Montezuma Fire
June 8, 2012
Serious Accident Investigation Report

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Location:
Bureau of Indian Affairs - Papago Agency
Tohono O'odham Tribe
Sells, Arizona

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Executive Summary

The Montezuma Fire started on May 30, 2012 on the Baboquivari Mountain Range, Bureau of Indian Affairs (BIA) Papago Agency. Initial attack took place and was managed by a Type 4 Incident Management Team (ICT4).

On June 1, 2012, a Type 3 Incident Management Team (IMT3) was ordered. The Incident Commander Type 3 (ICT3) assumed command of the fire on June 3, 2012 at 0600.

Fire objectives were to control all wildland fires through direct attack where safe and possible. Objectives were to burn out to natural and artificial barriers where possible, but to use fire retardant minimally. Objectives also included limiting firefighter exposure to direct attack conditions and the steep topographic features. Helicopter use was expected to be high.

Values at risk included Kitt Peak, power lines, wildlife habitat and Montane Riparian communities. The Baboquivari Mountain Range is considered sacred to the Tohono O'odham Nation. Fire suppression objectives were to keep the fire south of Kitt Peak, west of United States Fish & Wildlife Service (F&WS) lands and communities, south of Sycamore Canyon, north of Deadman's Pass, east of Baboquivari Camp, and west of Baboquivari Ridge and I'itoi's Cave Mountains.

The suppression strategy emphasized the use of air tactical resources (heavy air tankers and helicopters). Engines and water tenders were on the fire primarily for structure protection and to support helicopter operations. Ft. Yuma Engine 6351 (Engine 6351) was one of several engines ordered on June 3, 2012 and was assigned patrol and initial attack responsibilities on the west side of the fire. This was their assignment for the duration of the fire.

The morning of June 8, 2012, Engine 6351 was paired up with Arivaca Engine 1252 (Engine 1252) to patrol and provide initial attack for the west side of the fire. The engines left Sells, Arizona just prior to 0800 driving south on Indian Reservation Route 19[1] to check on a broken fire hydrant. Engine 1252 was in the lead with Engine 6351 following behind. Approximately 5 miles south of Sells, Engine 6351 veered off the right side of the highway, over corrected, crossed Indian Reservation Route 19, flipped forward, landing with the weight on the hood and cab. Then the engine bounced, landing on its wheels, and coasted back across the highway.

The Engine Boss (ENGB), who was a passenger, was fatally injured in the roll over and two crewmembers sustained non-life threatening injuries.

[1] Indian Reservation Route 19 is referred to as Federal Route 19 on the Crash Diagram prepared by the Tohono O'odham Tribal Police report. This road is identified by "Google Map" as Indian Route 19.

June 3, 2012 – The Montezuma Fire placed an order for a Type 5 Engine. Date and time needed was identified as June 3, 2000 hours. The order was filled with Engine 6351. Engine 6351 (Type 5) arrived at the Three Points Fire Department that night to check in. Base camp was relocating to Elkhorn and the check-in and finance personnel were headed to Elkhorn to eat dinner. Engine 6351 was instructed to remain overnight (RON) at Elkhorn and check in the next morning following the morning briefing.

June 4, 2012 – The Engine 6351 (Type 5) checked in at Elkhorn at 0915 am, with an ENGB and two crew members. Engine 6351 was paired with another engine and a local ICT4 trainee from the Fish and Wildlife Service. The assignment was to patrol and become familiar with the west side of the Baboquivari Mountains and be available for initial attack. No new starts occurred and the engine was told to RON at Elkhorn for the night.

June 5, 2012 – Engine 6351 and Engine 1252 were included in the Incident Action Plan on the division's IA Division Assignment List. Their assignment was to work on the west side of the Montezuma Fire. Control Operations were to patrol and be prepared to respond as an Initial attack resource. The shift hours were 0600 to 2200 hours. The Sells spike camp had been established and Engines 6351 and 1252 were told to RON at the Sells spike for the night.

