZIA-1's PPE Inventory)

82. DZIA-1 retreated behind the dozer and headed south up the dozer trail that had just been constructed. Took refuge in a sandy area ~ 190 feet south of the dozer.
(Statement: DZIA-1 9/13/07, DZIA-1 9/16/07)

83. DOZB-1 gave a briefing to DZIA-2 before his dozer was unloaded from the transport. DOZB-1 instructed DZIA-2 to unload and meet DOZB-1 at the log deck.
(Statements: DOZB-1 9/19/07, DZIA-2)

84. DZIA-2 makes a first attempt, working opposite direction from where DZIA-1 initiated his line.
(Statements: DOZB-1 9/19/07, DZIA-2)

85. DOZB-1 pulled DZIA-2 away from his assignment and they returned to the log deck due to an increase in fire activity.
(Statements: DOZB-1 9/19/07, DZIA-2)

86. DOZB-1 requested air support from OSC (in person)
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, OSC)

87. DZIA-2 started a second push to the east as directed by DOZB-1.
(Statements: DOZB-1 9/19/07, DZIA-2)

88. SOFR arrived on scene at ~ 1530.
(Statement: SOFR)

89. DZIA-2 completed second attempt. Localized fire activity increased. DOZB-2 called DZIA-2 on R5 Tac 6 and advised to withdraw. Did not received a response.
(Statements: DOZB-2, DOZB-1 9/15/07, DOZB-1 9/19/07)

90. DOZB-1 suspected DZIA-2 did not hear DOZB-2's transmission and entered area on foot to get the dozer out.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07)

91. DOZB-1 reported seeing a "wall of flame to the west" behind him as DZIA-2 was located. DOZB-1 entered the cab of DZIA-2's dozer to withdraw.
(Statements: DZIA-2, DOZB-1 9/13/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

92. DZIA-2 transported DOZB-1 and arrived at the staging area at the bottom of the 4-WD road.
(Statements: DZIA-2, DOZB-1 9/13/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

93. DOZB-1 spoke to both OSC and DIV B, in person, and asked if they knew the location of DZIA-1.
(Statements: DIV B, OSC, DOZB-1 9/13/07**,** DOZB-1, DOZB-1)

94. DOZB-1 talked to Div B about radio communications problems.
(Statements: DIV B, DOZB-1 9/15/07, DOZB-1 9/19/07)

95. OSC switched all Division B resources to "CDF Tac 5."
(Statements: OSC, DIV B, DOZB-1 9/19/07)

96. OSC asked DIV B if he knew the location of DZIA-1.
(Statement: OSC, DIV B)

97. OSC called ATGS requesting help in locating DZIA-1.
(Statement: OSC, ATGS)

98. ATGS reported to OSC "there's a dozer in the black due south of the crew bus."
(Statement: OSC, ATGS)

99. SOFR was asked by DOZB-1 to assist in locating DZIA-1 and they walked into the burned area looking for DZIA-1.
(Statements: SOFR 9/12/07, SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

100. DOZB-1 and SOFR spotted the burned dozer.
(Statements: SOFR 9/12/07, SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

101. The burned dozer was found approximately 515 feet due south of the ICP at NAD 27, 32 degree 48.246 minutes N, 116 degrees 32.840 minutes W.
(Record: SAIT Observation with Garmin 12)

102. SOFR spotted DZIA-1 sitting in a "rocky area." SOFR went to DZIA-1's location and checked on injury status.
(Statements: SOFR 9/12/07, SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

103. SOFR yelled to DOZB-1 to get medical assistance.
(Statements: SOFR 9/12/07, SOFR 9/14/07, DOZB-1 9/15/07, DOZB-1 9/19/07)

104. DOZB-1 tried unsuccessfully to clear the radio channel to announce the emergency. DOZB-1 ran down to OSC and reported the entrapment and requested medical assistance.
(Statements: DOZB-1 9/15/07, DOZB-1 9/19/07, OSC)

105. SOFR waited with DZIA-1 for medical assistance to arrive.
(Statements: DOZB-1 9/15/07, SOFR 9/12/07, SOFR 9/14/07)

106. IC reported the entrapment to CNF dispatch. Requested air Medivac and ground-based EMS.
(Record: WildCAD Incident Card; Statement: IC)

107. DOZB-1 took medical personnel to DZIA-1.
(Record: DOZB-1 9/15/2007, SOFR 9/12/07)

108. CNF determined that air ambulance had an estimated arrival time of 1640.
(Record: WildCAD Incident Card)

109. IC reported DZIA-1 had burns to the ears, felt weak, but was able to walk.
(Record: WildCAD Incident Card)

110. DZIA-1 was escorted out of the burned area, to the staging area, by SOFR, DOZB-1 and medical personnel.
(Statements: SOFR 9/12/07, SOFR 9/14/07, DOZB-1 9/15/07)

111. DZIA-1 and group stopped by the burned dozer on the way to the staging area. They turned off the battery master switch. DZIA-1 had his personal fire line pack removed from the dozer.
(Statement: DOZB-1 9/19/07, SOFR 9/14/07)

112. DZIA-1 was seated on the tailgate of DOZB-1's truck and was driven to the air ambulance landing area.
(Statement: DOZB-1 9/19/07)

