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# **Direct Detection Technology (“DDT”) for Exploration and Delineation of Hydrocarbon Deposits**

Jim Combs, Ph.D.

Chief Geophysicist

Oil and Gas Discoverer, LLC (“OGD”)

# Introduction and Background

- Demand for new economic hydrocarbon deposits are increasing worldwide.
- There is an urgent need to decrease costs and time for exploration.
- Better definition of the footprint of hydrocarbons is a critical environmental and economic issue.
- This is an excellent time to think outside the box.
- Consider applying the unique, proprietary, environmentally benign, and space-based geophysical technology of OGD.

# Introduction and Background

- Direct Detection Technology (“DDT”) is a revolutionary technology for direct detection of hydrocarbon-bearing formations in the subsurface.
- The basic essence of DDT rests on the premise that all physical objects have unique properties of energy represented by light elementary Super Small Subatomic Particles (3SPs) from the lepton family. The best known of all leptons is the electron.
- DDT laboratory and field equipment can detect reflections, shadows, and/or tracks of 3SPs, i.e., their “intrinsic radiation”, but not the super small particles.

# Introduction and Background

- All substances are to a lesser or greater degree in an excited state and are subject to natural decay, which leaves traces of its passing.
- Every element and compound in the Earth's crust exists in an excited state and emits an "intrinsic radiation" spectrum with a unique amplitude, frequency, and phase.
- DDT has particular and unequalled advantages by exploring the earth from outer space using satellite images (our Stage One Surveys) and from inside low-level aircraft (helicopters, our Stage Two Surveys) to precisely locate hydrocarbons.

# Introduction and Background

- During the past several years, OGD has successfully completed 54 DDT surveys for the identification and delineation of hydrocarbons with a success ratio of about 92% in defining locations for economic hydrocarbon wells.
- From 2000 to 2017, DDT has been used to delineate hydrocarbon deposits in **Russia, Sri Lanka, Mauritania, Uzbekistan, Australia, Moldova, Kalmykia, UAE, Qatar, Kazakhstan, Paraguay, Columbia, and the United States.**

# Worldwide Direct Detection Technology Surveys



# Basic Elements of Direct Detection Technology

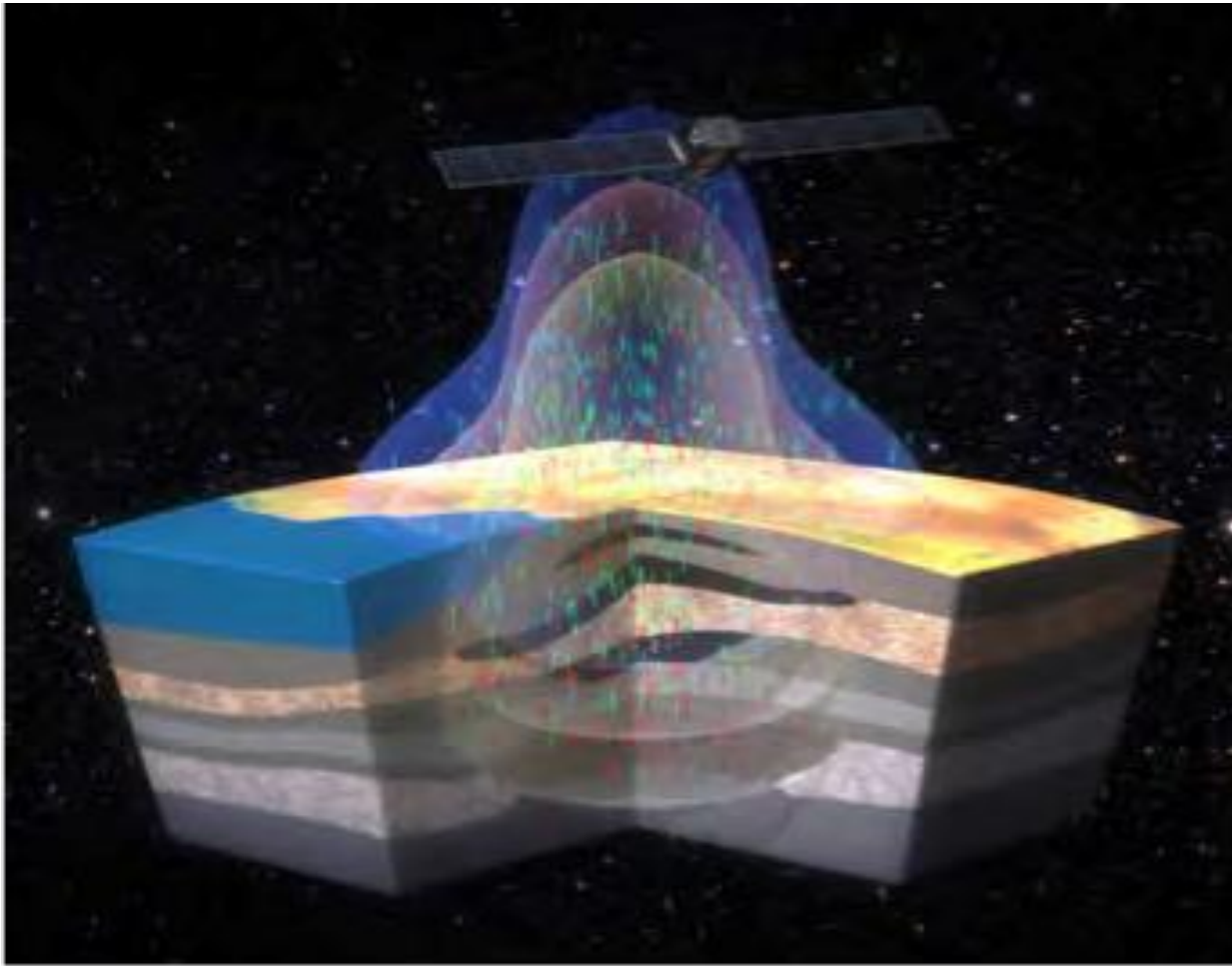
- As regards DDT two assumptions are fundamental:
  - All substances are in an excited state and subject to natural decay leaving traces of its passing.
  - The Earth is a strong natural generator of a constant electromagnetic field.
- In this way, all elements exist in an excited state and are constantly emitting what can be called their “intrinsic radiation”, a unique spectrum consisting of a unique frequency, phase, and amplitude, which can be measured with the proper instrumentation and advanced software.