June 6, 2012 - Engine 6351 and Engine 1252 are included in the Incident Action Plan on the division IA Division Assignment List, to work on the west side of the Montezuma Fire. Control Operations were to patrol and be prepared to respond as an initial attack resource. The shift hours were 0600 to 2000 hours.

At 2200 hours, Engines 6351 and 1252 are called to respond to reports of 3 or 4 fires near the border of Arizona and Mexico. The engines responded with an ICT4 and a water tender. The unit FMO was also present. The fires were not found and the engines returned to Sells Spike Camp at 0300 the morning of the June 7.

June 7, 2012 – Engines 6351 and 1252 were held in Sells Spike Camp and crewmembers rested until 1330 hours to ensure proper work rest guidelines were being followed as directed by the ICT4. Control Operations were to patrol and be prepared to respond to initial attack. Shift lengths in the IAP are reduced to 0700 to 2000 hours. The ICT4 kept the engines on duty until 2200 hours.

June 8, 2012 – The Engine Bosses for Engines 6351 and 1252 attended the morning briefing. Safety was one of the topics covered in the daily briefing. During this briefing, it was specifically mentioned that this was the "downhill side" of the firefighting effort. Everyone was directed to remain vigilant.

After the briefing the crews prepared to go to their assignments for the day. The Tohono O'odham Fire Management Officer (who is also the agency representative to the fire) and the BIA Western Region Fire Management Officer were also at Sells Spike Camp and met with the crew from Engine 6531. A discussion took place between the Tohono O'odham FMO and the ENGB on how to deal with time coding for the initial attack that had occurred the night of June 6th into the morning of June 7th. The Tohono O'odham FMO also asked the ENGB to check on a hydrant (near the Post Office south of the community of Sells) that had not been working earlier.

The ENGB asked the Tohono O'odham FMO if it was alright to let one of the crewmembers drive the engine so the ENGB could take care of some paperwork while they were in route. The Tohono O'odham FMO asked the ENGB if assigning another driver was consistent with their standard operating procedures. The Tohono O'odham FMO told the ENGB that if it was, it would be okay with him. As the ENGB returned to the truck, the BIA Regional FMO overheard the ENGB tell one of the crew members, "You are driving."

Approximately 0745-0800 - The engines left the spike camp with Engine 1252 in the lead. Engine 6351 followed Engine 1252. Engine 6351 was being driven by Crewmember 2. Crewmember 1 occupied the middle seat, and the ENGB occupied the passenger side of the engine. The engines headed south on Indian Reservation Route 19. The engines drove up a moderate grade for the first couple of miles, crested the hill, and then started down a slight decline.

Approximately 0800 – The driver (Crewmember 2) stated that as they were driving and without prompting, the ENGB passed Crewmember 2 a bottle of water that had been on the dashboard on the passenger side where Crewmember 2 had previously been sitting. Crewmember 2 took the bottle and put it between his legs. The ENGB passed Crewmember 2 a second bottle of water and told Crewmember 2 to put the bottle behind his back.

As Crewmember 2 put the water bottle behind the back of his seat, he drifted off the right hand side of the road. He tried to steer the engine back onto the road, but overcorrected and went across both lanes of the road into the dirt on the other side. The engine flipped forward, landing with the weight on the hood and cab. The engine bounced, landed on its wheels and coasted across the highway (from east to west), coming to rest on the west side of the highway.

Through his side mirror, the driver of Engine 1252 saw Engine 6351 skidding sideways across the highway. He said that the engine looked like it was going to flip over. Engine 1252 slowed down, made a U-turn, and returned to where Engine 6351 had come to rest. The driver of engine 1252 proceeded to request help on the radio while his ENGB proceeded to triage injuries and render aid.

The driver of Engine 1252 stated that he was traveling at approximately 50 mph when he saw the trailing Engine 6351, lose control and cross the highway.[2]

The crash resulted in injuries to Crewmembers 1 and 2, and the fatality of the ENGB due to blunt force trauma to the head.