113. Air ambulance arrived at 1646 hours.
(Record: Medivac Time Line)

114. IC updated that DZIA-1 had burns to the hands, and maybe to the face, and that DZIA-1 would be transported by air to a local burn center.
(Record: WildCAD Incident Card)

115. Air ambulance departed to burn center with DZIA-1 on board at 1655 and arrived at burn center at 1715 hours.
(Record: Medivac Time Line)

116. There was extensive burn damage to the air conditioning condenser unit mounted to the under side of the cab roof. One of the air conditioning coolant hoses burned through allowing the coolant to leak out.
(Appendix D: Automotive-Supp Report; Picture 3)

117. The communications radio antenna burned off. The antenna was found lying on the ground directly below the antenna mount.
(Appendix D: Automotive-Supp Report; Picture 3)

118. All the plastic light housings were melted. The paint and CDF decals were blistered randomly over the surface of the right side of dozer cab and battery box door.
(Appendix D: Automotive-Supp Report, Pictures 4a, 4b)

119. At the rear of the dozer very little burn or heat damage was observed. More burn and heat damage on the left side than right. A green USFS knapsack containing fusses was lying on the top of the winch. Very little heat damage to the knapsack was observed.
(Appendix D: Automotive-Supp Report; Picture 5)

120. The greatest amount of burn and heat damage was observed on the left side of the dozer. Very little of the yellow paint was visible.
(Appendix D: Automotive-Supp Report; Picture 6)

121. The left and right blade lift rams had an approximately 6 inch section of the ram below the cylinders that were clean indicating that the hydraulics had leaked down over night exposing a section of the ram not exposed during the entrapment. This would indicate that the blade was not grounded during the entrapment.
(Appendix D: Automotive-Supp Report; Picture 7)

122. The engine air filter pre-cleaner showed significant burn and heat damage.
(Appendix D: Automotive-Supp Report; Picture 8a, 8b, 21)

123. The cab air High Efficiency Particulate Air (HEPA) filter system had received extreme damage to the air intake screen and spark arrester.
(Appendix D: Automotive-Supp Report; Picture 9)

124. The neoprene door seals did not show signs of damage from heat or flame.
(Appendix D: Automotive-Supp Report; Picture 10)

125. Inside the cab the battery switch was in the "off" position, the throttle control was set at ¼ throttle.
(Appendix D: Automotive-Supp Report)

126. The brakes were not set, the transmission was in neutral but the transmission selector control was not locked.
(Appendix D: Automotive-Supp Report)

127. There are several corrugated plastic wire looms, wiring insulation, air conditioning vents and related components that are totally melted or at least warped out of its original shape. (Appendix D: Automotive-Supp Report; Picture 11)

128. The cab air HEPA filter control switch was in the "off" position. (Appendix D: Automotive-Supp Report, Picture 12b)

129. When the battery switch was turned on most of the running lights come on and the strobe light activated and flashed normally. (Appendix D: Automotive-Supp Report)

130. The radio powered up. The radio display indicated the radio was set on FS R5 TAC 6. The scan feature was activated and the radio was scanning FS R5 Tac 6, CDF A/G, MVU LOCAL, CDF TAC 5, CDF CMD 1. (Appendix D: Automotive-Supp Report; Picture 13a)

131. Most of the running lights came on and the strobe light activated and flashed normally. (Appendix D: Automotive-Supp Report)

132. The warning alert sound system was tested and was found to work correctly. (Appendix D: Automotive-Supp Report)

133. The microphone was hanging in its clip on the left side of the turning brake console. (Appendix D: Automotive-Supp Report; Picture 13b)

134. The primary air filter had a large area (20-30%) burned on the side of the filter facing up toward the inlet. (Appendix D: Automotive-Supp Report; Pictures 15, 16, 17)

135. Secondary engine air filter was scorched but not burned through. (Appendix D: Automotive-Supp Report; Picture 18)

136. On 9/14/2007, the engine started without hesitation with the air filters removed. The burned air filters were reinstalled and the engine was restarted. The engine did not accelerate quite as quickly and the exhaust did not clear up as well. (Appendix D: Automotive-Supp Report)

137. Right rear window has several cracks with laminate film melted and bubbled. (Appendix D: Automotive-Supp Report; Picture 2)

138. Front and rear fire curtains are roll-up style (vertically deployed) and were found deployed after the entrapment. (Appendix D: Automotive-Supp Report)

139. The front windshield fire curtain was rolled down but the lower front window flaps were still fastened with Velcro® and not dropped down. (Appendix D: Automotive-Supp Report)

140. The side curtains are stored in vertical pleats (shower curtain style) secured by straps and snaps, and were not deployed.
(Appendix D: Automotive-Supp Report)

141. After the incident the fire curtains in the cab were fully deployed and inspected. To deploy all curtains 18 retaining strap snaps were required to be unsnapped. The snaps were difficult to unsnap. There were very short or no tabs or handles on the retaining straps to pull on to unsnap the retaining straps.
(Appendix D: Automotive-Supp Report)

142. The dash-mounted radio was tested by Department of General Services Radio Technician. The microphone was found to be defective. The defect prevented the microphone from transmitting audio. The defect was at the connection to the radio head. The center locating pin on the connector appeared to have been cut or damaged. The microphone could be made to work intermittently if the cord was wiggled during transmission.
(Appendix D: Automotive-Supp Report; Appendix E: Radio Technician-Supp Report)