# Basic Elements of Direct Detection Technology

- DDT is applied in two separate stages: DDT Stage One Surveys are the initial identification of anomalous deposits based on data obtained from satellite images for a **Customer designated area.**
- DDT Stage Two Surveys are field expeditions (usually a helicopter or ground based survey of the hydrocarbon-bearing area) and data processing with a final report of hydrocarbon formations and drilling recommendations for hydrocarbon-bearing zones.

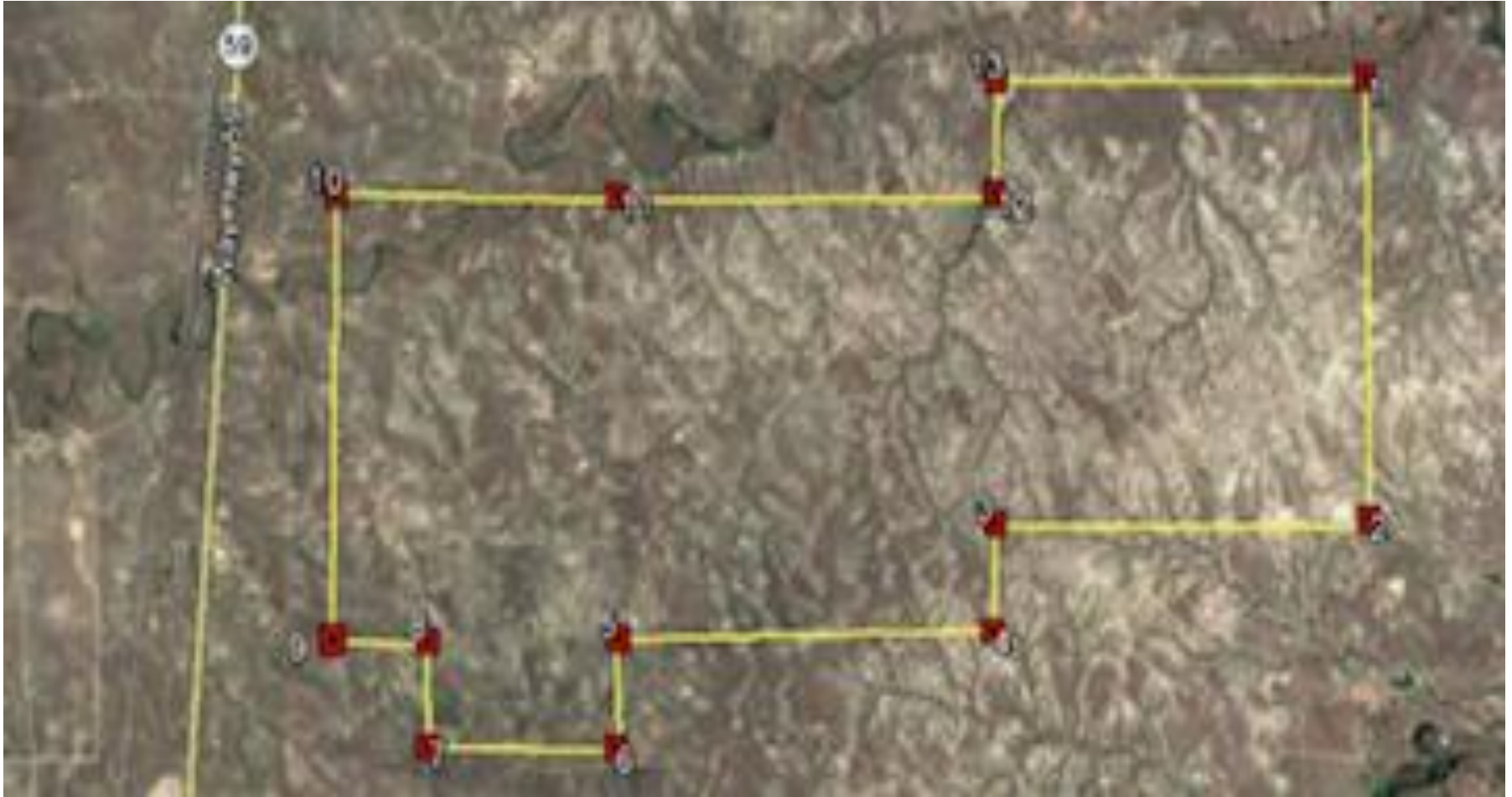
# Satellite Capture of Hydrocarbon “intrinsic radiation”.



