**Copeland Remote Sensing, LLC – Copeland Background and Capabilities**

We have been involved in the petroleum industry since 1986. As a result of being successful we have had the good fortune to work with and be mentored by some outstanding managers, geologists, petroleum engineers, geophysicists, and petrophysicists. Over the past thirty years we have acquired a broad background in geology and petroleum engineering which enables us to analyze potential geological prospects for left behind production potential and profitability.

To date our largest project involved working with a geologist who had researched and developed a large Marcellus Shale prospect in West Virginia. We found a funding source and negotiated the contracts for the project which resulted in us receiving an overriding royalty in 220,000+ acres as well as a mineral ownership in 85,000+ acres. This was sold and used for R&D on our remote sensing technology.

Copeland Remote Sensing, LLC – We have always had an interest in remote sensing technologies for the petroleum industry and tried many of them. We have developed a *unique, proprietary, and proven oil and gas remote sensing technology* over the past eleven years which is used to quickly evaluate projects.

The HS System's survey data was used to totally change the direction of a horizontal well which was very successful and spurred on the leasing of additional acreage on a project which was sold for a reported $165,000,000.

Our **Hydrocarbon Surveys** technology, **US Patent granted Sept 1, 2020,** is also used to eliminate dry holes and very low producers, thus greatly improving the project bottom line, including re-completion and water floods.

Copeland Remote Sensing, Introduction and Field Case Studies:

1. The first two pages are system introduction sheets.
2. Page 3 is the RW Carter 4BH where the horizontal leg had been laid out but was totally reversed in order place it in a very high reading area from Hydrocarbon Surveys. Page 4 shows geological trends established by the HS survey, including an unknown cross fault. This well was extremely successful and spurred additional leasing and many more wells. It produced (page 5) 75,116 barrels of oil by production month nineteen and was still making 91 barrels per day.
3. Pages 6 & 7 show two examples of HS surveys in North Texas waterflood scenarios.
4. Page 8 is from a Kentucky survey with very good HS survey correlation on oil wells, a new gas field discovery, and a dry hole drilled in a low HS reading but a high radiometric reading location.
5. Page 9 shows the HS Model 2610 Unit with Mr. Copeland. The unit has a tight temperature control system and is housed in a Yeti cooler, talking to the laptop's GIS and HS software packages via blue tooth. Readings are taken from inside a vehicle, boat, sled, etc.
6. Page 10 is an example of a HS unit in an ATV. With good terrain, we are able to take around 250 data point readings per unit day.

**Cell 512.917.7260** Dave@CopelandResources.com CopelandResources.com
PO Box 170943 Austin, TX 78717

# FIND OIL & GAS with Copeland Remote Sensing!

## COPELAND REMOTE SENSING'S HYDROCARBON SURVEY SYSTEM (HS) OFFERS POWERFUL AND INEXPENSIVE ENHANCEMENT TOOL FOR YOUR GEOLOGICAL & GEOPHYSICAL LINEUP

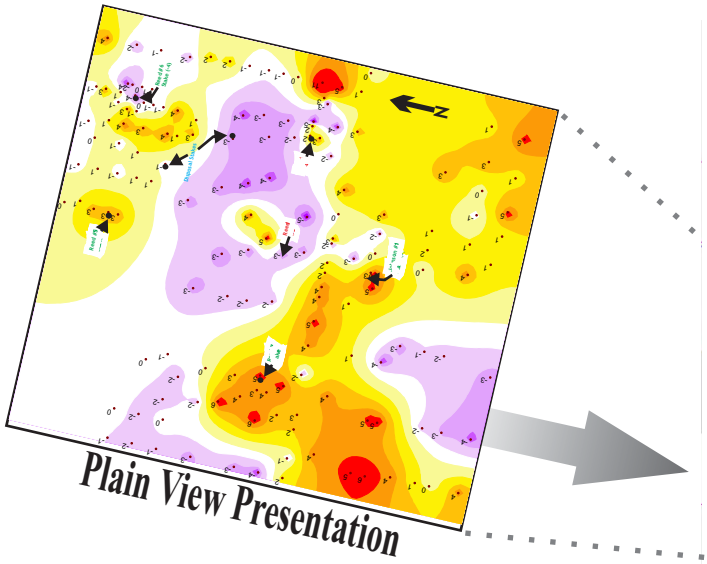
### HS SYSTEM WILL:

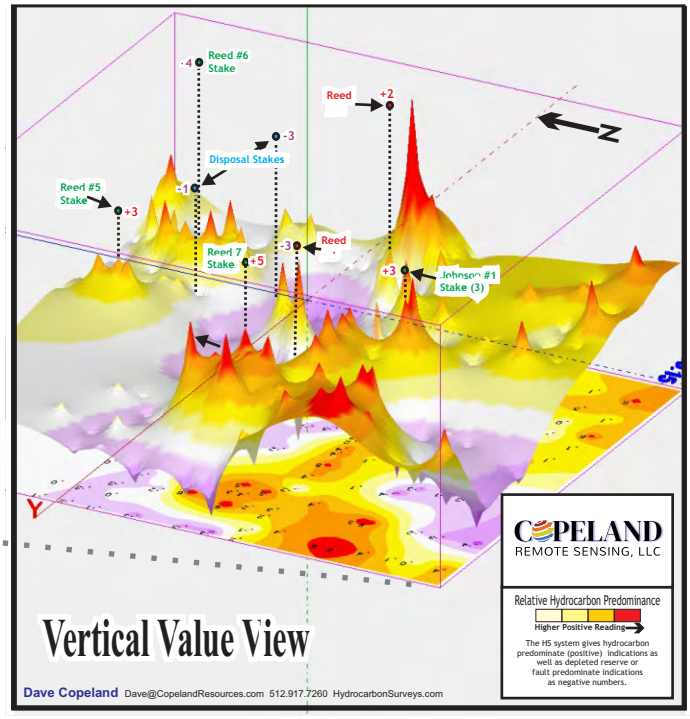
1. FIND HYDROCARBONS BELOW THE POINT OF MEASUREMENT.
2. FIND LATERAL EXTENT OF RESERVOIRS.
3. GIVE A RELATIVE STRENGTH READING FOR TOTAL RESERVOIR DENSITY.
4. GIVE A DISTINCT READING FOR NON-HYDROCARBON BEARING FAULTS.

### HS SYSTEM APPLICATIONS:

LOW COST PROSPECTING FOR LEASING, NEW DRILLS, RE-COMPLETIONS, ETC.
**WATERFLOODS - DETERMINE FLOOD EFFICIENCY & AREAS TO IMPROVE DRAINAGE.**

The preference is to run a grid pattern with the HS monitoring system. A color coded relative value map is presented after the data is processed. In some cases the client procures a "Vertical Value View Presentation" as to the right. This visualization tool gives a clearer idea of the relative values. HS's staff can work with the geological team to correlate the HS data with data from other sources. Data presentations can be overlaid on topographical, geological, etc. maps. This example is from a low density pattern.




**PATENT** US 10,761,237 B1 Sep. 1, 2020

### OUR SYSTEM UTILIZES A HYDROCARBON MONITORING SENSOR.

HS takes individual point measurements (requiring app. thirty seconds per point, plus travel time). Measurements can be taken over land or water and are adjusted for most roadways or other surface materials.