143. A David Clark brand headset was located in the cab. It was tested by DGS Radio Tech. The headset was found to be operating satisfactorily.
(Appendix D: Automotive-Supp Report; Appendix E: Radio Technician-Supp Report)

144. The headset interface box has 3 headset receptacles and is designed to accept multiple brands of headsets. The center receptacle works for the David Clark headsets.
(Appendix D: Automotive-Supp Report; Appendix E: Radio Technician-Supp Report)

145. The left and right side curtains were found to be undersized and did not cover the full width of the windows when fully deployed.
(Appendix D: Automotive-Supp Report, Picture 19)

146. The HEPA filter system cab inlet was blocked off by a piece of corrugated paper fiber board (cardboard).
(Appendix D: Automotive-Supp Report; Picture 20a)

147. DZIA-2 stated that cardboard was placed in the cab air system inlet to block off dust that was being blown into the cab when the system was turned on.
(Statements: DZIA-1 9/16/07, DZIA-2)

148. DZIA-1 had been informed by DZIA-2 of the cardboard being in place in the cabin air inlet system.
(Statements: DZIA-1 9/16/07, DZIA-2)

149. Dust and dirt were located within the cab air intake system beyond the HEPA filter element.
(Appendix D: Automotive-Supp Report, Pictures 20a, 20b; SAIT Observation)

150. DZIA-2 stated that dust was being blown into the dozer cabin when the cabin air system was turned on.
(Statement: DZIA-2)

151. There was no Faulty Equipment Report (ME 14) on record reporting the dust coming through the cabin air conditioning system.
(Record: SAIT Observation)

152. On 9/21/2007 fuel test results were received from Hawthorne Machinery Company. Results - "Sample is clear and yellow in color. All tests appear normal for diesel fuel."
(Record: Fuel Test Results)

153. The dozer had an hour meter reading of 2136 on 9/14/2007.
(Appendix D: Automotive-Supp Report)

154. All CAL FIRE personnel associated with the entrapment met the training requirements and qualifications for their assigned positions.
(Records: CAL FIRE Employment History, Personal and Professional Background, Tailgate Safety Signup Sheets, Training Certificates and Records, DZIA-1 Training Records Summary)

155. All USFS personnel associated with the entrapment met the training requirements and qualifications for their assigned positions on a Type III incident.
(Records: IQCS Training Summaries)

156. CAL FIRE training in using a dozer as a refuge does not mention the use of the audible alarm system as part of the entrapment response.
(Record: CDF Training Handbook – Dozer as a Refuge)

157. R5 Tac 6 [173.9875 MHz] and NIFC Tac 6 [166.775 MHz] are two different, and distinct, radio frequencies.
(Records: CDF Kenwood Handheld Radio Frequency Chart, NIFC VHF Radio Frequency Plan, California Interagency Mobilization Guide, Firescope Radio Frequency Guide)

158. DZIA-1 was "on duty" from August 1 through September 12, 2007 for a total of 43 straight days.
(Record: Timecards)

159. All other personnel related to the entrapment met acceptable current work/rest guidelines.
(Record: Timecards)

160. IC was concerned about damage to cultural resources and assigned DOZB-1 to work with the dozers because of his status as a paraprofessional archeologist but did not state this to DOZB-1. DOZB-1 accepts the assignment and assumes his role is "dozer supervisor."
(Records: IC; DOZB-1 9/15/07, 9/19/07)

161. The firefighting tactics employed were to anchor Divisions A and Z, then start a flanking action in Divisions B and Y by working toward the east.
(Statement: OSC)

162. The overall firefighting strategy was: 1st Priority – keep fire out of the wilderness; 2nd Priority – keep fire out of Pine Valley, and 3rd Priority – keep fire off Corte Madera Ranch.
(Statement: IC)

163. DZIA-1 abandoned the dozer because of difficulty breathing after the dozer engine stalled allowing heat and fumes to build up in the cab.
(Statements: DZIA-1 9/13/07, 9/16/07)

164. Four separate individuals assigned to, or near the incident, heard radio traffic "dozer's on fire" *[sic]*. None of the individuals took any action to report the radio traffic to their fire line supervisors.
(Statements: Crew-3 9/17/07, 9/18/07; Crew-2 9/15/07; Engine 9/15/07; DDO 9/15/07)

165. There was confusion regarding Forest Service Region 5 Tac 6 and NIFC Tac 6. *CAL FIRE* Battalion Chief incorrectly advised IC that some of the *CAL FIRE* radios did not have "Forest Service Tac 6."
(Statement: IC; DZIA-2 9/17/07; SAIT Observation)

Appendix C: FIRE BEHAVIOR REPORT

Fire Behavior Overview

A wildland fire was reported off Corte Madera Road near the town of Pine Valley, California on Wednesday, September 12 at 1233 hours Pacific Daylight Time (PDT).

Fire History

There is a significant fire history in the area. The Laguna Fire on September 26, 1970 was the last fire that consumed the area.

