INVESTIGATION REPORT

CASE NUMBER: 17CAMEU012169
CASE NAME: Redwood Incident
DATE: October 8, 2017
INCIDENT TYPE: Wildland Fire Investigation
INCIDENT INVESTIGATORS:
- Eric Bettger
  Captain – Fire Prevention
  CAL FIRE Mendocino Unit
- Ryan Smith
  Battalion Chief – Fire Prevention
  CAL FIRE Mendocino Unit
1 - VIOLATIONS:

Not Applicable
2 - SUMMARY:

On Sunday, October 8, 2017, Potter Valley experienced wind speeds reaching up to 67 miles per hour. The northeast wind caused large tree branches to break and fall onto conductors, communication lines and roadways throughout Potter Valley. At 11:34 PM, the CAL FIRE Howard Forest Emergency Command Center started receiving emergency 911 calls reporting vegetation fires in the Potter Valley area. The first fire was reported at 11:34 PM in a patch of blackberry bushes east of 13801 North Busch Road. An arc from a conductor was witnessed along with the start of a vegetation fire. A second vegetation fire was reported at 12:27 AM by a CAL FIRE Heavy Fire Equipment Operator who was responding to the fire on North Busch Road. The fire was identified as a small spot on the east side of Hawn Creek Road on the property of 9100 Main Street. This was thought to be a spot fire from the fire on North Busch Road. After investigation, it was confirmed to be a separate fire from an overhead conductor. The two fires were both located on the valley floor approximately 1.7 miles apart and later burned together. A third vegetation fire was reported at 12:37 AM on the south side of the East Road bridge near the Tomki Road intersection in Redwood Valley. This fire was confirmed by the Redwood Valley Fire Department who arrived at scene and reported a five acre vegetation fire. After investigation, it was confirmed to be a spot fire from the fires started in Potter Valley. The three fires burned together and were named the Redwood Incident. The Redwood Incident consumed 36,523 acres. The fire burned ten miles from Potter Valley to Reeves Canyon Road on the west side of Highway 101 in Redwood Valley. Nine lives were lost and 587 structures were damaged or destroyed.
3 - SUBJECT:
Not Applicable
4 - VICTIMS & WITNESSES:
Victims - There were multiple victims of the Redwood Fire, including 9 civilian fatalities. 587 structures were damaged or destroyed during the fire. The structures included 7 commercial buildings, 330 residential homes and 250 outbuildings. See the attached damage report for individual property loss.

Witnesses - Origin #1: North Bush Road, Potter Valley

W-1

Phone #
DOB:

Note: Witnessed conductors arc and the start of a fire.

W-2

Phone #
DOB:

Note: Witnessed fire spread across N. Bush Road.

W-3

Phone #
DOB:

Note: Witnessed conductors arc and the start of a fire.
4 - VICTIMS & WITNESSES (cont.):

W-4

Phone #
DOB:

Note: Witnessed conductors arc and the start of a fire.

W-5

Phone #
DOB:

Note: Visiting RD. Witnessed fires spread.

W-6

Phone #
DOB:

Note: Potter Valley Fire Chief. Witnessed fire behavior and spread.

W-7

Phone #

Note: Witnessed the hay barn catch on fire.
4 - VICTIMS & WITNESSES (cont.):

Witnesses - Origin #2: Hawn Creek Road, Potter Valley

W-8 Sean SWEENEY
2690 North State Street
Ukiah, CA. 95482
Phone # (707) 484-5050

*Note: CAL FIRE Heavy Fire Equipment Operator. Witnessed first stages of fire.*

W-9

Phone #
DOB:

*Note: Witnessed the conductors fall and start of a vegetation fire.*

W-10

Phone #
DOB:

*Note: Witnessed weather and fire spread past their property.*

W-11

Phone #
DOB:

*Note: Witnessed weather and fire spread past their property.*
4 - VICTIMS & WITNESSES (cont.):

Witnesses - Origin #3: East Road, Redwood Valley

W-12 [Redacted]
Phone # [Redacted]
Note: Redwood Valley Fire Chief.

W-13 Ray TAGLIO
17501 North Hwy 101
Willits, CA. 95490
Phone # (707) 391-6708
Note: CAL FIRE Battalion Chief.

Witnesses – CAL FIRE and PG&E

W-14 Dan GREGORY
1300 U Street
Sacramento, CA. 94244
Phone # (916) 324-1644
Note: CAL FIRE LIDAR.

W-15 Dave KAROLY
1300 U Street
Sacramento, CA. 94244
Phone # (916) 323-1044
Note: CAL FIRE LIDAR.
4 - VICTIMS & WITNESSES (cont.):

W-16 Charles MARTIN
17501 North Hwy 101
Willits, CA. 95490
Phone # (707) 459-7440
Note: CAL FIRE Resource Management.

W-17
Phone#
Note: PG&E Transmission Troubleman.

W-18
Phone#
Note: PG&E Lineman.

W-19
Phone#
Note: PG&E Subforeman.
5 - EVIDENCE:

Origin #1: North Busch Road

Evidence #1
Item: 17MEU012169 Item Number 1
Description: 60kV Overhead Conductor
Collected By: Officer Eric BETTGER Badge # 4703 on October 9, 2017 at 4:05 AM
Stored: CAL FIRE Howard Forest Prevention Office Evidence Locker
Address: 17501 North Highway 101 Willits, CA. 95490
Note: South section - 9 feet 2 inches long - ½ in. diameter

Evidence #2
Item: 17MEU012169 Item Number 2
Description: 60kV Overhead Conductor
Collected By: Officer Eric BETTGER Badge # 4703 on October 9, 2017 at 4:15 AM
Stored: CAL FIRE Howard Forest Prevention Office Evidence Locker
Address: 17501 North Highway 101 Willits, CA. 95490
Note: North section - 6 feet 6 inches long - ½ in. diameter
5 – EVIDENCE (cont.):

