## INVESTIGATION REPORT

<table>
<thead>
<tr>
<th>CASE NUMBER:</th>
<th>17CAMRN0002957</th>
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<tbody>
<tr>
<td>CASE NAME:</td>
<td>Thirty Seven</td>
</tr>
<tr>
<td>DATE:</td>
<td>October 8, 2017</td>
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<tr>
<td>INCIDENT TYPE:</td>
<td>Wildland Fire</td>
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<table>
<thead>
<tr>
<th>INCIDENT INVESTIGATOR(s):</th>
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<tbody>
<tr>
<td>Fire Captain - LNU</td>
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<tr>
<td>Fire Captain - LMU</td>
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<tr>
<td>Battalion Chief – CNR</td>
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<td>Battalion Chief - TCU</td>
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1 - VIOLATION(S):
2   No violations observed.
2 - SUMMARY:

On October 8, 2017, a vegetation fire occurred in the area of State Highway 37 and Lakeville Highway in the county of Sonoma. The fire was first reported the morning of October 9, 2017 at 1:53 AM to Redwood Emergency Dispatch Communications Center (REDCOM).

Due to a shortage of fire suppression resources, the fire burned uncontrolled on open space / grazing land for several hours. No structures or major private or public infrastructure were damaged as a result of the fire.

Due to a lack of available investigators within the area at the time because of other major fires burning the investigation was delayed for several days.

No physical evidence was located in connection to the cause of the fire. The origin and cause determination was determined by reviewing photographic and video evidence and eliminating all eleven fire cause classes in a systematic method which are defined by the National Wildland Fire Coordination Group (NWCG), Wildland Fire Investigation Fl210 course curriculum. I can rule out all of the eleven fire cause classes with the exception of electrical as a cause.

I could not rule out the possibility of the high voltage electrical powerlines, which were located above the general area of origin of starting the fire. The two sets of powerlines are owned and operated by Pacific Gas and Electric Company (PG&E).
3 - SUBJECT:

S-1  Pacific Gas and Electric Company

77 Beale Street 24th floor
San Francisco, CA 94105

Owner and operator of the powerlines located in the fire origin.
4 - VICTIM(S) & WITNESS(ES):

V-1

Can speak to conditions of property prior to incident.

V-2

Can speak to observations at the incident after fire personnel arrived.

W-1

Observed and photographed fire from Highway 37 prior to fire units arriving at scene.

W-2

First fire personnel at scene. Can speak to observations at the incident.
Can speak to observations and investigation at the incident.

Can speak to observations at the incident.

Can speak to observations at the incident.
5 - EVIDENCE:

No physical evidence was collected from the scene.

I received a large volume of data which was provided to me from PG&E. I reviewed all the data and found no abnormalities or areas of concern with the data which showed a failure or incident that could have led to a fire at this location. The unused data has been saved and securely stored at CAL FIRE Santa Rosa Station / Prevention office, evidence storage locker located at 2210 West College Ave. Santa Rosa CA.
6 – CONDITION(S):

Novato Fire District Weather Station Data:
Weather Station ID: 52014684
Location GPS: 38° 06'48" N -122° 32'59" W
Elevation 486' Feet above sea level

Weather Reading
Date: October 8, 2017
Time: 10:00 PM.
Temperature 71°F
Relative Humidity: 13%
Wind Direction: North
Wind Speed Average: 12 MPH.
Wind Gust: 26 MPH
Dew Point: 18°

7.3 miles southwest of the GOA of the fire.
7 - VEHICLE(S)/EQUIPMENT:

Three sets of electrical conductors on the north side of Highway 37, running east to west, parallel to Highway 37, located west of Arnold Drive and east of Lakeville Highway.
8 - PROPERTY:

Physical Location:
7701 Lakeville Highway
Petaluma, CA 94954
Sonoma County
APN # 068-150-035
GPS: 38 8.837' W -122 24.496' N
Elevation: 103' Feet (at GOA)