Fuels

The fuels within the area represent Native California Chaparral and grass. The fuels are heavy with Sage, Mahogany, Manzanita, Scrub Oak and annual grass. The age class of fuels was 37 years of growth with an average height of 12 feet. The pre-dominant fuels are Mahogany, Manzanita, and Scrub Oak. There is a light duff and grass component intermixed.

There is an estimated 45-50 ton's per acre. The fuels are stressed with drought conditions this year with an average live fuel moisture content of 45%. The canopy closure is 80% in the entrapment area.

Weather

No special fire weather forecasts were issued or in effect. Hot temperatures and dry conditions were forecasted. The estimated weather values for 1400 hrs = 95degrees, relative humidity 13%. Winds = Direction: Westerly. Speed = light and variable with 7 mph at eye level. Dead fuel moistures = 1 hr = 3%, 10 hr = 4% 100 hr = 7% as per the Descanso RAWS. Daily Burn Index = 119, Seasonal Burn Index Average = 70

- Burn Index High = 150
- Predictive Adjective = high
- 68^{th} percentile = 69

The National Weather Service San Diego relevant forecast to the fire area. KSGX 120911 FWFSGX Fire Weather Planning Forecast for extreme Southwestern California National Weather Service San Diego, CA 330 AM PDT Wed Sep 12 2007:

Mostly Sunny.
Max temperature: 84 TO 89 in the Western valleys 95 to 100 near the foothills.
Minimum humidity: 15% to 25%.
Wind 20 ft) Northwest 10mph. Becoming West 15 mph in the afternoon.
Lightening Activity Level (LAL): 1.

Topography

The topography is mild to moderate slopes with rocky terrain. The fire is vehicle accessible by maintained rural ranch roads. There is difficulty to traverse by foot travel due to heavy fuels. The slope average is 5% at the accident site.

Fire Behavior

The fire front displayed a moderate rate of spread. The flame lengths were observed at 15-40 foot. The fire traveled at approximately 40 chains an hour with head fire alignment. From the point of origin the fire backed down to Corte Madera Road and Oak Valley Creek under a West wind influence in approximately 1 hour. Spotting occurred across Corte Madera road. Once the fire had extended to the East across Corte Madera Road the fire then was in alignment with slope and wind. The fire then extended to the top of the rocky knob and around a clear cut to the South. Intermittent intervals of wind and slope dominancy was on the upper 2/3 of the slopes, this intensified the fire spread to the rocky knob and extending around the West Southwest aspects of this prominence extending to the East toward Long Valley Peak. Spotting was prevalent ahead of the fire front with an ignition component of 91%. Spotting distances were relatively short range less than ¼ mile or 20 chains. The fire brands maintained some residency time in the unburned fuels due to a sparse grass component in many areas.

Above the accident site the fire crested the rocky knob and clear cut area which became the left flank. Topographic wind sheltering was encountered in the Oak Valley Creek and Corte Madera Road area as well as the entrapment area (left flank) from the prevailing westerly wind component. The fire now precluding the entrapment was backing and flanking down the West Northwest flank West of the entrapment site. The main fire front was well to the Southeast extending toward Long Valley Peak by 1345hrs. (Photo 4)

Photo 4

There was intermittent mid flame winds in the fire in the entrapment area. The intermittent wind influence is due to the fire influence and topographic features. The local wind influence was channeling thru the Oak Valley Creek Drainage toward Long Valley Peak. The wind was intermittent and unstable in the entrapment site. There was segments of erratic fire behavior was encountered in the entrapment area. A shifting smoke column on the left flank displayed vertically movement with shifting winds to the North then the Southwest at mid flame level. The entrapment occurred at approximately 1440 hrs. The fire at the time of the entrapment was traveling at 3-5 chains/hour with flame lengths of 20 feet. After the entrapment the fire maintained backing and flanking toward the 4-WD road to the East. The fire progression to the jeep trail from the entrapment site took approximately 45 minutes to 1 hour. This fire progression (left flank) maintained a 3-5 chains/hour rate-of-spread. The fire intensified to the East of the 4-WD road when slope and wind aligned pushing the fire rapidly up to Long Valley Peak at approximately 1545 hrs (one hour after the entrapment).

Prepared by:
Drew Smith
Los Angeles County Fire Department
Fire Behavior Analyst

Appendix D: AUTOMOTIVE REPORT

Cal Fire/US Forest Service Interagency
Serious Accident Investigation
Supplemental Automotive Report

Dozer History

Equipment Number:	06X055
License Number:	E38736
Manufacturer:	Caterpillar
Model Number:	D6C
Engine model:	D333C
Serial Number:	76A2001
Year Model:	1965
Hour Meter reading:	02136 as of 9/14/07

Recent Preventive Maintenance

(Information taken from Pamphlet 6805 vehicle maintenance procedure and record.)