Origin #2: Hawn Creek Road

Evidence #1
Item: 17MEU012169 Item Number 3
Description: 12kV Overhead Conductor with Splice
Collected By: Officer Ryan SMITH Badge # 2722 on October 12, 2017 at 1:32 PM
Stored: CAL FIRE Howard Forest Prevention Office Evidence Locker
Address: 17501 North Highway 101 Willits, CA. 95490
Note: Approx. 4 ft. 6 in. Conductor with 3 in. Splice

Evidence #2
Item: 17MEU012169 Item Number 4
Description: Fulgurite
Collected By: Officer Ryan SMITH Badge # 2722 on October 12, 2017 at 1:32 PM
Stored: CAL FIRE Howard Forest Prevention Office Evidence Locker
Address: 17501 North Highway 101 Willits, CA. 95490
Note: 26 pieces - ¼ inch to 2 inches in size

Evidence #3
Item: 17MEU012169 Item Number 5
Description: Fulgurite with conductor
Collected By: Officer Ryan SMITH Badge # 2722 on October 12, 2017 at 1:32 PM
Stored: CAL FIRE Howard Forest Prevention Office Evidence Locker
Address: 17501 North Highway 101 Willits, CA. 95490
Note: Approx. 4½ in. Conductor with Fulgurite
6 – CONDITIONS:

Potter Valley was experiencing strong winds at the time of the Redwood Fire. CAL FIRE Fire Behavior Analyst Tim CHAVEZ referenced the Beaufort Wind Scale with the wind damage in Potter Valley to be associated with winds in excess of 39 miles per hour. CHAVEZ used data from the nearby Remote Automated Weather Stations (RAWS) and calculated the wind speeds to have reached 67 miles per hour at the ridgelines. See the attached Fire Behavior Analyst Report. The weather at the Lyons Valley Remote Automated Weather Station located on Cow Mountain 11 miles east-southeast of Potter Valley at 11:34 PM was as follows:

Lyons Valley RAWS

Temperature: 58 Degrees Fahrenheit
Relative Humidity: 12 Percent
Wind Direction: Northeast
Wind Speed: 25 MPH with gusts to 35 MPH
Location: Cow Mountain Ukiah, CA.
Time: October 8, 2017 at 11:30 PM
Elevation: 3355 Feet

Kestrel Digital Weather Reading

Temperature: 68.9 Degrees Fahrenheit
Relative Humidity: 12.2 Percent
Wind Direction: Northeast
Wind Speed: 17 MPH with gusts to 20 MPH
Location: Gibson Lane and Busch Lane in Potter Valley, CA.
Time: October 9, 2017 at 1:37 AM
Elevation: 1019 Feet
Taken By: Eric BETTGER

LE80 (Rev. 7/2011)
7 – EQUIPMENT:

The equipment associated with the Redwood Fire is owned by PG&E. The conductor that broke at Origin 1 on the property of 13801 N. Busch Road is a 60kV conductor according to PG&E Transmission Troubeman. This is one of six conductors that run from the PG&E substation located on Powerhouse Road south towards Highway 20 near Lake Mendocino. The break occurred between two transmission towers which are referenced below with the following Datum WGS 84 GPS coordinates.

Origin #1: North Busch Road

<table>
<thead>
<tr>
<th>North Transmission Tower</th>
<th>South Transmission Tower</th>
</tr>
</thead>
<tbody>
<tr>
<td>N 39°20.953</td>
<td>N 39°20.841</td>
</tr>
<tr>
<td>W 123°07.882</td>
<td>W 123°07.880</td>
</tr>
</tbody>
</table>

The conductor that broke at Origin 2 on the property of 9100 Main Street east of Hawn Creek Road is a 12kV conductor according to PG&E Subforeman. This conductor is one of three that run northwest to southeast from Hawn Creek Road to Main Street. The break occurred between two power poles which are referenced below with the following Datum WGS 84 GPS coordinates.

Origin #2: Hawn Creek Road

<table>
<thead>
<tr>
<th>Northwest Power Pole</th>
<th>Southeast Power Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>N 39°19.397</td>
<td>N 39°19.380</td>
</tr>
<tr>
<td>W 123°07.877</td>
<td>W 123°07.847</td>
</tr>
</tbody>
</table>
8 - PROPERTY:

The Redwood Fire burned approximately 36,523 acres. 587 structures were damaged or destroyed during the fire. See the attached damage report for the individual property loss.

The three separate fires started in the Local Responsibility Area and spread to the State Responsibility Area. The Specific Origin Areas of the two fires located in Potter Valley and the spot fire in Redwood Valley can be located with the following Datum WGS 84 GPS coordinates.

Origin #1: North Busch Rd. Potter Valley
North 39°20.929
West 123°07.88

Origin #2: Hawn Creek Rd. Potter Valley
North 39°19.392
West 123°07.867

Origin #3: East Side Rd. Redwood Valley
North 39°18.742
West 123°13.011
9 - NARRATIVE:

On Sunday October 8, 2017 at 11:34 PM an emergency 911 call was made to the California Department of Forestry and Fire Protection (CAL FIRE) Howard Forest Emergency Command Center (ECC) reporting a vegetation fire located in a field east of 13801 North Busch Road in Potter Valley, California. The reporting party told the Howard Forest ECC the fire was located in the blackberry bushes on the backside of their property. At 11:36 PM Howard Forest ECC dispatched the Potter Valley Fire Department and CAL FIRE resources to the fire. The first report on conditions was from the Potter Valley Fire Department reporting a 20 acre vegetation fire with a critical rate of spread and one structure fully involved.