The property of 7701 Lakeville Highway, Petaluma, CA. 94954 is located on the north side of state highway 37, west of Arnold Drive, east of Lakeville Highway in the county of Sonoma. The property's primary use is open space / cattle grazing land. The topography of the property consists of rolling hills and marsh land. The southern portion of the property consists of short grass and is heavily grazed by cattle. The majority of the larger vegetation (brush and small trees) is limited to the seasonal waterways located on the property. There are no permanent buildings on the property. Two commercial billboards are located on the southern portion of the property along Hwy 37. Three Pacific Gas and Electric powerlines run west to east through the middle of the property paralleling Hwy 37.
9 - NARRATIVE:

On October 8, 2017, a vegetation fire occurred in the area of State Highway 37 and Lakeville Highway in the county of Sonoma. The fire was first reported the morning of October 9, 2017 at 1:53 AM to Redwood Emergency Dispatch Communications Center (REDCOM).

I was told by CAL FIRE, Assistant Chief [redacted] that CAL FIRE, Fire Captain, [redacted] who was originally assigned to the investigation, had identified a possible general origin area (GOA) along Highway 37 bellow a set of PG&E powerlines. [redacted] hypothesis was proved to be incorrect with the discovery of cellular phone video and photographs provided to us from a passerby witness [redacted] video showed the fire spreading in a westerly direction north of where [redacted] located his GOA.

On October 23, 2017 at approximately 8:00 AM, I responded in uniform in my marked department issued vehicle to the address of 7701 Lakeville Highway. I met with CALFIRE Battalion Chiefs [redacted] and [redacted] at the access gate across from the address of 2100 Highway 37. From the access gate, I could see a vegetation fire had burned an area approximately 1500+ acres in size with a majority of the fire burning on the north side of Highway 37, just east of Lakeville Highway. From the macro burn indicators and being aware of the weather patterns at the time of the fire on October 8, 2017 I could see the fire appeared to have had originated east of our location near the Sonoma Raceway property.

The group and I began driving east on an access road under two sets of high voltage powerlines. Both sets of powerlines ran parallel with Highway 37, east to west. The burned area appeared to have been used recently for cattle grazing and consisted of short stubble dried grass. Near the access gate I saw an area which appeared to have been used regularly for the daily feeding of the cattle, due to the buildup of leftover cattle feed.
We continued east on the access road looking for fire spread indicators. The group and I stopped at a section of the road under the powerlines and began to identify lateral and advancing fire spread indicators. This location was the approximate location of the advancing fire in the video and photographs. The location was where a drainage and the two sets of powerlines intersected, north of Highway 37.

We began looking for fire spread indicators from Highway 37, north towards the paralleling access road. We found advancing fire spread indicators along the east side of the above-mentioned drainage on a spur ridge. On either side of the spur ridge we found backing and lateral fire spread indicators. Many of the backing indicators were located on the east slope of the spur ridge. We continued to follow the advancing fire spread indicators north up the main slope on the spur ridge to where it intersected the two sets of powerlines at the access road. This is where I established the GOA.

From the location of the access road and two sets of powerlines we began to find lateral and backing fire spread indicators to the east and advancing fire spread indicators to the west. The group and I began to visually inspect the powerlines and power poles for damage. I could see both sets of powerlines consisted of six conductors in each set. The southernmost set of powerlines appeared to be a smaller size wire than the northern set. The southern set of powerlines appeared to be a brown or darker oxidized color. The towers also appeared to be older by the level of weathering and oxidation compared to the northern set of powerlines. The southern set of powerlines appeared to be smaller than the northern set.