As readings are taken, the pattern and density for future readings can be adjusted on the fly to give greater detail to areas of interest. HS's real-time data acquisition versatility adds to its being a cost and time effective tool.

The initial data interpretation, mapping & presentations will usually be available in 5-7 business days depending on the size and scope of the project. Data can also be converted for use in various importable formats for most mapping software.

See HS APPLICATION SHEETS & **CopelandRemoteSensing.com** for additional information.


COPELAND
REMOTE SENSING, LLC

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COPELAND
REMOTE SENSING, LLC

**C. Dave Copeland**
President

## Copeland Remote Sensing
## SYSTEM INTRODUCTION – PATENT APPROVED

Hydrocarbon Surveys (CopelandRemoteSensing.com) technology was developed by C. David Copeland of Austin, Texas. Prior to entering the petroleum industry in 1986, Copeland worked in broadcast engineering, servicing and inventing industrial electronics and robotics products and systems. Over the past twenty years, he has investigated a number of remote sensing technologies (Including a NASA research grant.) in the oil and gas industry and established associations with many talented and knowledgeable individuals in the field.

Research and development together with countless field trials resulted in a working integrated system that delivers relative readings for net cumulative hydrocarbons below points being measured as well as fault indications.

Copeland and several engineering associates are in the process of taking the system to the new levels of field application development broadening and expediting data acquisition capabilities.

**CRS SYSTEM WILL:**

1. Find hydrocarbons below the point of measurement.
2. Help establish lateral extent of reservoirs.
3. Give relative strength readings for total reservoir density.
4. Give a distinct reading for non-hydrocarbon bearing faults.
5. Give an indication of gas or gassy zones versus oil-only zones.
6. Is very pin pointed in the cone of influence below the point of measurement.
7. Provide geocoded mapping that can be integrated in layers with client geology.
8. Map presentation capability in several formats to accommodate different needs.

**CRS SYSTEM WILL NOT:**

1. Tell how many zones or faults are below the point of measurement.
2. Measure depth of zones or faults.
3. Measure finite amounts of fluids in place.

This system, as well as all data sources, is most valuable when correlated with other geological and geophysical data to develop a picture of hydrocarbons in place.

**It is important to know that this system, other than finding faults, does not see structures but rather identifies actual hydrocarbons in place, real time, directly below the point of measurement.** It is a receiver that measures the effect that fluid hydrocarbons in a reservoir and faulting have on a certain signal. Hydrocarbons have a positive effect and faulting has a negative effect. In cases where a fault trapped reservoir is encountered, the hydrocarbon predominant effect is somewhat dampened in the area of the fault.

Data output presentation examples can be seen on the associated Hydrocarbon Surveys General Introduction sheet and on our web site. Our GIS personnel work with client geological, geophysical, and operational staff to deliver products to fit specific requirements.

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REMOTE SENSING, LLC
CopelandRemoteSensing.com

**C. Dave Copeland**
President & Inventor

US Patent 10,761,237 B1

# RW CARTER HYDROCARBON SURVEY POINTS OF INTEREST

## Two pay zone HS survey scenarios

Introduction: Subject well – RW Carter 4BH, 42-055-34885, Texas RRC lease #14965, IP test May 14, 2008. It was drilled horizontally in the Edwards zone, which is some 350 ft below the existing Austin Chalk producing zone to tap the strong water drive Edwards. The initial production (IP) of the well was **flowing up the 7" casing, 284 bopd & 6,188 bwpd which is a 4.6% oil cut**.

A medium resolution Hydrocarbon Surveys survey was run on the entire lease which revealed a high area around the 1B location. It showed a much higher area to near the southwest side of the lease. The HS data value code is shown on the left side of the Carter illustration. A vertical value presentation of the HS survey is also included.

To determine the best member of the Upper Edwards to drill the lateral in, 4 vertical wells were drilled straddling the path of the proposed 1,000 ft lateral. These wells were logged with high resolution, 20-inch logs through the Edwards. The log on the #1B well showed higher potential than the other 3 wells. Given the correlation between the HS readings around the #1B and the well logs, the operator reversed the direction of the lateral, to the southwest and made a VERY SUCCESSFUL WELL. It produced some **75,116 bo in the first 19 months, still making 91 bopd**, before another well was added to the lease.

Hydrocarbon Surveys Points of Interest

1. This is a **two-pay zone scenario** with the horizontal, Edwards, being below the existing Austin Chalk formation. The total vertical depth (TVD) of the Edwards is only 2,800 feet.
2. The play is based on a large, 450 ft, fault which traps the Edwards up against shales. This fault was shown by the HS system, as well as another known fault, down-dip to the east. HS survey data indicated an UNKNOWN CROSS FAULT.
3. Additionally, HS data indicates a small oil reservoir on the down-thrown side of the main fault which was caused by a dragging effect (see diagram). This is not the case on the lesser fault to the east.
4. A few years later HS road surveys along a road on the north side of lease showed lower HS readings, which confirms drainage by the horizontal wells.

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CopelandRemoteSensing.com

# Hydrocarbon Surveys SUCCESS

## Direction of lateral REVERSED AFTER HS SURVEY

NORTH SOUTH OIL, LLC
**RW Carter Lease - Texas RRC #14965**
**RW Carter 4BH - API 42-055-34885**
Caldwell County, Texas
**Hydrocarbon Survey Map**
HydrocarbonSurveys.com
Mapping based on Medium Density Survey
February 23, 2008.

**HYDROCARBON SURVEYS**
**US PATENT #US 10,761,237 B1**

Approximate
IN ZONE (Only 200 Ft.)

4BH

#1 DISPOSAL WELL

VERY GOOD WELL
from HS SURVEY

#3B

#2B

Approximate Original Drilling Plan

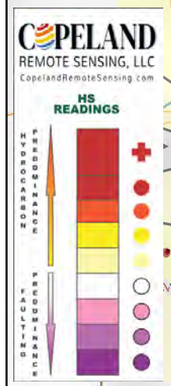
#1B

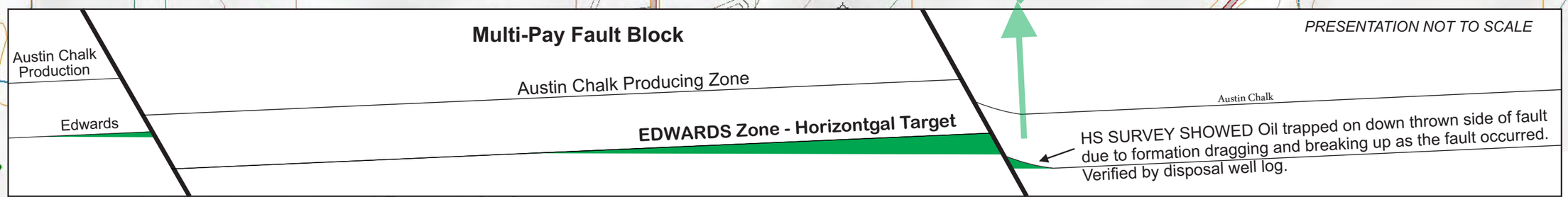
FAULT LINES

CROSS FAULT

CROSS FAULT FOUND
WITH HS SURVEY

FAULT LINES




**Hydrocarbon Surveys Field Example: The direction of the horizontal lateral was changed to encounter a HS HIGH READING AREA.** The well only has 200 feet in zone. Lease production was **75,116 BARRELS OIL IN THE FIRST 19 MONTHS** and was still producing approximately 91 barrels per day (App. 2800 ft TVD).