At 11:56 PM, I responded to Potter Valley from a fire in Laytonville. While driving to Potter Valley, I heard the Howard Forest ECC alerting incoming fire resources that conductors were down and the possibility of three separate fires in the Potter Valley area. I heard the Potter Valley Fire Department tell the Howard Forest ECC tree branches throughout the valley were falling across the roads blocking access to the fire on North Busch Road. The Potter Valley Fire Department also reported 40 mile per hour winds blowing across the valley floor with gusts of 60 miles per hour.

I drove into Potter Valley from Highway 20 at approximately 1:00 AM. At the intersection of County Road 240 and Westside Road I saw a bright orange glow towards the north. I continued driving on East Potter Valley Road and observed a strong wind from the northeast. I saw a well-developed fire on the west side of the valley floor heading southwest at a critical rate of spread. The fire was wind driven and aligned with the topography on the eastern facing slope. The smoke column was aligned horizontal with the slope and moving southwest with the wind. I estimated the fire to be 200 acres in size from this location. I continued driving to the established staging area located at Gibson Lane and Busch Lane. I drove on the opposite side of the road multiple times to get around broken tree branches blocking the roadway. I arrived at the designated staging area and saw the fire had already burned through this area.
At the staging area, I spoke with CAL FIRE Battalion Chief Jake SERRANO, who had established unified command with Potter Valley Fire Chief Bill PAULI. I wanted to confirm the initial report given by the Howard Forest ECC of three separate fires. SERRANO believed there were at least two separate fires, but possibly more with the spotting potential. I then spoke with PAULI, who was one of the first resources to arrive at scene. I asked him where the fire was when he first saw it. He pointed northeast towards N. Busch Road from our location. PAULI showed me a map he had sketched of the surrounding roads where he saw the fire initially burning. He told me the fire originated between N. Busch Road and Powerhouse Road. At the staging area, I took weather on level ground with a digital device at 1:37 AM. I observed a clear sky with a wind from the northeast at 17 mph and gusts of 20 mph, a temperature of 68.9 degrees Fahrenheit and a relative humidity of 12.2 percent.

I drove east on Busch Lane along the edge of the fire with the smoldering grass field to the north. I turned left on N. Busch Road and drove a short distance before I was blocked by a large tree branch across the road. I turned around and headed towards Powerhouse Road to find a different access point. At the intersection of Busch Lane and Powerhouse Road was a tree branch suspended by communication lines and conductors. A short distance past this branch was a tree across the road completely blocking Powerhouse Road. I turned around and headed back towards N. Busch Road. I bypassed the tree branch on N. Busch Road through a grass field to the west. While driving through the field, I observed three structures burning to the east. I observed a vegetation fire burning in a field approximately a quarter mile to the east of the burning structures. At 2:15 AM, I drove through an opened gate onto the property of 13851 N. Busch Road to gain access to the fire. At this residence, I was met by the home owners [REDACTED] and his wife [REDACTED]. I asked them if I could access the fire from their property. They told me I could drive a short distance and walk the rest of the way. I spoke with them for a short period of time and found they had witnessed the start of the fire and had called 911 to report it.

[REDACTED] told me he was in his bathroom preparing for bed when he saw a huge arc
towards the east. He said he saw a tree illuminate when the conductors arced. He told me he had lost power 15 minutes prior to witnessing the arc. He said he saw the fire start on the neighbor's property on the south side of the creek under the conductors. He described the initial size of the fire as a 5-yard burn pile. I asked [redacted] if he would show me the location of where he saw the fire start. I walked with him towards the southeast corner of his property. He showed me where the conductors were and where he saw them arc. On the southeast corner of his property was a transmission tower with six overhead conductors running north and south. The middle east conductor was broken and suspended on the bottom conductor. This conductor was not in contact with the ground. [redacted] pointed to the area on the neighbor's property where he saw the fire start. He pointed to the northeast corner of his neighbor's property, owned by [redacted] at 13801 N. Busch Road. I asked [redacted] how fast he thought the wind was blowing when he saw the conductors arc. He said it was well over 45 mph from the northeast. He told me there was a wind event two years ago when the wind reached nearly 100 mph. He didn't think it was that fast, but did say the wind almost knocked him over while he was walking outside. I walked back with [redacted] to his home and asked him and his wife [redacted] to fill out a witness statement form describing the events they saw (see witness statements attachment 12).

At 2:50 AM, I walked onto the property owned by [redacted]. The fire was actively burning in a patch of blackberry bushes. The fire had lost momentum as the vegetation transitioned into the green grass of the pasture. I looked to the south and noticed the fire was burning in the same fashion to the west along two other fence lines separating the properties. Each property line was separated by approximately 100 yards of green fields. I saw oak trees within the perimeter of the fire actively burning and casting embers with the wind in a southwest direction. I saw the fire had burned on both sides of the creek and was now smoldering as it reached the edges of the blackberry bushes. I looked east and saw a slow moving backing fire burning towards Powerhouse Road. The backing fire was in the creek drainage slowly burning against the northeast wind. I looked south and saw the fire had burned underneath the conductors between the two transmission towers. The fire appeared to be isolated from the main fire.
I walked towards the south transmission tower to find the other end of the separated conductor. The south tower is located on the property of [REDACTED] at 13751 N. Busch Road. At the transmission tower, I saw six conductors running north and south. The middle east conductor had lost its tension. It dropped down from the tower to a small tree where it was suspended. It then dropped down to the ground for a short distance and over the fence dividing [REDACTED] and [REDACTED] property. I found the conductor coiled up on the ground approximately 60 feet north of the fence line. It was directly under the remaining five overhead conductors.