Engine Boss (ENGB)

The ENGB was a permanent Ft. Yuma Agency BIA employee (fuels technician). He was employed in his eleventh season. According to IQCS records, he was a qualified ENGB, having performed in this capacity approximately 36 times since he was certified in 2006. Prior to the Montezuma fire, the ENGB last performed in this capacity on a detail to Texas in October of 2011. His IQCS records show a gap as an ENGB from August 2008, until May 2011. The ENGB received a valid Federal Motor Vehicle Operators ID card on May 10, 2011. The ENGB passed an arduous work capacity test on February 7, 2012, and completed Fire Refresher Training (RT-130) on February 7, 2012.

Crew Member 1

Crew Member 1 is an AD employee, hired at Ft. Yuma Agency on June 3, 2012. He is in his second season. According to his IQCS records, he is a qualified FFT2; having performed in this capacity approximately 15 times since he was certified in March 2011. Prior to the Montezuma fire, Crew Member 1 last performed as a FFT2 in October 2011. Crew Member 1 received a valid Federal Motor Vehicle Operator's ID card on May 3, 2012. He passed an arduous work capacity test on April 11, 2012 and completed RT-130 on April 11, 2012.

Crew Member 2

Crew Member 2 is an AD employee, hired at Ft. Yuma Agency on June 3, 2012. This was his first season. According to his IQCS records, Crew Member 2 is a qualified FFT2, certified in December 2011. Crew Member 2 had no previous fire experience. Crew Member 2 received a valid Federal Motor Vehicle Operator's ID card on May 3, 2012. Crew Member 2 passed an arduous work capacity test on December 9, 2011 and completed RT-130 on December 16, 2011.

Work/Rest Compliance

The ENGB's last day off was Saturday, June 3, 2012. Both Crewmembers 1 and 2 were hired as AD firefighters by the Ft. Yuma Agency on June 3, 2012, and traveled to the fire on June 4, 2012. The ENGB and both crewmembers were working within the "length of assignment" requirements as stated in Chapter 09 of the 2011 Bureau of Indian Affairs Wildland Fire and Aviation Program Management and Operations Guide (Blue Book).

Crew Time Reports and Emergency Firefighter Time Report forms from the Montezuma fire for the crew of Engine 6351 were incomplete. Documentation is available for the dates of June 3-5, 2012. Crew Time Reports for the firefighters on Engine 6351 could not be located for June 6-8, 2012. Since the crews of both Engine 6351 and the Engine 1252 were working together for those days, the Crew Time Reports for Engine 1252 are used to validate that the crew of Engine 6351 was working within the "2:1 work/rest ratio" as stated in Chapter 09 of the 2011 Bureau of Indian Affairs Wildland Fire and Aviation Program Management and Operations Guide (Blue Book).

Road Conditions/Accident Scene

Indian Reservation Route 19 is located on the Tohono O'odham Nation. Indian Reservation Route 19, south of Sells, Arizona in the vicinity of the accident site (mile post 22.3) (GPS: N 31^{o} 51' 23.11", W 111^{o} 51' 1. 6.99") is a nearly level, paved, two-lane road absent a "rumble strip." The posted speed limit is 55 MPH. The road surface drops off approximately 4-6 inches to the shoulders, which are narrow in many places. Vegetation adjacent to the roadway is typical Sonoran desert scrub. Rocky outcroppings occur frequently along the roadway. In addition, loose livestock (open range), moderately heavy vehicle and occasional pedestrian traffic may be encountered on the road. This area of Southern Arizona is frequently transited by undocumented aliens and there is a heavy law enforcement presence in the area.

The accident occurred at approximately 0800 MDT under daylight conditions. The roadway surface was dry. Seat belts were worn by all personnel.

IMT/Agency Management Commitment to Safety

The Montezuma Fire Wildland Fire Decision Support System (WFDSS) document, fire management strategy included language showing a commitment to firefighter safety. The WFDSS relative risk was valued at the moderate level. The WFDSS organization needs showed a need for a Type 3 IMT.