# Basic Elements of Direct Detection Technology

- Application of DDT allows a Customer to achieve significant reductions in exploration costs since the Customer can conduct a full feasibility study of a prospect without the need for conducting any indirect exploration methods, e.g., gravity, magnetics, as well as 2D and 3D seismics or direct techniques such as drilling and well logging.
- In other words, data obtained from a DDT Stage One Survey will definitely indicate whether there are hydrocarbons in the **Customer designated area**, or in fact, there are no hydrocarbon-bearing deposits in the surveyed area.

# Satellite Image for DDT Stage One Survey with Customer's Designated Area in Wyoming.



# Basic Elements of Direct Detection Technology

- One satellite image typically covers an area of about 95 to 150 square miles. The spatial resolution on the surface of the Earth that OGD can attain is from about 30 to 100 feet.
- The natural formation being explored for (i.e., the DDT Stage One Survey) are achieved as a result of the resonant expression of information carried by the emulsion layer of the photographic film or digital image, and an optical-subatomic filter tuned to a specific chemical element or compound, in this case, hydrocarbons.

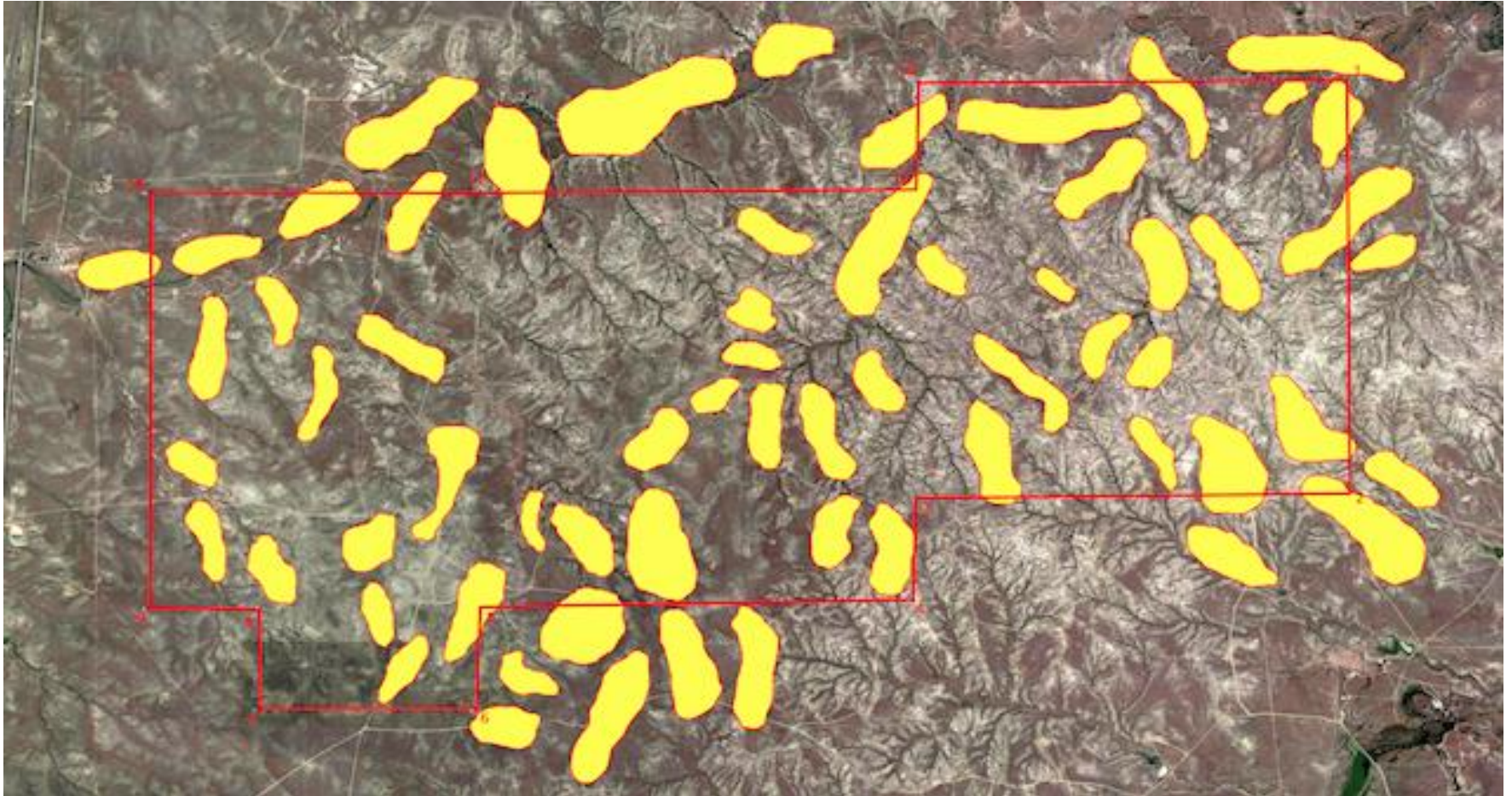
# Basic Elements of Direct Detection Technology