I wanted to confirm the conductors were deenergized and safe to work around. The assigned radio channels were congested with radio traffic. The channels were being used for life safety and firefighting operations. Therefore, a face to face conversation with the Incident Commander was more appropriate at the time. Potter Valley Fire Engine 6361 stayed at this location. At 3:40 AM, I drove to the staging area to talk with CAL FIRE Incident Commander SERRANO. SERRANO told me the power was being shut off by PG&E but wasn’t positive it was completely safe in the area I was at. While talking to SERRANO, I saw a PG&E utility truck drive by and I spoke with the driver, who identified himself as PG&E Lineman [REDACTED]. I asked if he would secure the power near N. Busch Road. He followed me in his truck and we arrived back at 3:54 AM. I showed [REDACTED] the conductor on the ground and asked him to cut a five-foot section off the end. We then walked to the north transmission tower to cut the other end of the broken conductor. The end of the conductor was hanging approximately twenty feet from the ground. [REDACTED] couldn’t reach this end with his extension pole so he cut the lower hanging section in the middle to get the conductor down. He then cut a five-foot section off the broken end. I took the two cut sections back to my truck. I coiled both conductors and taped them with red evidence tape. I placed them into two separate brown paper evidence bags and labeled them north and south and locked them in the cab of my truck.

I waited to further investigate this area until the fire stopped burning and the wind died down. There was still the possibility of more branches falling from the swaying trees. I tried
to call the Howard Forest ECC, but did not have cell phone service at my current location. I
later found out the cell towers in the area were damaged during the fire and reception was
poor. At 5:10 AM, I went to obtain more information on the other fires and find reception to
place a phone call to request additional investigators. Potter Valley Engine 6361 stayed at
this location. I drove south on Hawn Creek Road towards Spring Valley Road to confirm a
reported second fire. I saw that the fire had already burned through this area. I continued
south onto Spring Valley Road until I reached fire equipment along the fires edge. I spoke
to a resident at the end of the dirt road and asked if a fire had started in this area. They
said no and thought this was all one fire.

I drove to Eastside Road where I received a cell phone reception and placed a phone call
to the Howard Forest ECC. I spoke with Howard Forest ECC communications operator
Sean FARRELLE and asked if there was any updated information on the other reported
fires. From the information he had received, he now thought there might be one fire in
Potter Valley and another fire in Redwood Valley. I asked him who the Incident
Commander was on the fire in Redwood Valley and was told it was CAL FIRE Battalion
Chief Ray TAGLIO. I called TAGLIO to see where the fire was with the intention of having
the origin secured. I asked him if the fire in Redwood Valley was a separate fire from the
one in Potter Valley. He told me he now thought it was all part of the same fire. At that
time, Deputy Chief Kyle PINSON drove up to my location on Eastside Road. He also
thought it was all the same fire. With the information I gathered, I drove back to 13801 N.
Busch Road to start an origin and cause investigation.

At 5:50 AM, I returned to 13801 N. Busch Road. I was met by [REDACTED] who opened
a gate for me to access the back of their property. [REDACTED] told me she had reported the
fire by calling 911. She described the event as though lightning had struck near the
northeast side of their field. She said a fire then started in the blackberry bushes. [REDACTED]
told me no one else had accessed their property besides the Potter Valley Fire Engines. I
spoke with the firefighters on the Potter Valley Engine 6361 and was told no one had
entered the area. I waited for sunrise to start my investigation. I used the time to transfer
my field notes onto my computer and to prepare for the investigation.

Origin #1: North Busch Road October 9, 2017

At 7:10 AM, I started my origin and cause investigation by walking counter clockwise around the perimeter of the fire on [redacted] property. I made the same observations I saw earlier in the morning when the fire was actively burning. The primary fuel of the fire was the blackberry bushes. The fire self-extinguished when it reached the higher fuel moisture of the green irrigated pasture. The fire was isolated in the pasture approximately a quarter of a mile east of N. Busch Road. The fire was located on flat terrain and was approximately 4.15 acres in size. The blackberry bushes that grew between the two transmission towers were approximately six to ten feet tall and approximately thirty feet wide.

I looked at the fire’s direction of travel by identifying the macro and micro burn indicators. I observed burn indicators underneath the conductors midway between the two transmission towers, such as cupping on the blackberry stems and protection on the wooden fence posts, showing the fire traveling north to south. To the east of the north transmission tower I saw burn indicators, such as staining on glass bottles, protection on animal bones and stem fall, showing the fire traveling east towards Powerhouse Road. To the west of the north transmission tower I saw burn indicators such as, cupping on the blackberry stems, foliage freeze on the smaller oak trees and angle of char on their trunks, showing the fire traveling west towards N. Busch Road. With the burn indicators and the fire spread I observed earlier that morning, I was able to establish a General Origin Area (GOA). The GOA I established was an approximate 200 square foot in size. I walked the perimeter of the GOA in a counter clockwise direction identifying macro and micro burn indicators. I observed micro burn indicators, such as charring on the wooden posts supporting a barbed wire fence and cupping on blackberry stems. I finished walking counter clockwise and retraced my path in a clockwise direction. I marked the fire’s direction of travel with colored flags along the GOA perimeter. I marked advancing burn indicators with red flags, lateral
burn indicators with yellow flags and backing burn indicators with blue flags. I went to
where I saw advancing indicators and entered the GOA. I continued my systematic
approach by walking back and forth until I saw lateral burn indicators showing a transitional
zone. I continued this approach until I came across backing indicators. I identified the fire’s
initial run by the advancing burn indicators. Cupping on the remaining six to twelve-inch
blackberry stems showed the advancing run of the fire coming from an oak tree located
near the transmission lines. The advancing vector headed southwest from the oak tree,
which aligned with the northeast wind at the time of the fire.