COPELAND
RESOURCES, INC
OIL & GAS RESEARCH & TECHNOLOGY DEVELOPMENT

N

**C. Dave Copeland**
512.917.7260
Dave@CopelandResources.com

0 180 360 540 720 900 ft
Data Zoom 15-0

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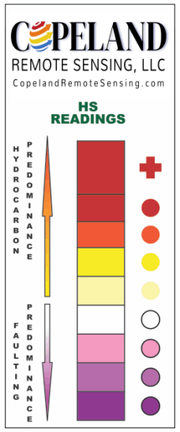
REMOTE SENSING, LLC
CopelandRemoteSensing.com

# Hydrocarbon Surveys SUCCESS

## Direction of lateral REVERSED AFTER HS SURVEY




**Vertical Value View**
Vertical Emphasized & Map Is Rotated & Tilted
For Presentation Purposes

Approximate
IN ZONE (Only 200 Ft.)

VERY GOOD WELL
from HS SURVEY

4BH

FAULT

Approximate
Original
Drilling
Plan

Area of new well 1B

FAULT

FAULT

Area of new well 1B

**Vertical Value View**
This plane is contoured and color coded based on HS reading values. ALSO, HS Values determine the vertical disposition of HS data points.

**Normal Flat Plane**
This plane is contoured and color coded based on HS reading values.

**Hydrocarbon Surveys Field Example: The direction of the horizontal lateral was change to encounter a HS HIGH READING AREA.** The well only has 200 feet in zone. Lease production was **75,116 BARRELS OIL IN THE FIRST 19 MONTHS** and was still producing approximately 91 barrels per day (App. 2800 ft TVD).

**Hydrocarbon Surveys**
**US PATENT #US 10,761,237 B1**

NORTH SOUTH OIL, LLC
**RW Carter Lease - Texas RRC #14965**
**RW Carter 4BH - API 42-055-34885**
Caldwell County, Texas
**Vertical Value View**
Hydrocarbon Surveys
HydrocarbonSurveys.com

**C. Dave Copeland**
512.917.7260 - Dave@CopelandResources.com

Mapping based on Medium Density Survey
February 23, 2008.

**HYDROCARBON SURVEYS**
a Unique Patented Technology for
**FINDING OIL & GAS Reserves**
**US PATENT # US 10,761,237 B1**
Issued Sep. 1, 2020

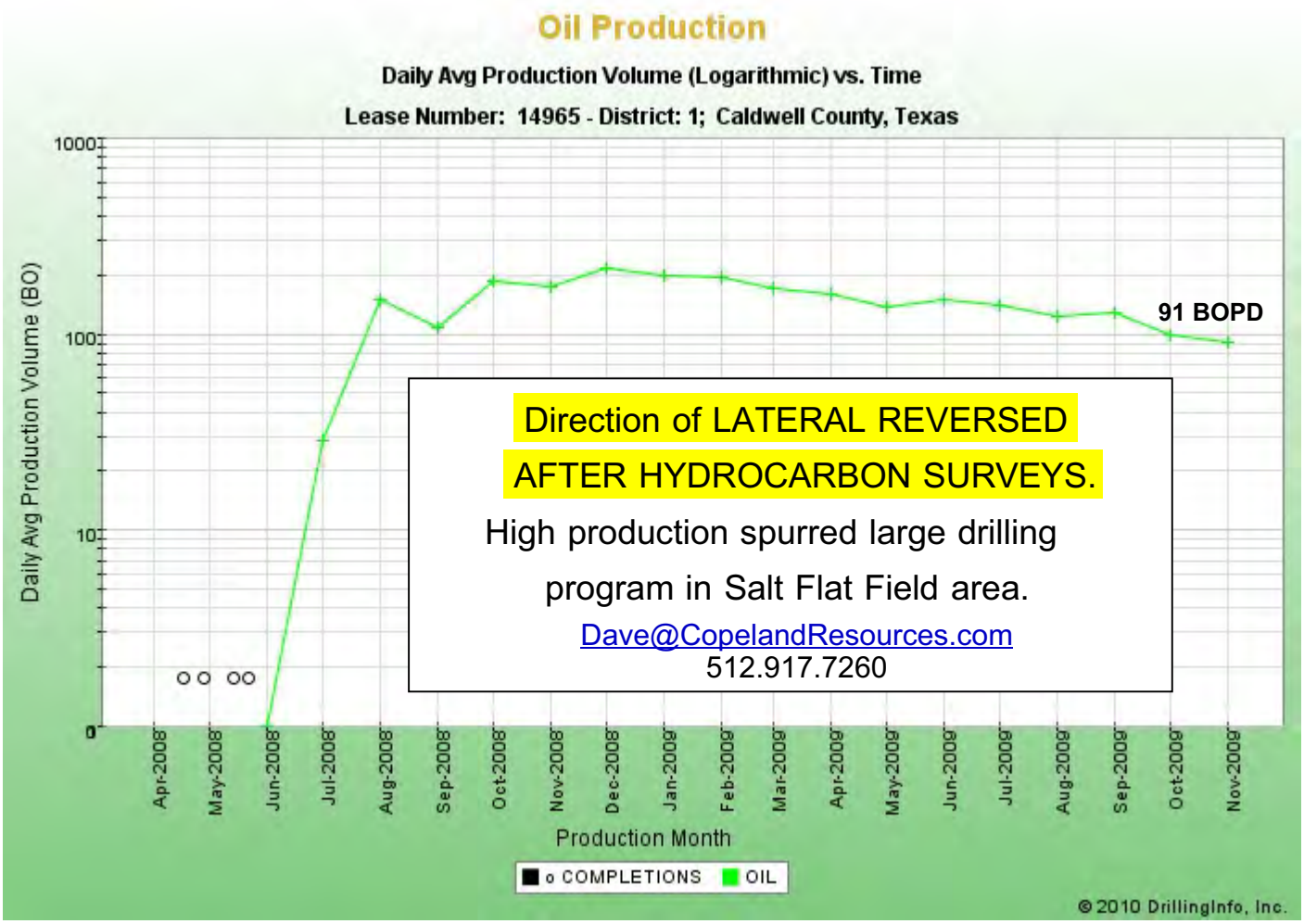
COPELAND
REMOTE SENSING, LLC
CopelandRemoteSensing.com

**Dave Copeland**
Dave@CopelandResources.com
512.917.7260

**Production Hub Pages** drillinginfo

## RW Carter #4BH – Only 200 foot lateral in Edwards – Location selected from Copeland Remote Sensing, LLC high reading show.

| Field | Operator | Location |
|---|---|---|
| SALT FLAT (EDWARDS) | NORTH SOUTH OIL, LLC | District: 1; Caldwell County, Texas |
| **Lease Name** | **Oil Lease Number** | **Cumulative (since 2008)** |
| CARTER, R. W. | 14965 | **75,116 BO** |
| **Wells** | | |
| 42-055-34882(1BH) 42-055-34883(2B) 42-055-34884(3B) **42-055-34885(4BH)** | | |
| 42-055-34909(5BH) 42-055-34910(6BH) (1BH, 5BH, & 6BH not on line yet.) | | |



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# LOW HYDROCARBON READING AREA ASSOCIATED WITH A MORE EFFICIENTLY DRAINED AREA.