Incident Action Plans (IAP) were available for the Montezuma Fire from June 4-9, 2012. IAP Safety Messages included specific attention to driving safety on all plans except for the June 4, 2012 message. The June 8 and June 9, 2012 IAP included a discussion from 6 Minutes for Safety titled "Driving Safety." IAP for all days included Medical Plan ICS 206 forms with a section addressing Medical Emergency Procedures.

Actions by the IMT3 were consistent with proper management of the fire and did not contribute to the accident.

[2] A speed analysis was done on the rollover as part of the Arizona Crash Report. It states "The results indicated the truck was traveling at 54 to 64 mph when it went into a critical speed yaw." The report further states that: "The main cause of the rollover appears to be inattention or distraction by the driver & then over-reaction."

June 8, 2012 – The fatality was reported to the National Interagency Fire Center (NIFC) office, and a BIA Serious Accident Investigation Team (SAIT) was mobilized. The team consisted of the following:

- Team Leader
- Chief Investigator
- Safety Advisor
- Engine Technical Specialist
- Documentation Leader

June 9, 2012 - The SAIT convened in Tucson, Arizona. The team was in-briefed by the BIA Acting Papago Agency Superintendent, the BIA Regional FMO, the Tohono O'odham FMO and the BIA Liaison at 0830 on June 10, 2012. After the in-briefing, the process of collecting evidence and information related to the fatality was begun by the SAIT.

The process for information and evidence gathering consisted of:

- Evaluating all human, material, and environmental factors that may have contributed to the fatality;
- A site visit where the accident occurred;
- Establishing the pattern of actions of the victim and the chronology of the accident;
- Reviewing operational guidelines, policies and position descriptions;
- Reviewing law enforcement investigative reports;
- Reviewing the medical examiners report;
- Gathering written statements of personnel which were involved in the incident, and;
- Interviewing supervisors, coworkers, and law enforcement personnel.

Finding 1: (Human)

The driver (Crewmember 2) was an AD Employee who was on his first off-unit fire assignment.

Finding 2: (Human)

The driver (Crewmember 2) had no previous experience driving an engine.

Finding 3: (Human)

The driver (Crewmember 2) was distracted, as water bottles were passed to him while he drove Engine 6351 on Indian Reservation Route 19.

Finding 4: (Human)

No manual direction exists within the Bureau of Indian Affairs to ensure employees are qualified to drive Type 6 and larger engines.

Finding 5: (Environmental)