At 11:19 AM, CAL FIRE Mendocino Bureau Chief Ryan SMITH arrived at the incident.
SMITH told me we were the only CAL FIRE investigators on the Redwood Incident due to
the high fire activity in Northern California. SMITH informed me he had requested a CAL
FIRE Survey LIDAR team from Sacramento to take measurements and map the origin. I
briefed SMITH on the events leading up to his arrival and the status of the investigation.
Together we walked the fire and retraced the steps I made earlier. SMITH and I continued
identifying burn indicators and marking them with colored flags. We used a systematic
approach until we located the Specific Origin Area (SOA), which we identified as a 32-foot
by 25-foot section. The SOA we identified was located on the northeast corner of [redacted] property under the conductors. Located in the SOA was a branch that appeared to
be the top section of an oak tree ten feet away. The tree branch was one foot in diameter
and approximately nineteen feet long. The branch had broken into two different sections.
The break at the end of the branch appeared to match the break at the top of the oak tree.
The oak tree was approximately six feet in diameter and approximately forty feet tall. The
oak tree had a lean away from the conductors.

SMITH and I visually searched the SOA without moving the tree branch. We waited to
further examine the SOA until the LIDAR team had taken their measurements and mapped
the area. CAL FIRE LIDAR Surveyors Dan GREGORY and Dave KAROLY arrived at the
incident at approximately 1:25 PM. They were briefed on the investigation and started
setting up their equipment. SMITH and I measured the distance from the SOA to the
transmission towers for future reference. The transmission tower to the north of the SOA was 111 feet 4 inches away and the transmission tower to the south was 546 feet 8 inches away. SMITH and I measured the distance from base of the oak tree to the eastern overhead conductors and received a measurement of 13 feet. The oak tree leaned away from the overhead conductors, which made the trunk the closest part of the tree to the conductors.

At 4:45 PM CAL FIRE Firefighter Jeremy WHITAKER arrived at the incident to secure the SOA overnight. WHITAKER was instructed not to let anyone into the SOA or disturb the investigation. He was left with a marked CAL FIRE vehicle and a portable radio to notify us if any issues arose. At 6:30 PM, SMITH and I left the incident for the night.

Origin #1: North Busch Road October 10, 2017

On Tuesday October 10, 2017, I met SMITH at the Redwood Incident Base located in Ukiah. SMITH put in a request for an arborist to examine the condition of the oak tree. After obtaining information on the fire and attending the morning briefing, I drove back to Potter Valley to continue the investigation. At 10:15 AM, I arrived back at the incident. SMITH was already there and told me he had requested CAL FIRE Forester II Charles MARTIN to examine the oak tree. MARTIN has over twenty years of experience as a Registered Professional Forester and Arborist. MARTIN arrived at the incident at 11:27 AM to examine the oak tree for health and structural defects. MARTIN concluded there were no signs of structural defect, disease, or other pest negatively affecting the branch at the break location. MARTIN identified the tree as a Valley Oak (see arborist report attachment 10).

The CAL FIRE LIDAR team was already at the incident taking measurements of the SOA. Walking in front of the LIDAR equipment will disrupt the measurements, so I used this time to examine how the fire progressed from the SOA towards N. Busch Road. I walked the two fields southwest of the SOA and saw multiple spot fires. I observed a few spot fires on [redacted] property, but the majority of them were located on [redacted] property.
two homes were fully consumed during the initial stages of the fire. Next to their homes was a 20 by 40-foot metal hay barn that had also burned. There were five spot fires near the hay barn and two homes. I walked the surrounding properties and did not observe any additional spot fires. LIDAR Surveyor GREGORY and I then walked the two fields using a GPS to record their locations. We marked 146 spot fires from the SOA to N. Busch Road. They ranged in size from approximately six by six inches to twenty by twenty feet. I later spoke with the son of, who was there the night of the fire, told me the stacked hay within the barn caught on fire from the windblown embers. The hay barn cast more embers igniting the two homes on fire. was visiting friends at 13901 N. Busch Road the night of the fire. In his witness statement, he said the sparks from the fire ignited the homes and ranch buildings. He said the sparks then caught the field to west of N. Busch Road on fire (see witness statements attachment 12).

After the LIDAR team was done surveying the area, SMITH and I tried to locate the Ignition Area within the SOA. SMITH and I examined the tree branch in the SOA and were unable to find any evidence on it, such as marks from the overhead conductors. SMITH used a chain saw to cut the small limbs and debris from around the tree branch to try to locate more burn indicators and an Ignition Area. I ran a magnet over the SOA and was not able to find any magnetic material except an old section of metal fence that was no longer in use. The fence line stopped near the south edge of the SOA. It was not continuous and was no longer maintained. Rusted remains of an electrical wire were near the metal fence. The wiring was in sections and partially buried in the ground. said the fence hadn't been used or energized for over ten years. The blackberry bushes acted as a fence to keep the cattle on the property. After examining the burned area within the SOA, we were unable to locate the Ignition Area.

After talking with witnesses and investigating the fire, SMITH and I determined the middle east conductor started the fire when the top section of the oak tree broke through it. The fire advanced west with the wind along the property line and creek until it reached irrigated
pasture and self-extinguished. The fire burned laterally from the origin south along the property line and underneath the conductors. The burning oak trees and blackberry bushes, with the wind, cast embers in a southwest direction towards the hay barn and two homes. The hay in the barn caught fire along with their two homes. The fire crossed N. Busch Road and continued to burn towards Redwood Valley. SMITH and I completed our investigation at 6:38 PM, on Tuesday October 10, 2017 and released the scene.