- In stage one, the laboratory work is conducted in accordance with an optical-subatomic methodology.
- With a specially designed and proprietary generator, OGD activates silver crystals on the emulsion of the satellite image.
- A confidential and proprietary optical-subatomic filter tuned to a specific chemical element or compound blocks all other element's "intrinsic radiation" except for the specific filter designed to pass hydrocarbon "intrinsic radiation".

# Basic Elements of Direct Detection Technology

- Under the filter, OGD places x-ray film which captures the locations of excited hydrocarbons in the **Customer's designated area**.
- OGD has specially written confidential and proprietary software programs with which to determine the level of the hydrocarbon signal from its “intrinsic radiation” level. The signal is presented on a scale of 0.1 to 1.0.
- The hydrocarbon “intrinsic radiation” anomalies are then colored yellow for better visual presentation.

# Satellite Image of DDT Stage One Survey Anomalies on Customer's Designated Area in Wyoming.

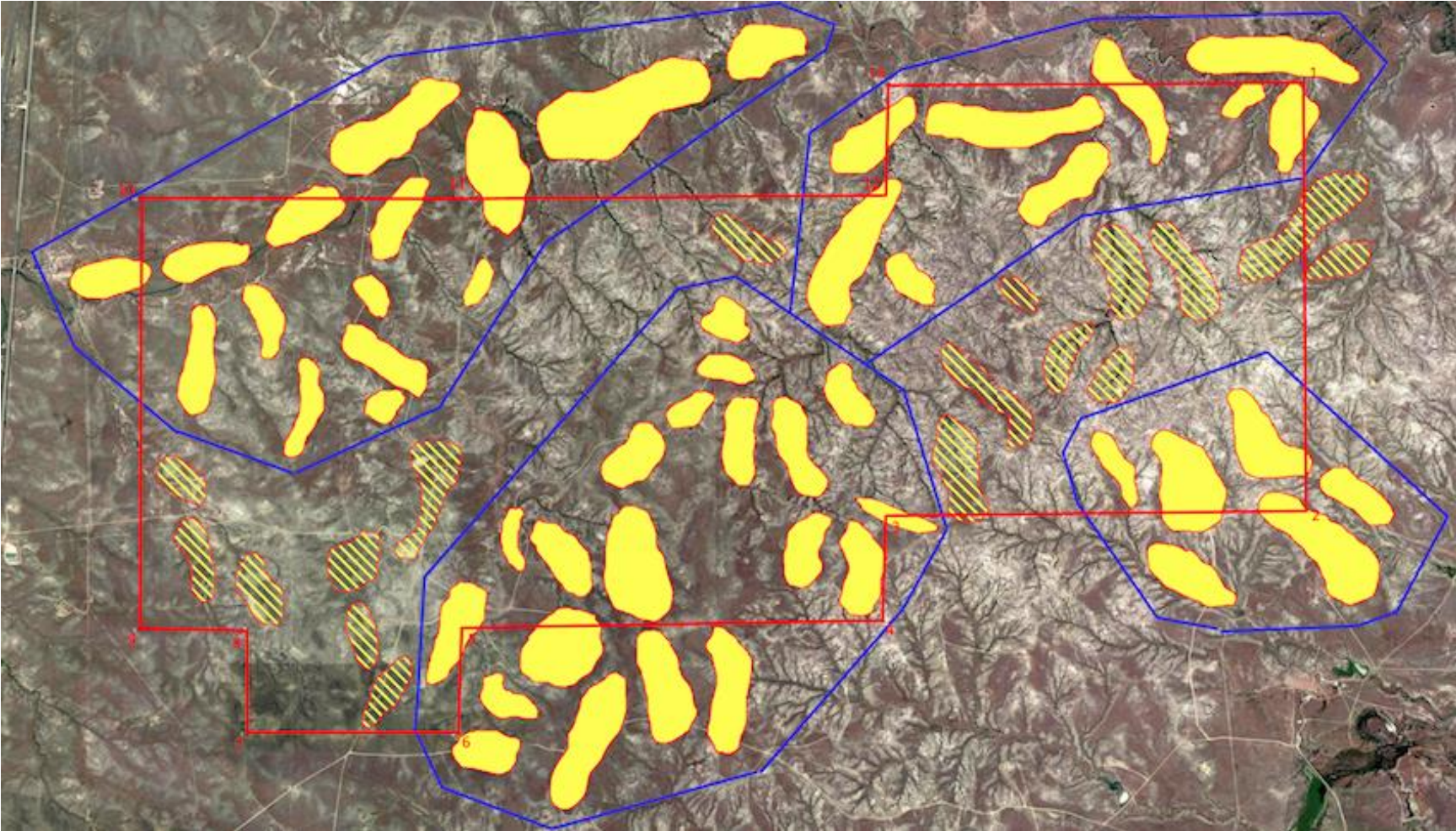




# Basic Elements of Direct Detection Technology

- The hydrocarbon anomalies are delineated on maps of the **Customer's designated area** in a Final Report for the completed DDT Stage One Survey.
- Anomalies on the **Customer's designated area** with signal strength of 0.3 or higher will be recommended by OGD for the completion of DDT Stage Two Surveys.