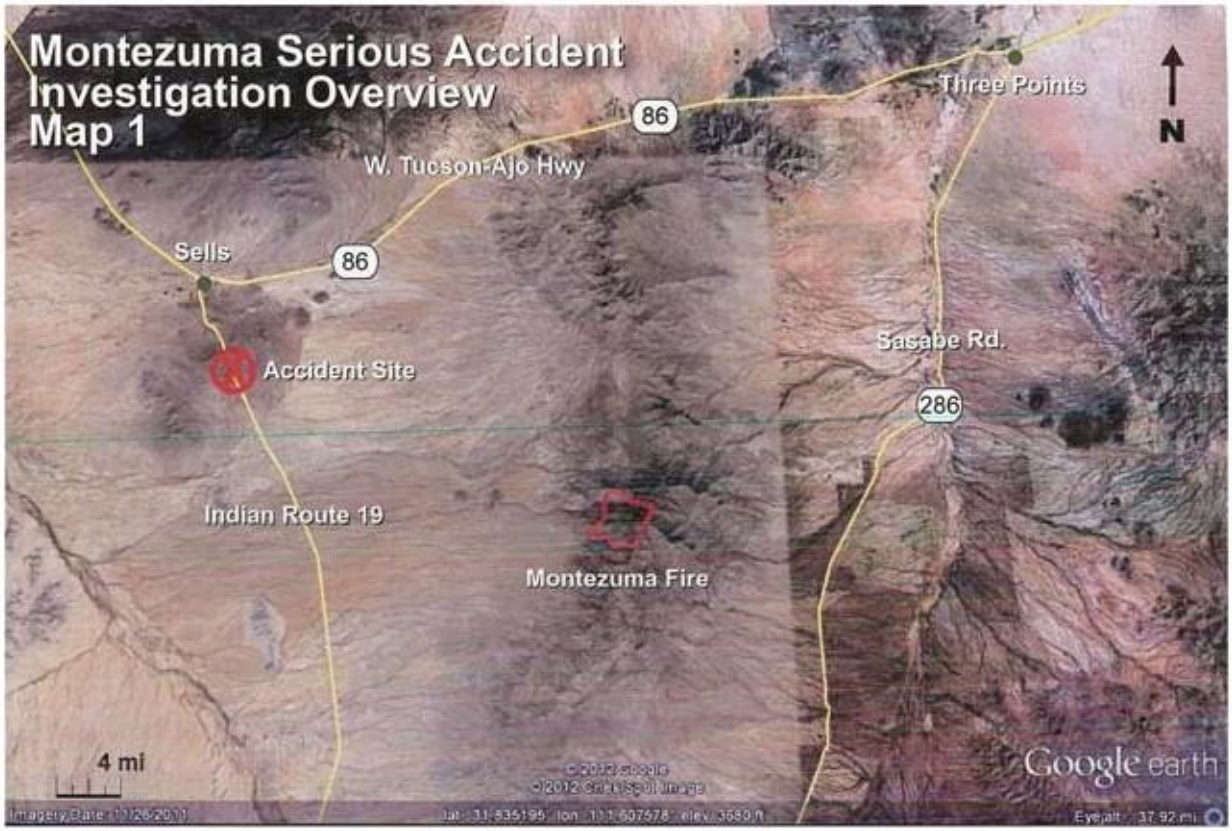
Indian Reservation Route 19 is a relatively narrow road with no shoulder. The drop off from the paved surface to dirt is 4 to 6 inches. There is no "rumble strip" in place to alert the driver to the outside edge of the road surface.

Finding 6: (Material)

Engine 6351 is a Chevrolet C-5500 engine platform (Model 52) rated as 19,500 GVW that has unique road handling characteristics that differ from the average sedan or pickup.

1. While this vehicle does not have a CDL requirement, the weight of the vehicle (19,500 GVW) contributes to its unique road handling characteristics.

2. The front axle width is approximately 15" wider than standard size vehicles. The axle width results in the vehicle encountering road surface irregularities differently than a vehicle with a narrower axle width.