Origin #2: Hawn Creek Road October 12, 2017

On Thursday October 12, 2017, I drove to Potter Valley to interview witnesses who were there the night of the fire. I went to the Potter Valley Fire Station to speak with Chief PAULI and the firefighters who were part of the initial response. I was met by Warren FOSTER, who is a CAL FIRE firefighter with the Lassen Modoc Unit and a former Potter Valley firefighter. He told me there was a separate fire from the initial fire on N. Busch Road. I asked FOSTER if he would show me it's location. I followed him in my vehicle to the intersection of Main Street and Hawn Creek Road. We then walked north towards the driveway of 12300 Hawn Creek Road. I looked to the east and saw a burned area on the property of 9100 Main Street. I estimated the burned area to be approximately an acre and a half in size. I walked to the fires edge and saw it had burned along an irrigation canal in short annual grass. I saw pieces of fulgurite on the ground near the bank of the canal. Above the pieces of fulgurite were three distribution conductors. All but three pieces of fulgurite were in the burn. Two of the three pieces had a small burned area around them approximately 3 inch by 3-inch in size. To the south of the fire appeared to be a scaffold (main) tree branch that broke from an oak tree located on the east bank of the irrigation canal. The tree branch had been moved to the west from where it had fallen. I saw drag marks in the dirt and grass from where the branch had landed to where it was currently located. I called SMITH and told him there was a separate fire from the one we investigated on N. Busch Road. SMITH told me he was on his way from Willits.
SMITH arrived at the scene at 9:20 AM and we began an origin and cause investigation. I showed SMITH the location of the broken tree branch. I showed him a black mark on the branch I thought was from the conductors, but after a closer observation it appeared to be from equipment grabbing onto the branch and moving it away from the canal. SMITH and I found a depression on the west side of the canal bank where the branch had hit. To the south of the depression was a conductor and splice laying on the ground. The conductor was approximately 5 feet in size. Directly above were three overhead conductors running parallel with the irrigation canal. The east conductor appeared to have a newer copper conductor spliced into an older existing conductor. The newer conductor was shinier in appearance compared to the dull darker existing one. SMITH and I looked at the fulgurite on the ground and saw they were in line, spread out over approximately 95 feet. One of the pieces of fulgurite had an approximately 4 ½ inch bare copper wire imbedded in it.

SMITH and I continued our investigation by determining the fire’s direction of travel by identifying the macro and micro burn indicators. We started walking counter clockwise along the north edge of the fire. We crossed into the field to the west of Hawn Creek Road and saw macro burn indicators such as angle of char in the tree crowns and on their trunks. These macro burn indicators showed the fire traveling west from Hawn Creek Road. SMITH marked the macro and micro burn indicators with red flags identifying advancing fire. The angle of char on the trees along the west side of Hawn Creek Road showed advancing fire. We walked across the road and identified advancing burn indicators along the east side of Hawn Creek Road. We observed fire burn indicators such as staining and ash deposits on a mail box post, angle of char on a small tree stump and protection on the metal fence posts. SMITH and I determined the GOA to be approximately an acre and a half on the east side of Hawn Creek Road. We followed the perimeter of the GOA by walking both counter clockwise and clockwise and entered from the advancing side. We identified the SOA as a 6-foot by 60-foot area located next to the irrigation canal. We continued identifying advancing burn indicators until we reached the apex of the burn. At the apex of the burn was a piece of fulgurite, which SMITH and I identified as our primary point of ignition. From the Ignition Area, the fire burned in a V pattern towards
Hawn Creek Road. SMITH and I determined the fire had started on the east side of Hawn Creek Road and spotted across the road with the wind.

SMITH and I then placed white flags next to the items we were going to collect as evidence. We placed a white flag next to the conductor found on the ground and marked it Item 1. We placed white flags next to the pieces of fulgurite along the irrigation canal. We marked individual pieces of fulgurites as one piece of evidence and numbered them as Item 2. The last item we marked was approximately a 4 ½ -inch long copper conductor fused to a piece of fulgurite and numbered it Item 3. SMITH and I took measurements of the primary point of ignition for future reference. We triangulated it by taking two measurements from Hawn Creek Road. We used two 3-inch vertical culvert posts used as part of the construction of the irrigation canal running underneath Hawn Creek Road. The measurement from the north post to the primary point of ignition was 92 feet 3 ¾ inches. The measurement from the south post to the primary point of ignition was 88 feet 2 ½ inches.

SMITH and I examined the tree branch that was moved approximately 30 feet to the west from the irrigation canal and approximately 30 feet to the south of the SOA. We observed a broken section on the branch that appeared to match the tree located on the east side of the canal. The branch was approximately 45 feet 8 inches long and was 14-inches in diameter. SMITH and I measured the distance from the trunk of the tree to the closest eastern conductor and received a measurement of 36 feet 6 inches. We measured the distance of the closest tree branch to the closest east conductor and received a measurement of 20 feet 8 inches. SMITH and I concluded our investigation at 1:44 PM.

To support our investigation at Hawn Creek Road, a recording from the Howard Forest ECC has a radio transmission from CAL FIRE Heavy Fire Equipment Operator Sean SWEENY telling the Incident Commander of a new vegetation fire at Hawn Creek Road and Main Street. The radio transmission was recorded at 12:27 AM. I later spoke with SWEENY, who told me he was driving to the staging area the night of the fire. He turned
staging area the night of the fire. He turned right from Main Street onto Hawn Creek Road and drove a tenth of a mile and saw a fire on the east side of the road. He said the fire was 10-foot by 10-foot in size located southwest of the irrigation canal. SWEENY told me by the time he turned his dozer transport around the fire had already crossed Hawn Creek Road. He said in a matter of a few minutes the fire had crossed the road and was already burning 5 to 10 acres on the west side of Hawn Creek Road. The fire SWEENY described was what I saw approximately 30 minutes later when I arrived in Potter Valley the night of the fire. I estimated this fire as 200 acres in size when I first saw it from Eastside Road.