The northern set of powerlines appeared to be a larger size wire than the southern set of powerlines, they were also a gray or galvanized color compared to the southern set of powerlines. The towers were larger and appeared to be newer than the southern set of powerlines. On the northern set of powerlines, on the tower just west of our location, I could see barbed fence wire hanging from one of the ladder rungs. It appeared a bird was attempting to construct a nest with this material. The material was located too high on the tower to be thrown and was too heavy to be blown by the wind to end up there.
On October 23, 2017 Electrical Engineer [REDACTED] visited our site and began visually inspecting both sets of powerlines, starting from the access gate working east to our location. On the northern set of power lines, [REDACTED] found and showed me a single powerline with a broken strand of conductor (See photograph IMG_0941.JPG). The broken strand was only visible with a set of binoculars. After [REDACTED] showed me the location of the conductor, I saw one single strand of conductor pointing perpendicular to the direction of the main conductor.

The broken strand did not appear to have any arc or burn marks on it, the conductor was gray in color. Additionally, the location of the broken strand of conductor was not located near or up wind of our GOA. I ruled out the broken strand of conductor as a cause for the fire and marked it on the ground with flagging. The GPS coordinates for the location are as followed 38°45.078″ -122° 27’ 39.144″.

I continued to evaluate the GOA where the drainage and the two sets of powerlines intersected. I was unable to locate abnormalities or damage to the above powerlines with our available equipment, which is not to say it did not exist. Several factors hampered our abilities to properly visually inspect the powerlines. One of which was the height of the powerlines versus the size of the object we were looking for. The second was we were only able to see a partial portion of the bottom side and not the whole 360-degree view of the powerline itself. The third issue was the view of the powerline versus the relation to the sun which casted shadows on said powerlines making it extremely difficult to properly inspect the powerlines. We inspected the portions of the powerlines to the best of our abilities without locating any noticeable abnormalities or damage.

After attempting to visually inspect the powerlines, I returned and inspected the GOA. I found protection type advancing, backing and lateral fire pattern indicators. I narrowed the GOA down to a twenty by thirty-foot area. Within this area, I found a portion of unburned grass, consistent with a low intensity burning fire. This area of interest was approximately a twelve foot in diameter circle. The area of interest would have been
downwind from the southernmost set of powerlines during the night of October 8, 2017. The GPS coordinate location is 38, 8'50.376" -122 27' 29.268"

On October 22, 2017 I received information that an individual by the name of [redacted] an off duty fire fighter from Sonoma Valley Fire Authority, several cellular phone pictures and videos of the fire on October 8, 2017 (See attached video). I contacted [redacted] and he told me the following in summary. [redacted] told me he was returning home from San Francisco Airport on Highway 37 when he saw the fire.

[redacted] told me he was driving home with his wife when they saw the fire after passing the address at 2100 Highway 37. [redacted] told me he thought the fire was ten to fifteen acres in size spreading to the west. [redacted] told me he didn’t see any fire engines or emergency vehicles when he drove by on Highway 37. I asked [redacted] to come out the fire location the next day.

When [redacted] arrived, I asked him to drive me eastbound on Highway 37 and walk me through the events of that night. I told [redacted] to pull over to the center divide of Highway 37 when he thought he was in the same location where he took the pictures and videos of the fire. [redacted] agreed and proceeded. When [redacted] pulled off the highway he pointed to the location of where I had located the GOA. I asked [redacted] if he remember any reference points. He said “yes” he recalled what he thought was small bushes on the southeast side of the fire near the drainage. [redacted] said he realized they were actually small trees in the drainage to the southeast side of the fire. I asked [redacted] if he had seen any flashes of light or arcing prior to or while seeing the fire. [redacted] said he had not.

I was able to narrow down and confirm [redacted]s location on Highway 37 via the cellular video he recorded. In the video, a street sign passes through the screen in the video from right to left, between [redacted] and the fire. I was able locate the street.