- As noted before, DDT Stage Two Surveys are helicopter or ground based surveys depending on size of the prospect.

# Satellite Image of DDT Stage One Survey Anomalies with OGD Recommended Areas for Stage Two Surveys.



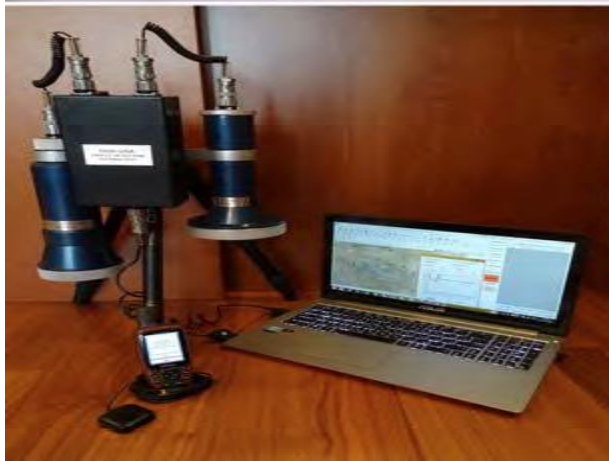
# Basic Elements of Direct Detection Technology

- Field expeditions include measuring anomalous deposits using our GEO-SCAN ML2 equipment installed onboard a helicopter.
- The DDT field equipment is designed, built, and incorporates Mono-Spectrometers, which are calibrated for a specific single element or compound that is being explored for in the Earth's subsurface.
- In stage two DDT applications, the helicopter survey will provide the Customer with information on the exact location of deposit outlines and bedding depth of productive horizons.

# Basic Elements of Direct Detection Technology

- During 2015, OGD developed and tested 5<sup>th</sup> generation field equipment, which is compared to 4<sup>th</sup> generation on the next slide.
- The 5<sup>th</sup> generation of with the development of new software and the exploitation of nanotechnology has enabled OGD to downsize the field equipment so the helicopter crew has been reduced from 3 to 2 individuals.
- By minimizing the weight of the crew and equipment, OGD has an ability to extend the flight capability of the helicopter which is very important for conducting offshore DDT Stage Two Surveys.