## HS READINGS ARE - REAL TIME FOR OIL IN PLACE!

## POWERFUL WATER FLOOD DESIGN TOOL!!

**WATER FLOOD LEASE STUDY**
North Texas
**Hydrocarbon Road Survey**


**Hydrocarbon Survey : May 2011**
**C. Dave Copeland -** 512.917.7260
Dave@CopelandResources.com


**PATENTED**

Well Drained
Lease Area

HydrocarbonSurveys.com
**HS READING**
RELATIVE HYDROCARBONS
3.4
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-5.0

HIGHER HS READINGS IN AREA PRESSURED UP BY ADJACENT WATER FLOOD ACTIVITY

HIGHER HS READINGS IN AREA PRESSURED UP BY ADJACENT WATER FLOOD ACTIVITY

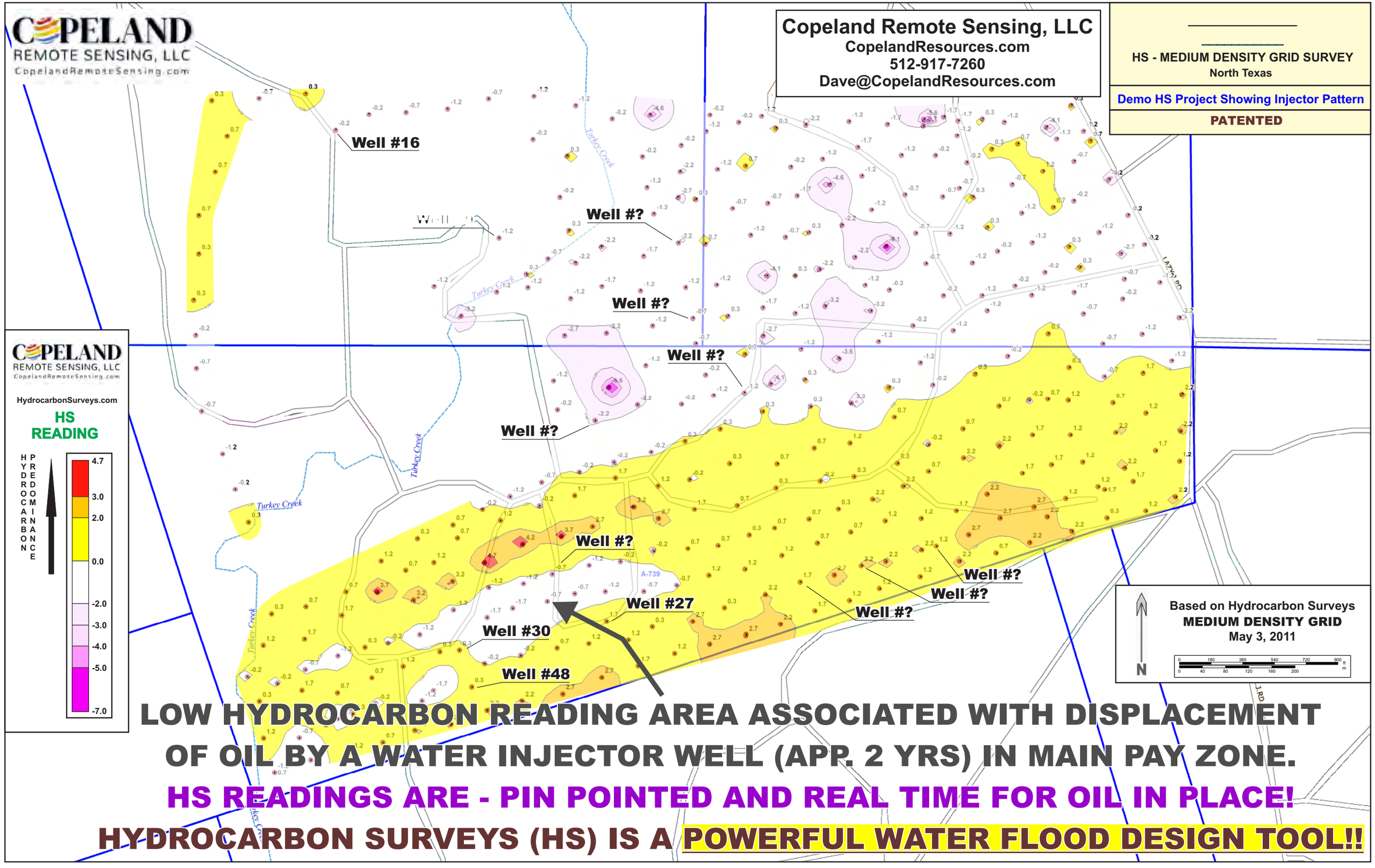
LOW HS READING IN AREA MORE EFFICIENTLY PRODUCED BY WATER FLOOD

Long Creek
Cole Creek
PAYTON RD
BICKLEY RD
AUSTIN RD
MIDWAY CHURCH RD N
MIDWAY CHURCH RD
F-M 1739
F-M 1739 N
Floral Mound
A-809
A-737
A-280
A-343
A-713

**Well Locations Per RRC**
▼ Injection Locations
• Well Locations


**Copeland Remote Sensing, LLC**
CopelandResources.com
512-917-7260


TN
MN (5.2°E)
0 200 400 600 800 1000 ft
0 100 200 300 400 500 m


COPELAND
REMOTE SENSING, LLC
CopelandRemoteSensing.com
Copeland Remote Sensing, LLC
CopelandResources.com
512-917-7260
Dave@CopelandResources.com
HS - MEDIUM DENSITY GRID SURVEY
North Texas
Demo HS Project Showing Injector Pattern
PATENTED
HydrocarbonSurveys.com
HS READING
HYDROCARBON PREDOMINANCE
4.7
3.0
2.0
0.0
-2.0
-3.0
-4.0
-5.0
-7.0
Well #16
Well #?
Well #?
Well #?
Well #?
Well #?
Well #?
Well #?
Well #27
Well #30
Well #48
Turkey Creek
A-739
LAZY RD
Based on Hydrocarbon Surveys
MEDIUM DENSITY GRID
May 3, 2011
N
LOW HYDROCARBON READING AREA ASSOCIATED WITH DISPLACEMENT
OF OIL BY A WATER INJECTOR WELL (APP. 2 YRS) IN MAIN PAY ZONE.
HS READINGS ARE - PIN POINTED AND REAL TIME FOR OIL IN PLACE!
HYDROCARBON SURVEYS (HS) IS A POWERFUL WATER FLOOD DESIGN TOOL!!