Last B & C Service:	March 22, 2007	2008 Hours
Safety inspection by Unit FEM:	March 01, 2006	1899 Hours
(Bill Renner, Inspector)		
Safety Inspection by HFEO:	July30, 2007	2110 Hours
(Scott Lester, Inspector)		

Noted: cracked window

Recent Repair Records
Information

(Information taken from Cal Fire ME 107 Work Orders)

April 25, 2006 1900 Hours
Remove angle blade and install used straight blade
Replace exhaust stack
Replace headlights
Install new tilt cylinder hoses
Repack lift cylinders

March 22, 2007 2008 Hours
C Service Performed: Changed all fluids and filters
Replaced #5 roller right side
Code III and Amber lights added to rear including wiring and plug
Pre-cleaner changed with new "Topspin" *(never tested in fire)*
Belly pans removed and cleaned
Radiator cleaned *(External)*
Adjusted fan belts

May 26, 2007
Replace seat belts

May 30, 2007 2069 Hours
Replace Strobe light, cabling and driver
Install headset equipment
Replace pre cleaner with a "Turbo II" model 24

Inspection of Dozer at Incident Sight

September 14, 2007, Time 1220

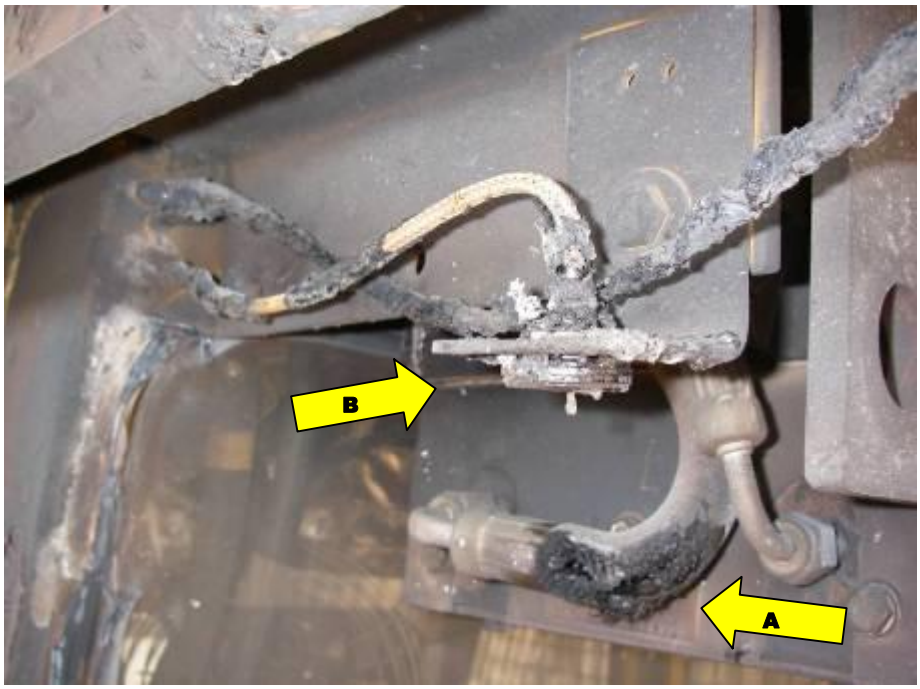
The Dozer was inspected by Gordon Gholson Cal Fire Southern Fleet Manager and John Dell 'Orto, Fire Captain, Cal Fire Academy Automotive Battalion. Starting from the right front of the dozer then moved clockwise around to the right side of the dozer, the following are observations made during the inspection. The dozer blade is resting on a small dozer pile; the blade is covered with soot except for a portion that was covered with dirt during the entrapment (Picture 1).

Picture 1 – Right side and front of Dozer

The right rear window had several meandering cracks with the laminate film melted and bubbled (Picture 2).

Picture 2 – Right-rear side window

There was extensive burn damage to the air conditioning condenser unit mounted to the under side of the cab roof. One of the air conditioning hoses burned through (arrow A) allowing the coolant to leak out. The communications radio antenna burned off. The antenna was found lying on the ground directly below the antenna mount (arrow B) (Picture 3).



Picture 3 – Antenna mount.

All the plastic light housings were melted (Picture 4a).

Picture 4a – Melted light housings

The paint and CDF decals were blistered randomly over the surface of the right side of dozer cab and battery box door (Picture 4b).

Picture 4b - Heat damaged paint and decals

At the rear of the dozer very little burn or heat damage was observed. There was more fire and heat damage on the left side of the dozer than the right side.

A green USFS knapsack containing fusses was lying on the top of the winch (Picture 5). Very little heat damage to the knapsack was observed.

Picture 5 – Knapsack with fusses.

The greatest amount of burn and heat damage was observed on the left side of the dozer. Very little of the yellow paint was visible. (Picture 6)

Picture 6 – Left side of Dozer 3346

The left and right blade lift rams had an approximately 6 inch section of the ram below the cylinders that were clean indicating that the hydraulics had leaked down over night exposing a section of the ram not exposed during the entrapment.

This would indicate that the blade was not grounded during the entrapment. (Picture 7)

Picture 7 – Blade lift rams indicating bleed-down.

The engine air filter pre-cleaner showed significant burn and heat damage (Pictures 8a and 8b).

Picture 8a – Engine air filter pre-cleaner.

Picture 8b – Engine air filter pre-cleaner. Close-up of reducer mount.

The fresh air supply comes from a custom designed forced air High Efficiency Particulate Air, (HEPA) filter that includes a charcoal section for hazardous gas removal and includes a spark arrester to protect the HEPA filter element.

The cab air High Efficiency Particulate Air (HEPA) filter system had received extreme damage to the air intake screen and spark arrester. (Picture 9)

Picture 9 – Cab air intake (HEPA) screen damage.