Montezuma Serious Accident Investigation Overview Map2

N

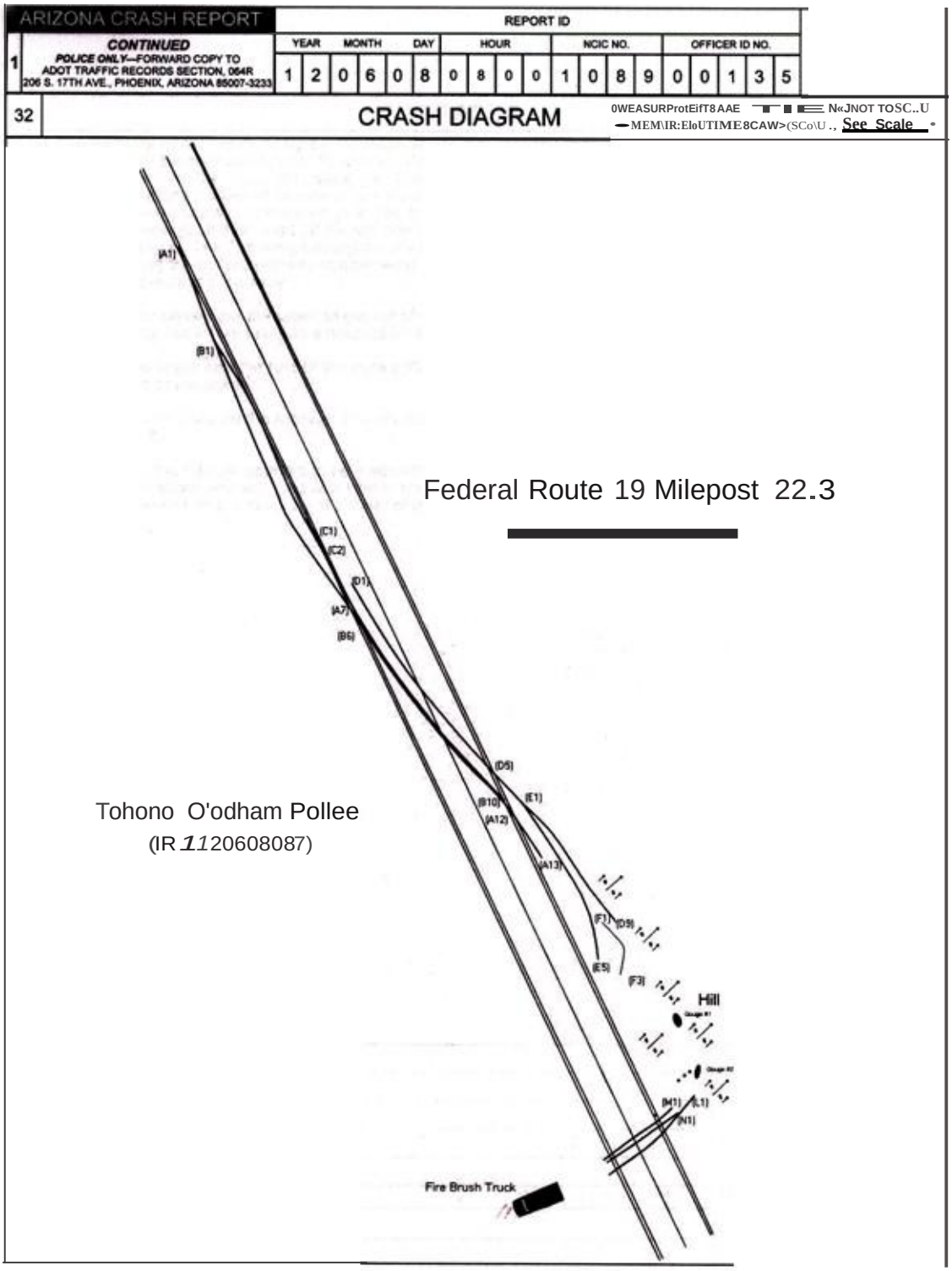
W.Tucson-Ajo Hwy

Sells

Indian Route 19

Accident Site

4mi



Crash diagram prepared by Tohono O'odham Police

Montezuma Fire Technical Report on Physical Evidence and Vehicle Specifications

This report is in reference to a BIA Wildland Type 5 engine that was involved in a vehicle rollover that caused a fatality of one of the passengers. This purpose of this report is to evaluate whether or not there is evidence of issues with vehicle weight, equipment, or any other mechanical failure(s). The technical expert evaluated those items which are typically noted as items of concern in a wild-land engine accident. Those items addressed are identified as; vehicle information, tires, chassis and flatbed, cargo/equipment, weight and truck measurements/dimensions. The truck was a 2009 with low mileage and light use, particularly for a vehicle of that age. The last documented mileage found in Engine 6351, was the oil change service sticker that is located on the windshield of the vehicle. At that time, the recorded mileage was 11,402 miles noted on 5-24-12. Mileage would have only changed slightly from 5-24-12 to present based on normal operations.

Note: Engine weight ticket, engine equipment inventory, and drivers log were not found in the ve-hicle or in the brief case belonging to the ENGB.