# FINDING OIL & GAS WITH "HYDROCARBON SURVEYS"

**Field Application Study - Lowe Lease, Warren County, KY**

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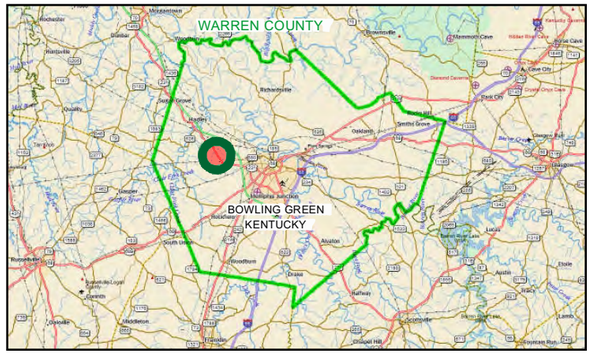
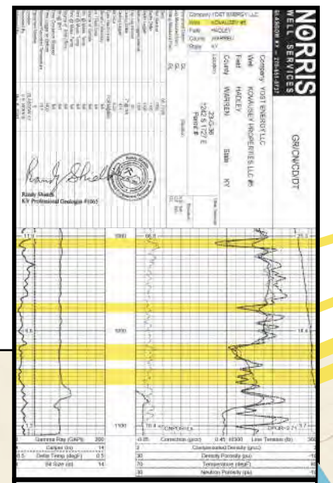
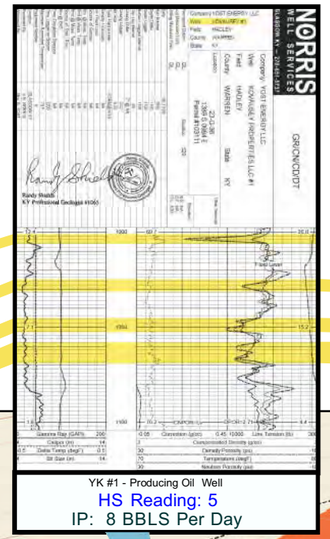
REMOTE SENSING, LLC
CopelandRemoteSensing.com



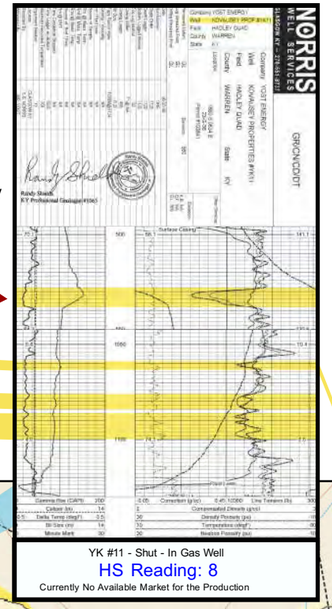



YK #5 - Producing Oil Well
HS Reading: 2
IP: 6 BBLS Per Day

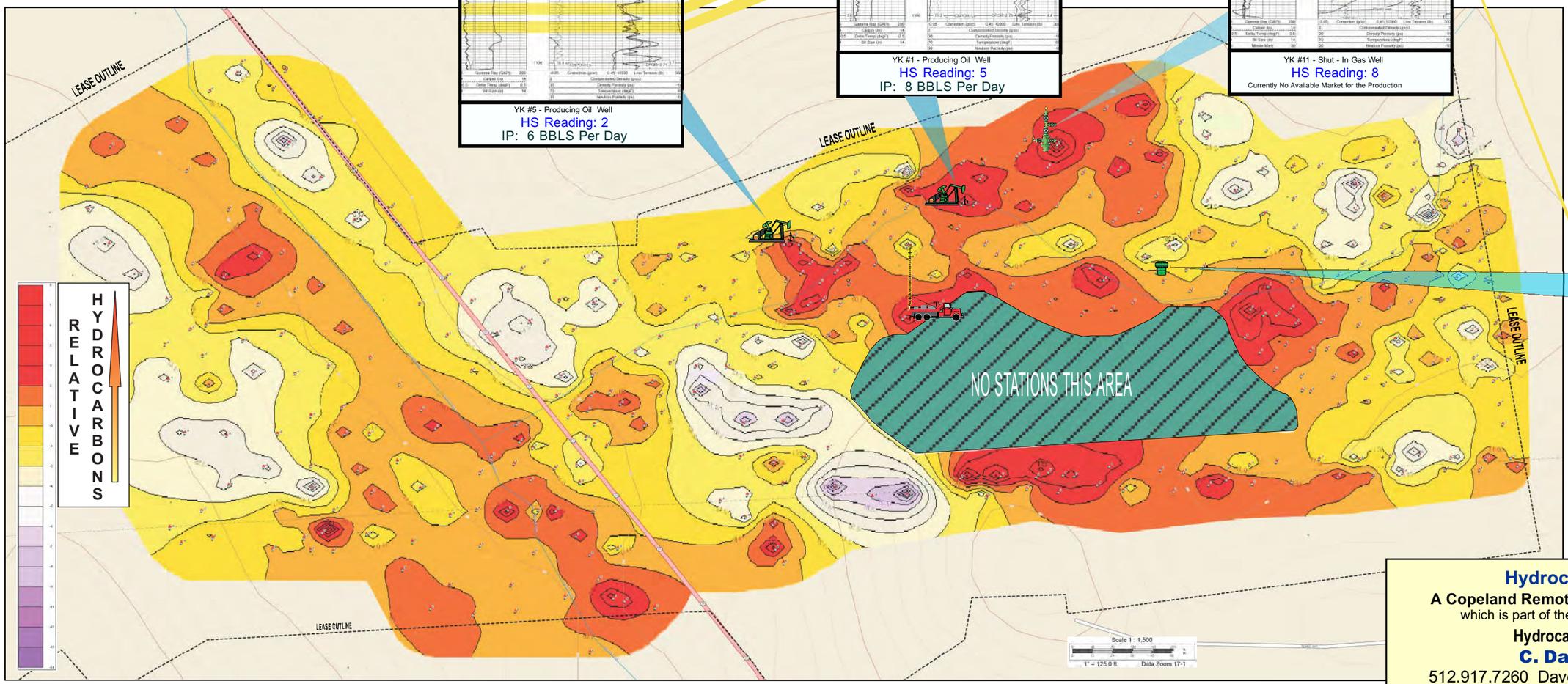


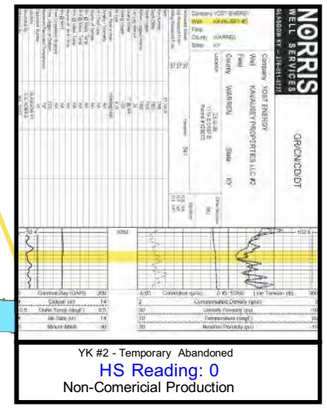
YK #1 - Producing Oil Well
HS Reading: 5
IP: 8 BBLS Per Day

High Hydrocarbon Survey reading leads to NEW GAS FIELD DISCOVERY



YK #11 - Shut - In Gas Well
HS Reading: 8
Currently No Available Market for the Production