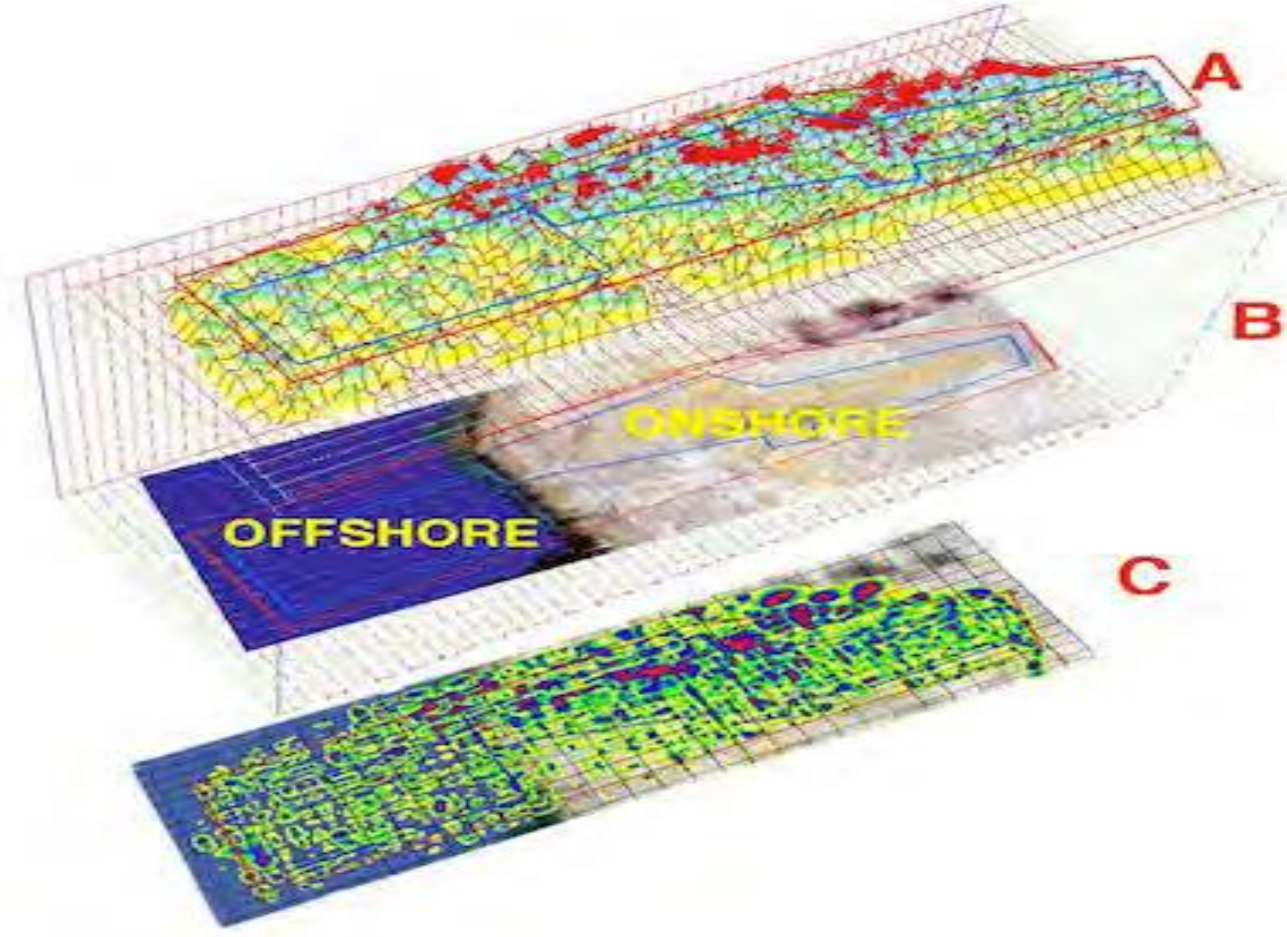
# Comparison of 4<sup>th</sup> (above) and 5<sup>th</sup> (below) Generation Field Equipment for DDT Stage Two Surveys.



# Basic Elements of Direct Detection Technology

- Similar to seismic exploration data collection and presentation, OGD advanced from 2D to 3D presentations of DDT data in 2015 with the conversion of our software and equipment to 5<sup>th</sup> generation data collection and analysis (see next slide).
- Predominate red areas in A and C indicate the highest hydrocarbon “intrinsic radiation” anomalies; however, a significant number of the highest intensity anomalies occur outside the Customer’s concessions.
- The 3D data presentation in A provides an excellent representation of the hydrocarbon “intrinsic radiation” spectra with its frequency and amplitude readily apparent.