LE80 (Rev. 7/2011)
sign on center divide on Highway 37. The location of the sign confirms

point of view while driving on Highway 37. (See attached photograph
of screen shot of video)

During the investigation, Lakeville Volunteer Fire Chief told me to drive out to our
location and I interviewed him. told me the following in summary. told me
when he first arrived at the fire he was driving east bound on Highway 37 and had to
drive past the fire to turn around to make access to the fire. While he was passing the
fire on the highway told me the fire was burning from the location of where the
two powerlines and the drainage intersected told me the fire had not spread to
the east side of the spur ridge where he remembered seeing several small trees. I
asked how he knew for sure this was the correct area told me he
remembered the location because it was the only area where there were trees along the
drainage.

told me the fire was advancing to the west with a strong north wind. estimated the fire was 20 acres in size and under the two sets of powerlines when he
saw it. told me after he turned around Highway 37 he returned to the fire in the
west bound lane and made access to the fire via the gate on the north side of highway
37 at the address of 2100 Highway 37.

told me after he made access, the fire was spreading towards the location in the
field where the cattle usually feed. (See photograph IMG_8556.JPG) told me
when the fire advanced to the discarded cattle feed it reduced in speed and intensity.
told me the fire began to spread to the northwest up a small hill. Near the feeding
area, it I began to build speed again and proceed to the northwest towards Lakeville
Highway.

told me after the fire continued to the north and over the hill, the fire jumped
Highway 37 on the southeast end of the property. The fire burned the field south of
Highway 37. During this time, the fire also began advancing to the northeast towards

Sonoma Raceway and Cougar Mountain. I asked [BLANK] if he had seen any of the powerlines arc during the fire and [BLANK] said he hadn’t.

I analyzed [BLANK] GOA location (See photograph IMG_0985.JPG). With the information provided to me from [BLANK] I could understand how [BLANK] came to his conclusion. I could see advancing, lateral, and backing indicators within his GOA which would have lead him to the conclusion that this location could have been the possible GOA under the powerlines, [BLANK] without having [BLANK] information, would not have known the fire was spreading in erratic multi directional runs. I suspect what [BLANK] located was a spot fire which had established itself ahead of the fire during one of the erratic runs.

Fire cause exclusion

I excluded the following causes for the fire at Highway 37 on October 8, 2017 except for electrical.

Lightning, I excluded lightning as a cause for the fire. I did not see any evidence of a lightning strike which could have occurred in the area. I inspected the surrounding vegetation and structures and found no evidence of a lightning strike. Witnesses in the area prior did not see lightning or hear thunder prior to the fire. I researched recorded weather data from National Interagency Fire Center (NIFC) and found no recorded lightning strike for this area between the dates of September 24, 2017 and October 8, 2017. (See attachment 2 BLM Lightning map)

Campfires, I excluded campfires as a cause for the fire. I inspected the area surrounding the GOA. I did not see a campfire or evidence which would lead me to believe a campfire was built in the area of the GOA or on the property. Campfires are not allowed by the Sonoma Open Space Agency on the property.

Fireworks, I excluded fireworks as a cause for the fire. I did not see evidence of fireworks in the location the GOA. I did not find any evidence of used fireworks near the GOA or on the property. The use of fireworks are not allowed by Sonoma Open Space.
Agency, CAL FIRE or Sonoma County Fire Department.

Debris burning, I excluded debris burning as a cause for the fire. I did not see any recent remains of debris burning piles in the GOA or on the property. I did not see any prepared unburned burn piles in the GOA or on the property. Sonoma County Open Space Agency did not approve or conduct any debris burning on the property.

Vehicle, I excluded vehicle use as a cause for the fire. I did not see evidence of vehicle use in the area or off the powerline access dirt road near the GOA. The location of GOA would not have been a typical location to experience a vehicle malfunction which would have resulted in a vegetation fire. The location of the GOA was not near the powerline access dirt road. This location was a powerline access road not used by the public and seldom used by employees. Do to the time of day of the fire it would not be common or typical for anyone to be driving in the area. I did not see vehicle tracks or other markings typical to agriculture machinery left in the area of the GOA. Due to the significant distance of over 600 feet from Highway 37, I eliminated vehicle use on Highway 37 as a cause.