YK #2 - Temporary Abandoned
HS Reading: 0
Non-Comericial Production

## RESULTS LOWE LEASE STUDY

YK 5 - HS reading of 2, IP 6 BOPD
YK 1 - HS reading of 5, IP 8 BOPD
YK 11 - HS reading of 8, New GAS FIELD

YK 2 - HS reading of 0, DRY HOLE
***YK 2 was drilled to test HS system negative validity.***
***Yk 2 was on the best location according to radiometric readings.***

**US PATENT 10,761,237 B1**
Issued Sept. 1, 2020


**Hydrocarbon Surveys**
**A Copeland Remote Sensing, LLC Technology**
which is part of the Copeland companies group.
**HydrocarbonSurveys.com**
**C. Dave Copeland**
512.917.7260 Dave@CopelandResources.com

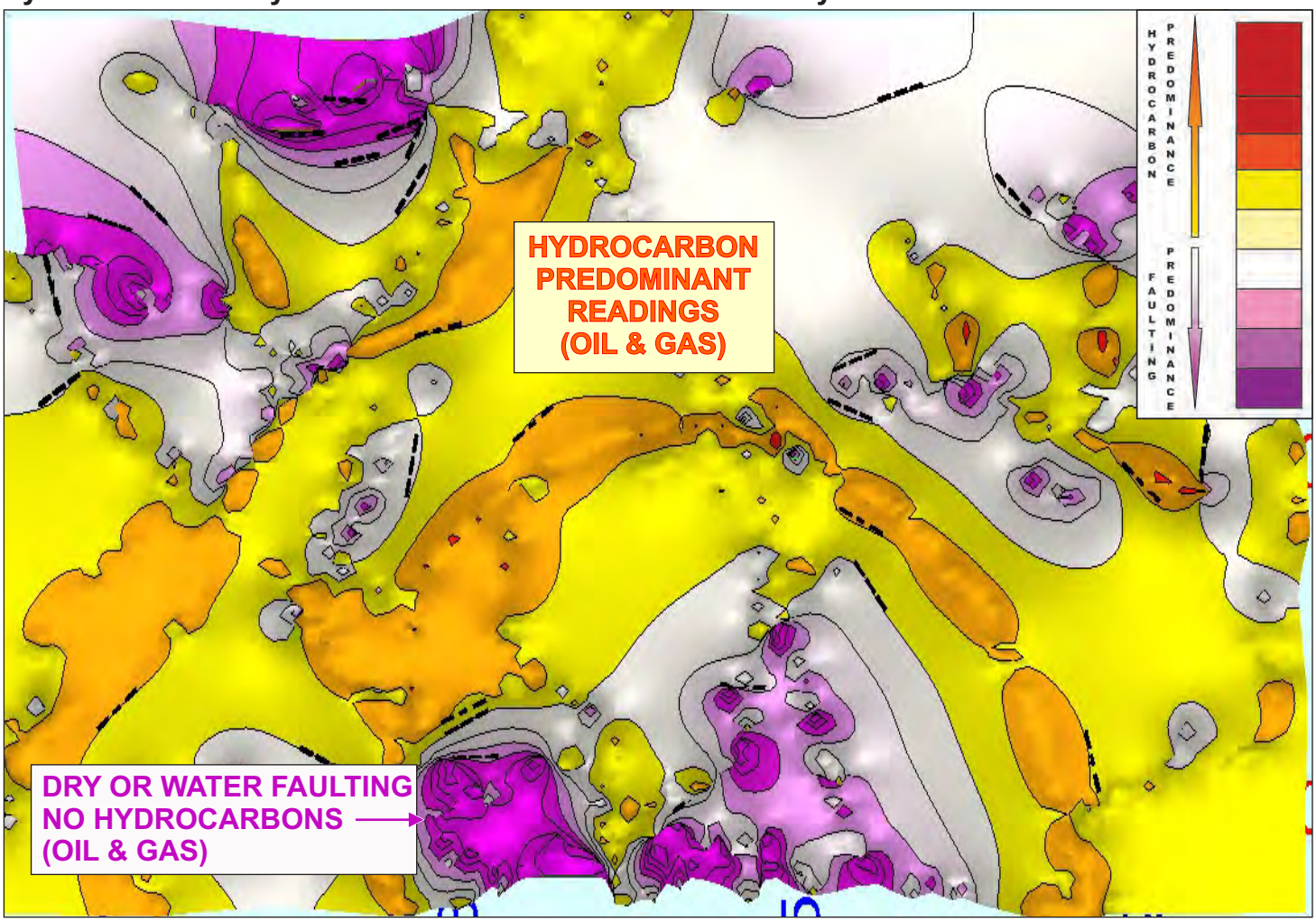
# Finding VERTICAL FAULTS with Hydrocarbon Surveys (HS)

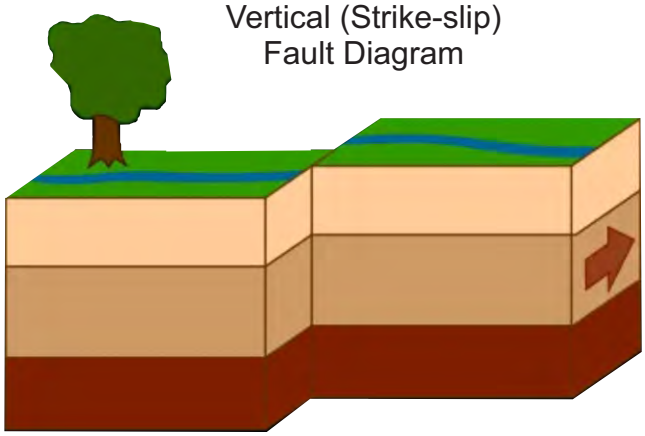
1. HS system is very effective at locating vertical (slip-strike) faults.

2. It can determine if they are hydrocarbon bearing and the best place to drill wells, as well as where not to drill.

3. For building construction planning, HS can point out potential unstable areas associated with the vertical, slip-strike faults.

**Hydrocarbon Surveys - Vertical Value View of an area surveyed in Texas.**



Vertical (Strike-slip) Fault Diagram

**PATENT** US 10,761,237 B1 Sep. 1, 2020

**HydrocarbonSurveys.com**
**C. Dave Copeland** - 512-917-7260 c
Dave@CopelandResources.com
CopelandResources.com

See additional sheets for system capabilities and design.

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# Hydrocarbon Surveys - Do NOT drill here example!