The specifications for Engine 6351 are as follow:

1) Truck information
   a. Truck - 2009 Chevrolet C-5500 Series, 19,500 lbs GVWR, Regular cab, 4x4, gasoline powered, automatic transmission.
   b. Flatbed for Model 52 pump system
      i. Purchased and installed by Carl's Trailer Sales in Belle Fourche, South Dakota
      ii. The BIA Model 52 Pump System was installed by the BIA Southwest Model 52 Center, Dulce, New Mexico.
      iii. Date of delivery of completed BIA Model 52 Engine 6351 to Ft. Yuma Agency is July 19, 2011.

2) Tires
   a. Tires were new with minimal signs of wear.
   b. The wear on the inside of the front passenger's side tire was consistent with the vehicle leaving the paved surface and rubbing on the pavement edge during the driver's attempt to return to the road surface.
   c. Both the front and back outside dual, drivers' side tires, were off the rim due to the impact with the embankment which broke the seals of the tires. Tohono O'odham Nation Vehicle Accident Investigator, Marty Fuentes stated this action was normal in this type of accident.

3) Chassis and flatbed attachment points –
   a. The brackets (attachment points) where the flatbed is attached with bolts to the chassis can become loose or break during hard use over time. These areas were inspected and only one attachment bolt was broken. None of the attachment brackets were broken. It was determined that the broken bolt (found at the accident site) was probably caused by the impact of the accident.

4) 500 gallon water tank
   a. Manufacturer – APR Plastic Fabricating, Inc.
   b. Dimensions – L 111"x W 44"x H 27"

c. Specifications – Anti-Splash and Baffles Supports
d. Design meets and/or exceeds NFPA standards
e. No evidence of tank failure was discovered
f. No evidence of tank installation failure was discovered

5) Weight of the Cargo/Equipment

a. The weight of the cargo that was retrieved from the crash site was 810 lbs. This included one firefighter red bag (personal gear).

6) Weight, Truck Measurements, and Truck Specifications

a. Manufactures GVWR (known) of the Chevrolet C-5500 19,500 lbs

b. Estimated Cab & Chassis weight with Model 52 pump package as received new by BIA Ft. Yuma Agency.

i.	Cab & chassis weight	Estimated	7,900 lbs
ii.	Tank weight (empty)	Estimated	450 lbs
iii.	Weight of Model 52 tool boxes empty	Estimated	800 lbs
iv.	Baskets (on top of tool boxes)	Estimated	150 lbs
v.	Weight of pumping system	Estimated	900 lbs
vi.	Weight of flatbed	Estimated	900 lbs
		Total	**11,100 lbs**

c. Estimated of fire tools/equipment, water, fuel, and gear.

i.	Weight of water (500 gal)	Estimated	4,000 lbs
ii.	Weight of equipment (from picture)	Known	810 lbs
iii.	Weight of items in the damaged vehicle	Estimated	< 500 lbs
iv.	Truck – 40 gallon fuel tank @ 6 lbs per gallon	Estimated	240 lbs
v.	2 each - 5 gallon can gasoline @ 6 lbs per gallon	Estimated	60 lbs
vi.	1 each – 2.5 gal chainsaw fuel & oil containers	Estimated	20 lbs
vii.	2 each drip torches, @ 16 lbs (full)	Estimated	32 lbs
viii.	3 PAX @ 250 each	Estimated	750 lbs
		Total	**6,412 lbs**

d. Total weight

i.	Maximum Vehicle GVWR (C-5500)	Known	19,500 lbs
ii.	Engine estimated weight as issued to Agency (Includes cab & chassis, tool boxes, baskets, tank, and flatbed)	Estimated	11,100 lbs
iii.	Payload Includes fire tools/equipment, water, fuel, gear and people	Estimated	6,412 lbs
	Total GVWR weight minus total weight	**Estimated**	**1,988 lbs**

The safety margin of actual weight to total GVW is 10%, which is well within the 2% safety weight rating ratio

e. Equivalent Type 5 engine specifications
   i. Eagle Butte, SD Type 5 engine, BIA Cheyenne River Agency 2008 Chevrolet C-5500 certified scale weight ticket (5-3-12) (fire ready) is 17,300 lbs.
   ii. Weight Difference between the maximum GVWR (19,500 lbs) minus the weight ticket (17,300 lbs.) equals 2,200 lbs. This weight difference is within acceptable vehicle limitations.