Cigarettes, I excluded smoking as a cause for the fire. I did not see cigarettes, cigarette filters or remains of either in the area of the GOA. The weather conditions recorded at the time of the fire did support the possibility of cigarettes as an ignition source but, due to the low intensity of the burn in the GOA, I believe we would have located the remains of a cigarette or some other type smoking device within the GOA. Additionally, due to the time of day and the fact the property was closed to the public, the possibility of someone accidentally starting a fire with a cigarette is very limited. The distance from the GOA to Highway 37 is approximately 600 feet.

Arson, I excluded arson as a cause for the fire. I did not see evidence of an arson device in the area of the GOA or the property. Due to the main entry gate being closed, the location on the property and high visibility of the GOA from highway 37, it would be very difficult for an individual to enter and exit the property without being seen.
property owners do not have any record or recollection of any individuals who would be
motivated or have made statements, current or in the past to commit arson to the
owner’s land or property. The distance from the nearest point of entry to the field to the
GOA is approximately a half mile.

Children playing with fire, I excluded children playing with fire as a cause for the fire. I
saw no evidence of forts or toys near the area of the GOA. The location of the GOA was
barren. The location of the GOA did not have any landmarks or geographical features
which would had attracted children. I inspected adjacent properties and found no
evidence of children. Due to the time of day of the fire starting, I concluded that it was
highly unlikely a child or children were in the area of the GOA. The nearest child lives a
significant distance away. The nearest residential home is located over one mile from
the GOA.

Equipment use, I excluded equipment use as a cause of the fire. I did not see any
evidence of recent equipment use in the area of the GOA. [REDACTED] and
[REDACTED] told me during our interviews they had not seen, heard or instructed any
employees or persons operating heavy equipment in this area prior to the fire. I did not
see signs of recent "hot" work, agricultural or ranch work in the GOA. To my knowledge,
the only equipment used on the property was a flatbed pickup driving in the area west of
the GOA, when [REDACTED] or his employees feed their cattle the day of October 8,
2017.

Opinion and conclusion
I located an area which I identified as the (GOA). The area of the GOA was supported
and identified by advancing, lateral, and backing fire spread indicators found at the
scene. The GOA showed significantly lighter damage from fire than the surrounding
burned area. The geographic location of the GOA was south / southwest from the
powerlines.
The location of the GOA would have been in line with the powerlines, wind, and the fire seen in the photos and video after the initial start of the fire. I believe due to the characteristics of this fuel model (grass) no one would have seen the heel of the fire at night, in person or recorded on a camera. Per the photographs only the advancing head of the fire and a small diminishing edge of the southern left flank of the fire are visible. The heel of the fire cannot be seen in the photograph. Additionally, due to the low quality of the video and photographs we were unable to precisely identify the location of the advancing head of the fire.

I do not see any other scientifically plausible explanation for the fire except for electrical. I have ruled out all other plausible causes for the fire. I cannot rule out electrical as a cause due to the inability to adequately inspect the powerlines.

I was unable to locate any direct physical evidence which links the cause for the fire to an electrical cause. I found a correlation between the geographic location of the GOA and the above located powerlines. The weather at the time of ignition would have supported the possibility two powerlines encountering each other (phase to phase) creating an electrical arc. The resulting electrical arc would have deposited hot burning or molten material on to the ground in a receptive fuel bed causing a fire.

A document which was provided to me from PG&E, a Supervisory Control and Data Acquisition (SCADA) Event Log, showed no faults or electrical power outage within the area during the time of the fire.

Signature

Date

Fire Captain
10 - ATTACHMENTS:

1 - Marin County Fire Department Woodacre Dispatch Log
2 - BLM Lightning Map
3 - Novato Weather Station Readings
4 - Novato Weather Stations Info
5 - Photograph Catalog
6 - Sonoma County Parcel map for property
7 - LIDAR Data (from 2\textsuperscript{nd} scan)
8 - REDCOM Dispatch Log
9 - CAL FIRE Dispatch Log
10 - LIDAR Data (from 1\textsuperscript{st} scan)
11 - Cell phone photos
12 - DINS grid index
13 - DINS Parcel table
14 - CAL FIRE LE7...