# Comparison of 2D and 3D Data Generation with Field Equipment for DDT Stage Two Surveys.

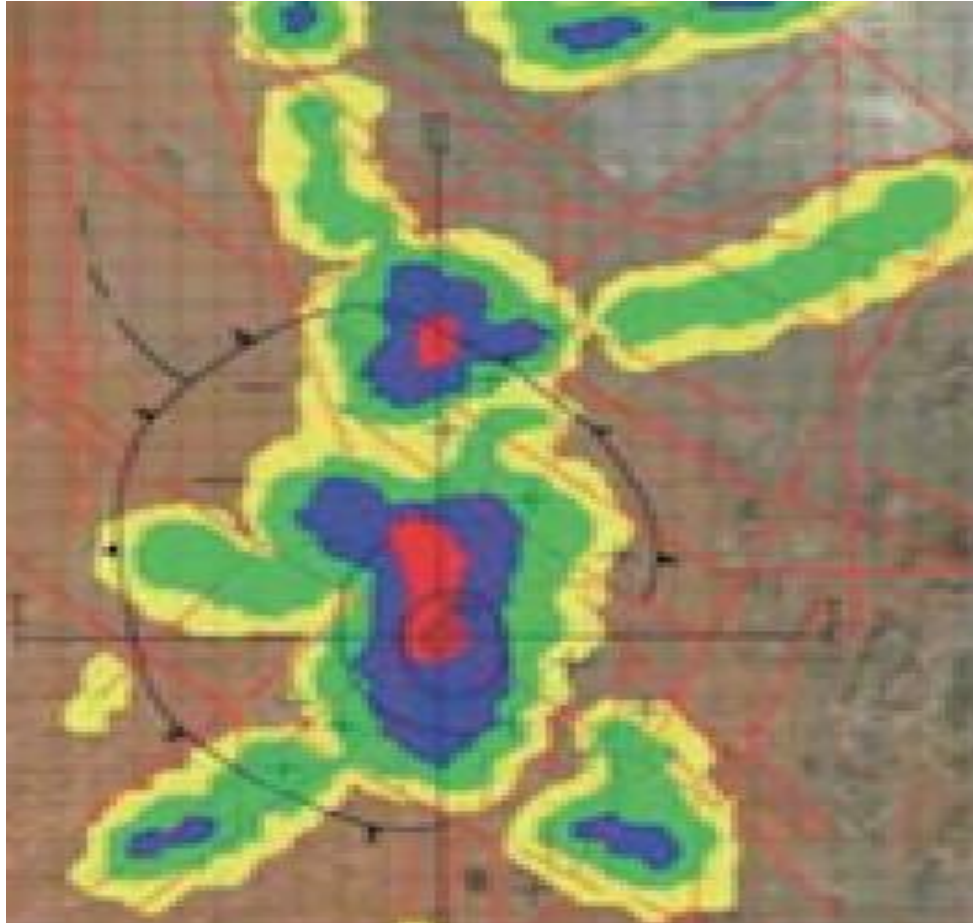


# Basic Elements of Direct Detection Technology

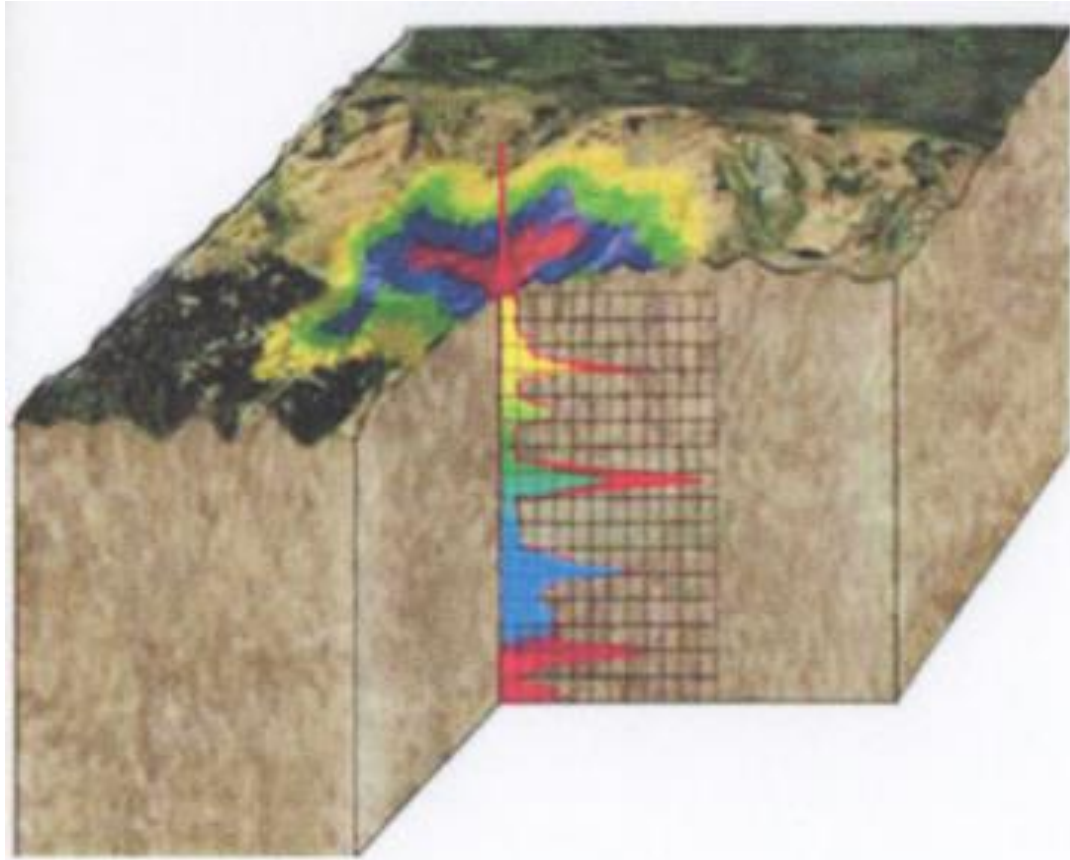
- Processing DDT Stage Two data creates digital imaging of the hydrocarbon anomalies, their intensity and areal extent, to be used to conduct mathematical and cartographic modeling of the deposits.
- With second stage data processing, different depths of the hydrocarbon deposits are defined, using the superposition principle.
- The survey results and coordinates of the deposits are presented on topographic maps and 3D images. The combined results is a tightly focused map and depth plot.