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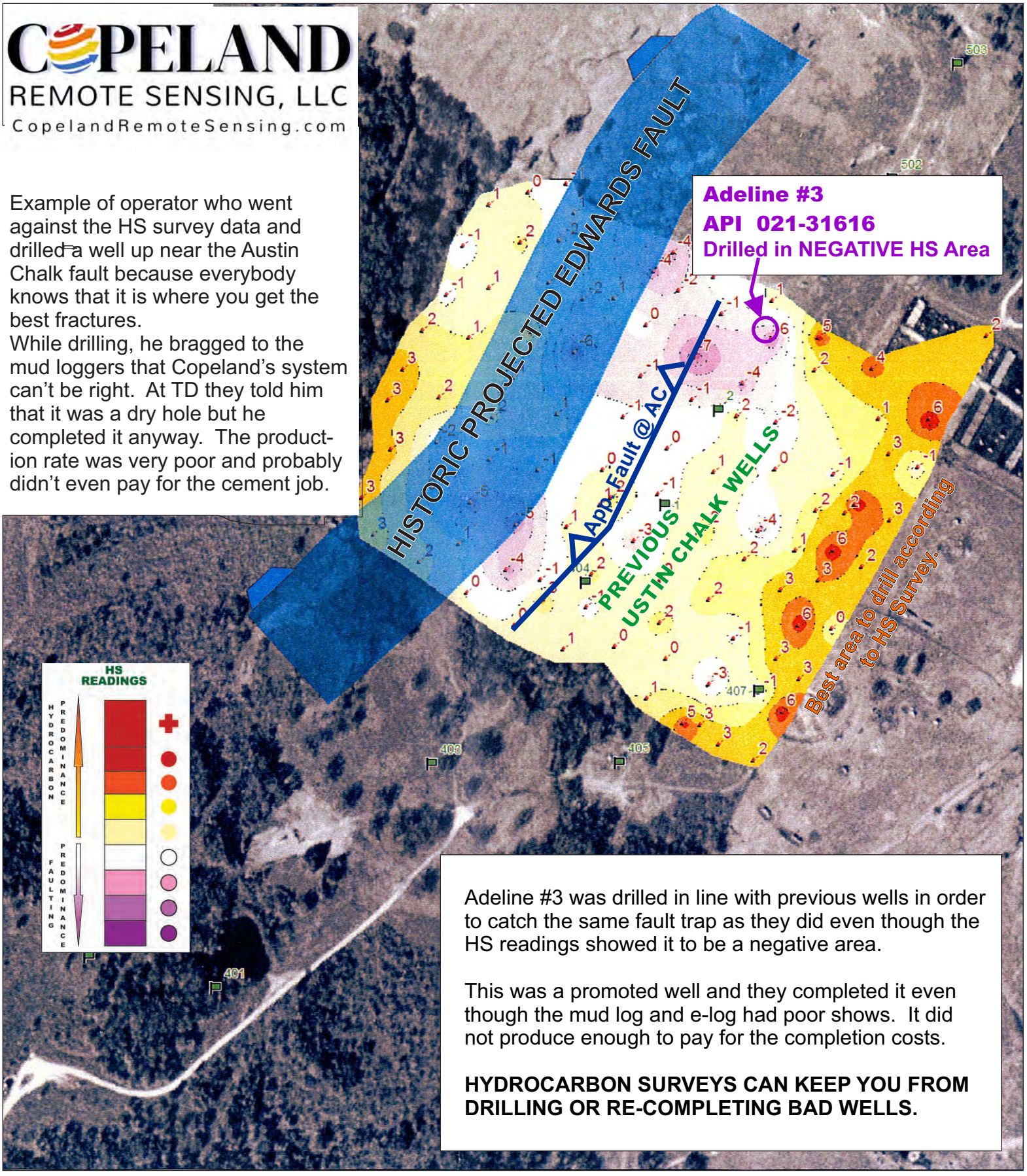
Example of operator who went against the HS survey data and drilled a well up near the Austin Chalk fault because everybody knows that it is where you get the best fractures.
While drilling, he bragged to the mud loggers that Copeland's system can't be right. At TD they told him that it was a dry hole but he completed it anyway. The production rate was very poor and probably didn't even pay for the cement job.




Adeline #3 was drilled in line with previous wells in order to catch the same fault trap as they did even though the HS readings showed it to be a negative area.

This was a promoted well and they completed it even though the mud log and e-log had poor shows. It did not produce enough to pay for the completion costs.

**HYDROCARBON SURVEYS CAN KEEP YOU FROM DRILLING OR RE-COMPLETING BAD WELLS.**

## Hydrocarbon Surveys indicated **DO NOT DRILL A WELL HERE!**

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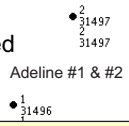
REMOTE SENSING, LLC
CopelandRemoteSensing.com


**Adeline #3**
021-31616
Completed Oct. 2010
2,170'-2,200' Dale Lime

Initial Production
Adeline Lease Started
in January 1995.




**United States PATENT**
**# US 10,761,237 B1**
Issued Sep. 1, 2020

**Copeland Remote Sensing** is good for picking optimal locations to drill and indicating where you should NOT drill. **THIS OPERATOR CHOSE TO GO AGAINST OUR HS READINGS AND DRILLED & COMPLETED A WELL THAT DID NOT EVEN PAY FOR COMPLETION!**