Opening the left and right dozer cabin doors, the neoprene door seals did not show signs of damage from heat or flame. (Picture 10)

Picture 10 – Right door seal and safety equipment (fire extinguisher, ear muffs, portable radio).

Inside the cab the battery switch was in the off position, the throttle control was set at ¼ throttle.

The brakes were not set, the transmission was in neutral but the transmission selector control was not locked.

There are several corrugated plastic wire looms, wiring insulation, air conditioning vents and related components that are totally melted or at least warped out of their original shape. (Picture 11).

Picture 11 – Air conditioning vents melted and started to warp. Wire loom was melted.

The cabin air intake control switch was in the off position (Pictures 12a and 12b).

Picture 12a – Looking inside cab air intake system.

Picture 12b - Cab air intake system switch in "off" position.

When the battery switch was turned on most of the running lights came on and the strobe light activated and flashed normally. The warning alert sound system was tested and was found to work correctly.

The dash-mounted mobile radio powered up. The radio display indicated the radio was set on FS R5 TAC 6. The scan feature was activated and the radio was scanning FS R5 Tac 6, CDF A/G, MVU LOCAL, CDF TAC 5, CDF CMD 1 (Picture 13a.)

Picture 13a – Dash-mounted mobile radio

The microphone was hanging in its clip on the left side of the turning brake console (Picture 13b). The radio was tested but was found to not transmit audio. A radio operations check was requested from the Department of General Services.

Picture 13b also shows that the front windshield fire curtain was rolled down but the lower front window flaps (see arrow) were still fastened with Velcro® and not dropped down to cover the lower front windows.

The rear fire curtain was also rolled down.
Neither side curtains were deployed.

Picture 13b – Mobile radio microphone in mounting clip

The left engine cover was opened to expose the engine air filter housing. The air filter housing cover was removed to gain access to the air filter elements (Picture 14).

Picture 14 – Left side engine cover removed.

The primary and secondary air filters were removed at the incident site.

Picture 15 – Burned primary engine air filter.

The primary air filter had a large area burned on the side of the filter facing up toward the inlet. (Pictures 15, 16, 17)

Picture 16 – Primary engine air filter showing burn through on end.

Picture 17 – Primary engine air filter, inside view.

The secondary filter was scorched but had not burned though. (Picture 18)

Picture 18 – Secondary engine air filter.

The oil and fuel levels were checked. The engine oil was full. The fuel level was over half full. The dip stick was missing in the hydraulic tank.

With the air filters removed the engine started without hesitation. The engine was allowed to warm up. The blade, turning clutches, and brakes, were tested for function and found to be satisfactory. The engine was accelerated several times, the exhaust smoke was observed and then the engine was turned off. The burned air filters were reinstalled and the engine was restarted. The engine did not accelerate quite as quickly and the exhaust did not clear up as well, but we chose to leave the filters in to protect the engine from dust during the drive back to the transport. The dozer was driven back to the transport, loaded and secured with tie-down chains and binders, and hauled to the San Diego Unit headquarters.

Inspection and Observations at San Diego Unit Headquarters

September 15-16, 2007

The fire curtains in the cab were fully deployed and inspected. To deploy all curtains 18 retaining strap snaps had to be unsnapped. The snaps were difficult to unsnap. The retaining straps had only very short, or no tabs or handles, to grab onto to unsnap the straps and deploy the curtains. The left and right side curtains were not wide enough to completely cover the door windows. The left and right side curtains were shower curtain style and each had three or four 1/8 to 1/4 inch holes worn in them (Picture 19).

Picture 19 – Fully deployed side curtains did not cover side windows.

The air conditioning system housing attached to the roof inside the cab contains the evaporator coils, heater coils, blower fans and system controls. This housing was opened for inspection by releasing two clips on each side, and lowering the rear edge down by its hinge.

When the system was lowered, a piece of corrugated paper fiber cardboard was found inserted over the fresh air inlet blocking fresh air supply to the air conditioning system and cab. (Pictures 20a and 20b).

Picture 20a – Corrugated paper fiber cardboard blocking fresh air inlet.

Picture 20b – Cab air inlet with cardboard removed.

The engine air filter pre-cleaner had been modified from the original equipment to an after-market, Maradyne Corporation, Turbo Pre-cleaner, Turbo II - Model 24 (Picture 21.)

Picture 21 – Engine air pre-cleaner with top cover removed.

After researching the product applications it was discovered that the Turbo II, Model 24 is not the correct unit for Dozer 3346, and could cause the engine to have a significantly restricted engine air supply. The Turbo II - Model 24 is for a 100 to 250 CFM rated engine. Dozer 3346 has a D333C diesel engine requiring 650 cubic feet per minute under maximum load. According to the manufacturers guide the correct model for a Caterpillar D333C diesel engine is a Turbo II - Model 46 pre-cleaner providing up to 650 CFM.

Additional Inspections/Evaluations

Radio Operations Check - September 17, 2007
We requested a Radio Operations Check be conducted. On September 17, 2007, Angie Lorab, Radio Technician with the State of California, Department of General Services (DGS) conducted the test. The mobile radio microphone in the dozer cab was determined to be defective. Ms. Lorab's findings were reported to the SAIT and are part of the record.