7) Type 5 engine of equal measurements/dimensions (located in Eagle Butte, SD, BIA Cheyenne River Agency 2008 Chevrolet C-5500):

Vehicle Measurements
a. Body width – 8' 1\2"
b. Body length – including flatbed – 21' 1"
c. Axle width (Inside front and rear dual steel wheel)
   i. Front- 6' 1"
   ii. Rear- 4' 5"
d. Axle width (outside of tire to outside of tire)
   i. Front – 7' 8 ½"
   ii. Rear – 7' 9"
e. Height of cab or highest point – 7' 9"

Technical Note:

This is a special purpose vehicle with unique handling characteristics, size, weight, and overall function compared to a smaller ¾ ton (F-250, C2500, etc), ½ ton Class (F-150, C1500, etc) vehicle. A side by side comparison of the smaller class vehicle (F-250, C-2500) vs. the Chevrolet C-5500 will be on a spreadsheet (Appendix 1a).

Vehicle Handling

The width of the Type 5 engine's front axle is measured at 12.5" to 15.5" which is wider than a Ford F-250 or Chevrolet 2500 Series vehicle. The vehicle with the wider axle tracks on portions of the road that are normally less traveled and less worn by standard axle width vehicles. This results in noticeably different handling characteristics.

Montezuma Fire June 8, 2012 Serious Accident Investigation Report Capabilities and Limitations of Similar Engines			
	2008 Chevrolet C□5500 4x4 Reg Cab	2012 Ford F□250 4x4 CrewCab	2006 Chevrolet 2500HD 4x4 CrewCab
	19,500 GVWR	10,000 GVWR	9,200 GVWR
TOTAL WEIGHT WITH WATER (no personnel)	17,300 lbs (as of 5/3/12)		
TOTAL BODY WIDTH	8' 1/2"	6' 5"	6' 7"
TOTAL MIRRORS WIDTH	9' 7"	9'	8' 3"
TOTAL LENGTH	21' 1"	20' 3"	19' 8"
BOX/FLATBED MEASUREMENTS	12' 6 1/2" LONG X 8' 3/8" WIDE	7' 3" LONG	7' LONG X 5' 9" WIDE
TOTAL HEIGHT	7' 9"	6' 5"	6' 6"
FRONT OUTSIDE RIM TO OUTSIDE RIM	7' 8 1/2"	6' 3"	6' 6"
FRONT INSIDE RIM TO INSIDE RIM	6' 1"	5'	5'
BACK OUTSIDE RIM TO OUTSIDE RIM	7' 9"	6' 3"	6' 6"
BACK INSIDE RIM TO INSIDE RIM	4' 5"	5'	5'
Current BIA Model 52	FORD F□550		
	2012 EXTENDED CAB		
	18,000 GVWR		
BODY WIDTH	7' 1"		
TOTAL MIRRORS WIDTH	9' 4"		
TOTAL LENGTH	21' 10"		
BED MEASUREMENTS	9' 7" LONG X 8' WIDE		
TOTAL HEIGHT	6' 10"		
FRONT OUTSIDE DUAL RIM TO OUTSIDE DUAL RIM	7' 5"		
FRONT INSIDE DUAL RIM TO INSIDE DUAL RIM	5' 7"		
BACK OUTSIDE DUAL RIM TO OUTSIDE DUAL RIM	7' 8"		
BACK INSIDE DUAL RIM TO INSIDE DUAL RIM	4' 8"		

Vehicle passenger side - The fatally injured employee was riding as the passenger.

Vehicle driver side - Crewmember 1 (middle passenger) and Crewmember 2 (driver) successfully exited the vehicle through the driver side window following the accident.