**CopelandRemoteSensing.com**

**C. Dave Copeland**
**512.917.7260 Dave@CopelandResouces.com**

**Copeland Remote Sensing, LLC.**

## Production Hub Pages

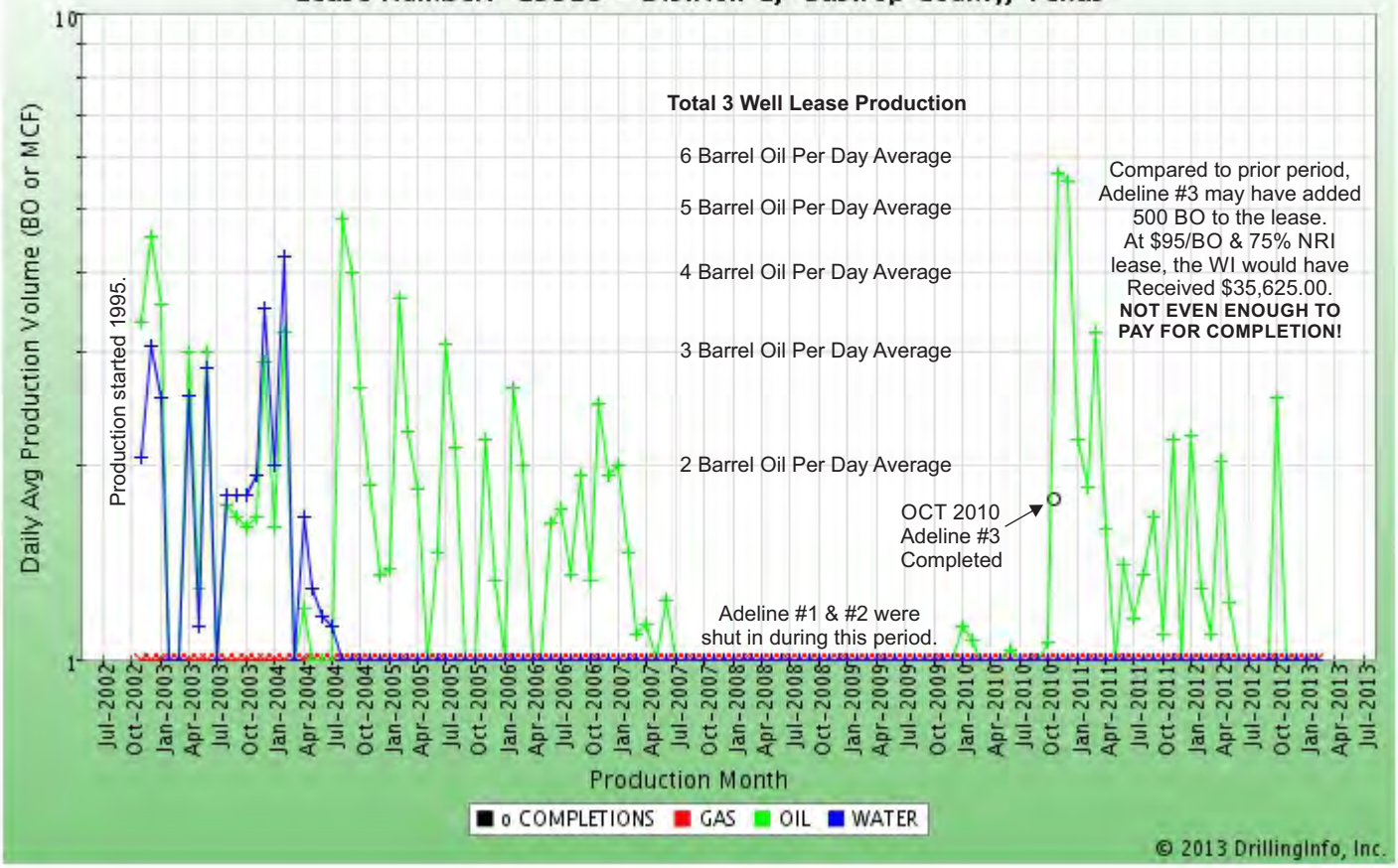
drillinginfo

| Field | Operator | Location |
|---|---|---|
| BATEMAN (AUSTIN CHALK) | | District: 1; Bastrop County, Texas |
| **Lease Name** | **Oil Lease Number** | **Cumulative (since 1995)** |
| ADELINE | 13929 | 20,386 BO; 0 MMCF Explain |
| **Wells** | | |
| 42-021-31496(1) 42-021-31497(2) 42-021-31616(3) | | |

### Oil and Casinghead Gas Production

Daily Avg Production Volume (Logarithmic) vs. Time

Lease Number: 13929 – District: 1; Bastrop County, Texas



# Find MORE OIL & GAS with
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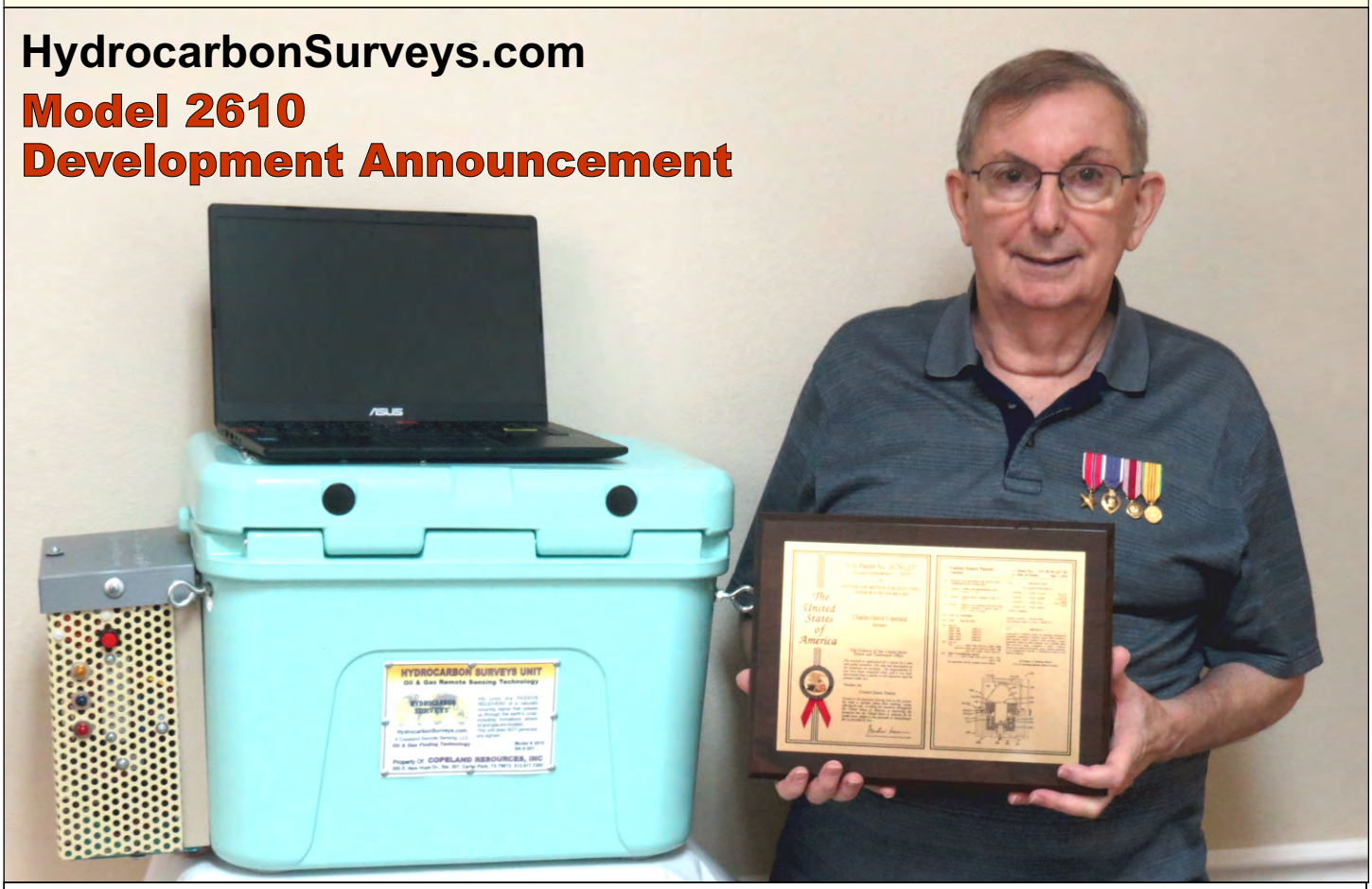
**Model 2610**
**Development Announcement**




(12) **United States Patent**
**Copeland**

(10) **Patent No.: US 10,761,237 B1**
(45) **Date of Patent: Sep. 1, 2020**

**Hydrocarbon Surveys technology was invented and Patented by C. Dave Copeland, president of Copeland Resources, Inc. and Copeland Remote Sensing, LLC.**

The company has been actively involved in the development and funding of geological prospects since 1986 and continues to develop new capabilities to work within the petroleum industry.

Mr. Copeland is proud to have served our great country against the communist invasion of South Vietnam and was decorated with a **Bronze Star for leadership under hostile conditions.**

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Sept. 2021

**CopelandRemoteSensing.com**

COPELAND
REMOTE SENSING, LLC
CopelandRemoteSensing.com

**C. Dave Copeland**
President

HydrocarbonSurveys – **DATA ACQUISITION** from off-road vehicle:

Hydrocarbon readings are gathered in a grid pattern at specified intervals using our proprietary HS software. Since both operator and equipment stay in the vehicle, only 30 seconds are required for each reading. As a result, hundreds of readings can be recorded by each operator in a workday.


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