Fuel Analysis – September 20, 2007
On September 20, 2007 we requested a fuel sample analysis to determine if fuel composition as a factor in the dozer engine stalling. Hawthone Machinery Company sampled and tested the fuel. The fuel sample was determined to be "normal". The results were submitted to the SAIT on October 2, 2007 and are part of the record.

Conclusion(s)

As a result of direct flame impingement the primary engine air filter caught fire and burned approximately 20 – 30 %. The secondary filter was scorched, but was not burned through. These filters catching fire deprived the engine of air causing the engine to stall.

Once the engine stalled the cabin air conditioning system was no longer functional which would have hastened heat build up in the cab.

The fire curtains had numerous snaps and could not be easily deployed even in a non-emergency situation. Even if the side curtains had been deployed they were not of the correct size and did not fully cover the side windows.

The mobile radio microphone was found to be defective. The defect was at the connection to the radio head and prevented the microphone from transmitting audio. We could make the microphone transmit audio intermittently by manipulating the plug while whistling in the microphone.

Prepared by:
Gordon Gholson
Southern Region Fleet Manager
CAL FIRE
Riverside, CA

John Dell'Orto
Fire Captain, Automotive Battalion
CAL FIRE
CAL FIRE Academy, Ione, CA

Appendix E: RADIO TECHNICIAN REPORT

SUPPLEMENTARY INVESTIGATION REPORT
STATE OF CALIFORNIA
DEPARTMENT OF FORESTRY AND
FIRE PROTECTION

ORIGINATORS CASE NUMBER
07-CSR-078
ORDER NUMBER

CASE TITLE	MONTH	DATE	YEAR	COUNTY	REG	RU	INCIDENT #
PINE	September	17	2007	San Diego	CSR	CNF	2463

Summary of radio operation check -out by Angie Larob, DGS- TD radio tech.

I arrived at Monte Vista garage to check dozer radio at 1410 hrs. on 9/17/07.
Visual inspection showed extensive burn damage to radio antenna cable on exterior of dozer. The original antenna whip mount was melted and could not be used, also found the cable was damaged shorting center conductor to ground so a mag-mount antenna was substituted to test the radio.
I was able to hit repeaters with mag-mount antenna but Monte Vista dispatch was not answering my radio check. I then called dispatch on the phone and spoke with Larry (dispatcher) and asked him if he could hear my radio test. He said he could only hear carrier, no voice audio. I then checked radio with my service monitor. I saw PL but it was slightly distorted and over-deviating (1.7khz, should be about 700hz) and observed no voice audio. I then got a microphone from my vehicle and substituted it in dozer and observed the PL tone was now clean (undistorted) and deviating at proper level (700hz). There was now transmit voice audio as well. When I inspected the original microphone I noted the center plastic pin which should have a small hook shape appeared to be cut off. In my past experience this could be done when someone is having trouble installing or removing the microphone from the radio and does affect transmit audio.

I also observed slight damage to control head (outer plastic case looked slightly distorted).
Also noted slight melting of KSA-1 plastic case.

The radio receiver sensitivity and audio checked o.k.

Transmit and receive also checked o.k. using the headset.

DGS-TD radio tech.
Angie Larob 9/17/07
(760) 554-3139

CDF # 37540-130-0070 88 84544

Appendix F: TEAM PROCESS

Serious Accident Investigation Team Initiation

On September 12, 2004, as soon as it was known that an entrapment of *CAL FIRE* Dozer 3346 had occurred, and a firefighter had been injured on the Pine Fire, an interagency Serious Accident investigation Team (SAIT) was designated by the Regional Forester, USFS, Pacific Southwest Region and the Director of *CAL FIRE*.

Serious Accident Investigation Team Process

The Team convened at the San Diego Unit Headquarters in El Cajon, California on September 13. Over the next few weeks the SAIT did a comprehensive investigation into the facts and circumstances of the accident. The Team interviewed witnesses, then developed **Facts** and **Findings**. From the Findings the SAIT determined the situations that were the "**Causal Factors**" and "**Contributing Factors**" for this accident. The Team then prepared a list of **Recommendations**.

Investigative Team Authority

The Team was given full authority as described under the Cooperative Fire Protection Agreement (an agreement between the Bureau of Land Management; National Park Service; U.S. Forest Service; and California Department of Forestry and Fire Protection - 7/25/01 version), which states:

"67. Accident Investigations
Whenever an accident occurs involving the equipment or personnel of a supporting agency (CAL FIRE), the protecting agency (USFS) shall take immediate steps to notify the supporting agency that an accident has occurred. As soon as practical, the protecting agency shall conduct an investigation of the accident. A team made up of appropriate representatives from all affected agencies shall conduct the investigation…

The sharing of information between agencies on accident investigations and their findings and probable causes is a valuable tool for safety and must be encouraged."

The Team had full authority to utilize technical support personnel necessary to complete the accident investigation. The Team was directed to do the following:

- Identify factual data associated with the circumstances relating to the incident.
- Accurately and objectively record the findings of its investigation.
- Analyze the findings to determine factors involved and their relationships.
- Recommend actions that should be immediately implemented to prevent similar future occurrences.
- Develop and submit a Factual Report and a Management Evaluation Report (MER) to the Regional Forester, Pacific Southwest Region and the Director of *CAL FIRE*.