SMITH requested CAL FIRE LIDAR Surveyors GREGORY and KAROLY to map the SOA at Hawn Creek Road. Due to the high fire activity in Northern California and other assignments they weren’t able to come to Potter Valley until October 19, 2017. SMITH also requested CAL FIRE Forester II MARTIN to examine the tree for health and structural defects. On October 19, 2017, I met with both the LIDAR Surveyors and MARTIN in Potter Valley to show them the fire’s SOA and the tree to be examined. I showed MARTIN the tree branch and the oak tree east of the irrigation canal. MARTIN concluded the branch was solid and did not have any signs of decay where the break occurred. He saw no signs of structural defect, disease, or other pest negatively affecting the branch at the break location. MARTIN identified the tree as a Valley Oak (see arborist report attachment 10). Shortly after MARTIN examined the oak tree, CAL FIRE LIDAR Surveyors GREGORY and KAROLY arrived at the incident to take measurements and map the SOA.

Before showing MARTIN the oak tree, I was approached by [REDACTED], who said he saw the fire start on Hawn Creek Road. [REDACTED] told me he was assisting his neighbors evacuate the night of the fire. He said he was driving south on Hawn Creek Road when he saw a flash to the east and saw the conductors come down. He said the conductors sparked and started a fire about 50 feet east of Hawn Creek Road. He said the fire crossed the road within seconds. [REDACTED] filled out a witness statement form describing the events he saw (see witness statements attachment 12).
Origin #3: East Road October 12, 2017

On October 12, 2017 at 2:45 PM, SMITH and I went to Redwood Valley to investigate another fire reported to the Howard Forest ECC the morning of October 9, 2017 at 12:23 AM. We drove to the Redwood Valley Fire Department located at 8481 East Road. SMITH and I spoke to Fire Chief [REDACTED] who told us he was responding to Potter Valley when he heard about a new fire in Redwood Valley. He drove to the intersection of East Road, West Road and Tomki Road and saw a vegetation fire. He said the fire was approximately 5 acres in size when he first saw it.

SMITH and I investigated the field where [REDACTED] had seen the fire. The field was located next to dry river bed of the Russian River and East Road. We accessed the field through a gated fence and started looking at the macro and micro burn indicators. We started walking clockwise towards the dry river bed. We observed burn indicators, such as protection and staining on a white irrigation pipe, rock staining and protection on brush stems, showing the fires direction coming from East Road. We walked in a circular path until we reached a fence along East Road. We saw the burn indicators change direction indicating a transitional zone. We marked these with yellow flags showing lateral fire. We then walked counter clockwise reading advancing burn indicators until we reached the opposite transitional zone. We located the transitional zone and marked the lateral burn indicators with yellow flags. SMITH and I established the GOA as 5 acres in size between the river bed and East Road. SMITH and I entered the GOA where we identified the advancing burn indicators. We marked advancing indicators with red flags. We walked back and forth in a systematic approach between the transitional zones reading the advancing indicators. The distance between these zones became narrower and eventually we reached an area where the burn indicators showed a backing fire. SMITH and I identified the SOA as a ten-foot by ten-foot area. In the SOA, we observed short annual grass that wasn't fully consumed by the fire. SMITH and I continued to identify micro burn indicators until we identified an ignition area approximately 1-foot by 1-foot in size. I ran a magnet over this area and didn't find any ferrous metal fragments or particles. We were unable to find any physical
evidence in this area. SMITH and I found the cause of this fire to be a spot fire from the fires in Potter Valley. These three fires burned together creating the Redwood Incident (see SMITH's investigative report attachment 1).

During the first couple of days of the Redwood Incident, SMITH requested the fire spread and spotting potential for the first two hours of Origin #1 and Origin #2 located in Potter Valley. The map created by CAL FIRE Fire Behavior Analyst Tim CHAVEZ shows the fire from Potter Valley headed directly towards the area we identified as the SOA in Redwood Valley. CHAVEZ's map shows the fire had potential to spot a half mile in front of the fire. CHAVEZ said the results of the data are an underestimate of the fires spread and spotting distances (see fire behavior analyst report attachment 13).

Through the investigation, SMITH and I established three separate Specific Origin Areas on the Redwood Incident. Within these three SOA, I conducted the following fire cause exclusion analysis.

Lightning - The sky was clear with no thunderhead or cloud build-up observed. The lightning detection data shows there were no lightning strikes in Potter Valley or Redwood Valley at the time of the fires (see lightning activity attachment 14). The reporting party said it looked like lightning had struck during the 911 call while reporting the fire east of 13801 N. Busch Road. This was later clarified as the light and noise coming from the conductor breaking. Based on these facts, I eliminated lightning as a cause of these fires.

Campfire – There were no signs of a campfire observed at any of the SOA. There were no designated campgrounds, tents or shelters in these areas. There were no rock rings, ash pits or cooking stoves. There were no piles of stacked wood associated with camp fires at any of the three fires. Based on these facts, I eliminated a campfire as the cause of these fires.

Smoking - There were no discarded cigarettes or other smoking material within the SOA of
any of the three fires. The three fires were all located behind gated fences on private
property away from public access. Based on these facts, I eliminated smoking as a cause
of these fires.

Debris Burning - All burning was suspended in Mendocino County at the time of the
Redwood Incident. There was no evidence of debris burning on any of the three properties.
I saw no burn piles or burn barrels at or near the SOA. Based on these facts, I eliminated
debris burning as the cause of these fires.

Incendiary - There were no types of incendiary devices observed in the SOA of any of the
three fires. There was no evidence of any arson devices such as matches or cigarettes.
Access to each SOA involves passing through gated fences onto private land. Based on
these facts, I eliminated arson as the cause of these fires.

Equipment Use - There was no equipment use seen by witnesses at the time of any of the
three fires. There was no evidence of equipment use at Origin #1 and Origin #3. It
appeared that some type of equipment was used to move a fallen oak branch from
underneath the conductors south of Origin #2 after the fire had started. However, there
was no evidence of equipment use in the SOA, such as tire marks, carbon particles or rock
strikes. Based on these facts, I eliminated the use of equipment as the cause of these
fires.

Railroad - There are no railroads located near the SOA of any of the three fires. There are
no railroads in Potter Valley. The closest railroad in Redwood Valley to the SOA is more
than two and a half miles to the south. Based on these facts, I eliminated a railroad as a
cause of these fires.

Children - There was no indication of children being in or near the SOA of any of the three
fires. There were no toys left behind. The fires were located away from playgrounds,
schools and campsites. The falling tree branches from the strong wind made it unsafe to
be around these areas. The time of night and location of these fires are unlikely to have
children present. Based on these facts, I eliminated playing with fire as a cause of these
fires.

Fireworks - The use of fireworks are illegal in Mendocino County. There was no evidence
of fireworks in or near the SOA of any of the three fires. While walking the perimeter of
GOA I did not observe any remnants of fireworks. Based on these facts, I eliminated
fireworks as a cause of these fires.

Vehicles - The SOA of each of the three fires were located behind gated fences on private
property away from paved roads. Each SOA was in a remote area on the properties with
no dirt roads or easy access to them. Based on these facts, I eliminated a vehicle as a
cause of these fires.

Glass Refraction - The only glass capable of refracting sunlight were glass bottles located
in the burn at N. Busch Road. The glass bottles were located approximately 60 feet from
the SOA and were used as a burn indicator showing a backing fire. All three fires occurred
at night with the first fire starting at approximately 11:34 PM. Sunset on October 8, 2017
was at approximately 6:43 PM. Based on these facts, I eliminated glass refraction as a
cause of these fires.

Electrical Power - Conductors were damaged due to falling tree branches. Evidence at N.
Busch Road and Hawn Creek Road show that conductors broke and contacted the ground.
Witnesses at N. Busch Road saw the conductors arc and a fire start immediately after.
Witnesses saw a fire start on the eastside of Hawn Creek Road on the property of 9100
Main Street. Fulgurite pieces and copper wire were found during the investigation of this
fire. There was no electrical power in or near the SOA in Redwood Valley. Based on these
facts, I included electrical power as a cause of the fires at N. Busch Road and Hawn Creek
Road.
After gathering witness statements, receiving fire behavior data and conducting our investigations, I've concluded that the initial fire reported on North Busch Road was ignited when the top section of a valley oak tree broke and fell through the conductor at approximately 11:34 PM. The branch contacted the middle east 60kV overhead conductor and caused it to break. The conductor caught the blackberry bushes below on fire. The fire advanced west with the northeast wind towards Redwood Valley. A second fire started on the east side of Hawn Creek Road when a branch from an oak tree broke and contacted a 12kV overhead conductor at approximately 12:27 AM. The conductor fell to the ground starting a vegetation fire in the annual grass east of Hawn Creek Road. The fire grew and spotted across the road and burned into the fire from N. Busch Road. The wind blew embers towards Redwood Valley and started a third fire in a grass field near East Road and Tomki Road at approximately 12:37 AM. The three fires burned together for a total of 36,523 acres.

The conductors at Origin #1 - N. Busch Road, is a 60kV overhead conductor. The conductor at Origin #2 - Hawn Creek Road, is a 12kV overhead conductor. Per California Public Resource Code 4293, except as otherwise provided in Sections 4294 to 4296, inclusive, any person that owns, controls, operates, or maintains any electrical transmission or distribution line upon any mountainous land, or in forest-covered land, brush-covered land, or grass-covered land shall, during such times and in such areas as are determined to be necessary by the director or the agency which has primary responsibility for the fire protection of such areas, maintain a clearance of the respective distances which are specified in this section in all directions between all vegetation and all conductors which are carrying electric current: (a) For any line which is operating at 2,400 or more volts, but less than 72,000 volts, four feet. (b) For any line which is operating at 72,000 or more volts, but less than 110,000 volts, six feet. (c) For any line which is operating at 110,000 or more volts, 10 feet. In every case, such distance shall be sufficiently great to furnish the required clearance at any position of the wire, or conductor when the adjacent air temperature is 120 degrees Fahrenheit, or less. Dead trees, old decadent or rotten trees, trees weakened by decay or disease and trees or portions thereof that are leaning toward the line which
may contact the line from the side or may fall on the line shall be felled, cut, or trimmed so as to remove such hazard. The director or the agency which has primary responsibility for the fire protection of such areas may permit exceptions from the requirements of this section which are based upon the specific circumstances involved.

The Valley Oak at Origin #1 N. Busch Road, leaned away from the conductors. The closest part of the Valley Oak was the base of the tree. The distance from the base of the tree to the closest eastern conductor was 13 feet. The examination of the tree concluded there were no signs of structural defect, disease, or other pest negatively affecting the branch at the break location.

The Valley Oak at Origin #2 Hawn Creek Road, stood predominantly upright and was 36 feet 6 inches away from the closest eastern conductor. The closest part of the Valley Oak was a tree branch that measured 20 feet 8 inches to the closest eastern conductor. The examination of the tree concluded there were no signs of structural defect, disease, or other pest negatively affecting the branch at the break location.

Signature: [Signature]
Date: [6/4/2018]

Eric Bettger, #4703
Fire Captain Specialist
10 - ATTACHMENTS:

1. SMITH's Investigative Report
2. Photographs Origin #1 - Potter Valley
3. Photographs Origin #2 - Potter Valley
4. Photographs Origin #3 - Redwood Valley
5. Photographs and Dispatch Recordings
6. Scene Entry Log
7. Evidence Log
8. Chain of Custody
10. Arborist Reports
11. LIDAR Reports
12. Witness Statements
13. Fire Behavior Analyst Report
14. Lightning Activity
15. Remote Automated Weather Stations Data
16. Incident and Fire Progression Map
17. Damage Assessment Report
18. Incident Status Summary ICS 209
19. PG&E Electrical Data
20. FC-34