Arthur Gaffrey, Co-Team Leader for the USFS, received his Delegation of Authority from Jim Pena, Deputy Regional Forester for the USFS, Pacific Southwest Region.

John Hawkins, Co-Team Leader for *CAL FIRE* received his Delegation of Authority from Ken McLean, Deputy Director of Fire Operations for *CAL FIRE*.

Serious Accident Investigation Team Composition

The interagency SAIT team consisted of 14 members. There were 5 members from the USFS, 8 members from *CAL FIRE* and a fire behavior specialist from the Los Angeles County Fire Department.

Team members were:

Arthur Gaffrey – Co-Team Leader, USFS
John Hawkins – Co-Team Leader, *CAL FIRE*
Peter Tolosano – Chief Investigator, USFS
Matthew Gilbert – Investigation and Documentation, *CAL FIRE*
Mort Allen – Investigation and Documentation, *CAL FIRE*
John "JT" Thomas – Fire Operations Subject Matter Expert, USFS
Mike Deacon – CDFF Union Representative *CAL FIRE*
Ken Mello – Safety and Training Specialist, *CAL FIRE*
Ron Ashdale - Safety Officer, USFS
Rose Leonard – Writer/Editor and Documentation, USFS/PSW
Gordon Gholson – Technical Specialist, Mobile Equipment, *CAL FIRE*
John Dell'Orto– Technical Specialist, Mobile Equipment, *CAL FIRE*
Robert Clark – Geographic Information Specialist, *CAL FIRE*
Drew Smith – Fire Behavior Analyst, Los Angeles County Fire Department

Outside Agency Activity

California OSHA (Cal OSHA), was notified by *CAL FIRE* of the incident according to policy. A separate Cal OSHA report will be prepared based on their investigation and findings.

A USFS Special Agent was in charge of the cause and origin investigation. The cause was determined to be from an abandoned campfire at a well-known illegal immigrant campsite.

Team Chronology

September 13, 2007 — The SAIT convened in the afternoon in El Cajon, California at *CAL FIRE* San Diego Unit Headquarters. The Team received an in briefing from Cleveland National Forest and *CAL FIRE* San Diego Unit personnel.

September 13, 2007 – A joint *CAL FIRE* Blue Sheet and USFS 24 hour brief were released at 1600 hours.

September 13–21, 2007 — Over the next week, the SAIT investigated the accident site and conducted a series of interviews with witnesses. In addition to interviews, written statements were taken. A detailed site examination was conducted including the gathering of physical evidence. Training and qualification records of all personnel directly involved in the accident from firefighters through the incident commander were assembled. The Team gathered information and evidence about dispatch records, personal protective equipment, fire weather observations, policies, procedures and guidelines related to the incident actions for both agencies. In addition, the Team met regularly to discuss progress, clarify assignments, plan the report and review the findings.

September 16, 2007 - The USFS 72 Hour Expanded Briefing was issued.
September 20, 2007 — The *CAL FIRE* Green sheet was released by *CAL FIRE.*

September 21, 2007 — With the initial interviews completed, the Team adjourned. Individual members continued their specific assignments. The Team Leaders debriefed the *CAL FIRE* San Diego Unit Chief and Cleveland Forest Supervisor on the status of the investigation prior to departing September 21.

October 1-4, 2007 — The SAIT reconvened at the Southern California Operations Center (South Ops) in Riverside, California. The Team reviewed interview transcripts, and the Supplemental Automotive Equipment report. The Team assessed the accident information relative to current fire safety protocols including LCES (Lookouts, Communications, Escape routes, Safety zones). The Team identified causal and contributing factors, and developed recommendations.

October 2, 2007 — Dozer 3346 was released back to *CAL FIRE* at 0900.

October 10-11, 15; November 1-2, 14-15, December 5, 2007, and January 14, 2008. — The Chief Investigator and Writer/Editor met in Redding, California, to complete Draft Report, Version 1.

January 18 (pdf version), and January 30, 2008 (WORD password protected version) –- Draft Report, ver. 1 was posted on the file transfer protocol (ftp) site for distribution to the Team Members.

March 18-19, 2008 –- The Chief Investigator and Writer/Editor met in Redding, California, to review and incorporate the Team editorial review comments.

March 19, 2008 - Draft Report, ver.2 (WORD password protected version) was completed and posted to the ftp site for distribution to the Team Leaders.

April 2008 — The Team Leaders submitted the final draft report to their respective agencies for presentation to a formal Accident Review Board.

April 21, 2008 — *CAL FIRE*/USFS Joint Agency Accident Review Board was held. Report presented by Investigation Team Leaders and accepted by Accident Review Board.

Accident Review Board Team Members:

***CAL FIRE* / USFS**

Jim Pena	USFS	Deputy Regional Forester
Mike Arias	USFS	Regional Fleet Manager
Ralph Domanski	USFS	Assistant Director, Southern Operations
Candice Gregory	*CAL FIRE*	Region Chief, Southern Region
Dave Teter	*CAL FIRE*	Battalion Chief, Department Safety Officer
Jeff Jones	*CAL FIRE*	Deputy Chief, Training and Safety