# Typical DDT Stage Two Survey Hydrocarbon Anomalies on Topographic Map.



# 3D Block Diagram with DDT Stage Two Data Defining Hydrocarbon-Bearing Formations.



**Comparison of DDT with  
Traditional Exploration Methods  
or Why Should One Utilize DDT  
in All of Their Hydrocarbon  
Exploration Programs**

# DDT Versus Traditional Exploration Methods

**In comparison to traditional methods used for hydrocarbon exploration, DDT has particular and unequalled advantages:**

- DDT is completely ecologically friendly.
- DDT is profoundly less expensive than presently utilized hydrocarbon exploration methods; e.g., 3D seismics at about \$40,000 per square miles versus approximately \$2,500 per square mile for a DDT Stage One Survey.

# DDT Versus Traditional Exploration Methods

DDT is significantly faster than traditional technologies since the estimated time to conduct a complete analysis of a given area; say 35 miles by 35 miles is normally 5 to 6 months instead of 2 to 3 years using conventional hydrocarbon exploration methods.

DDT is proven to be highly accurate in defining and delineating laterally and vertically multiple hydrocarbon-bearing formations.

DDT provides a considerable reduction in environmental mitigation costs since the technology is space-based.

# DDT Versus Traditional Exploration Methods

**DDT achieves multiple reductions in cost and the technology provides the opportunity to:**

Control the cost and timely evaluation of hydrocarbon lease sales and potentially minimal exposure to indications of acquisition intent.

Control cost and time of discovery for extensive lease positions.

Conduct in-depth evaluations from satellite imagery to near surface surveys.

Obtain critical data about the mass and depth of hydrocarbon deposits, prior to extensive exploration.

Conduct a full feasibility study, without the need for any indirect exploration methods or direct techniques such as drilling.

# DDT Plus Traditional Exploration Methods

The complex analysis of information received from DDT Stage One and Two Surveys, in addition to collection and interpretation of data from other geological and geophysical methods, allows Customers an increasing precision in forecasting and identifying hydrocarbon deposits plus providing more accurate drilling locations, essentially ending a considerable number of “dry hole” drilling results.

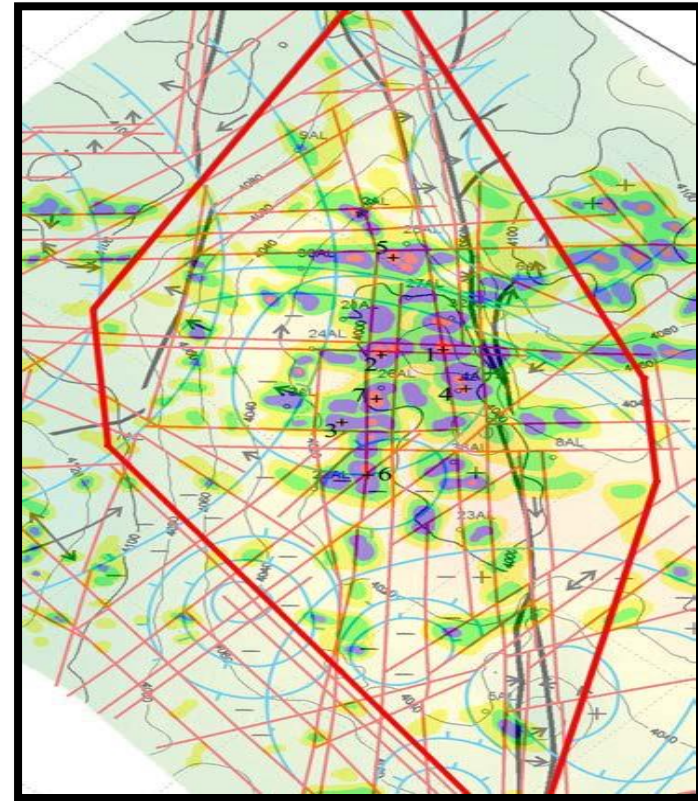
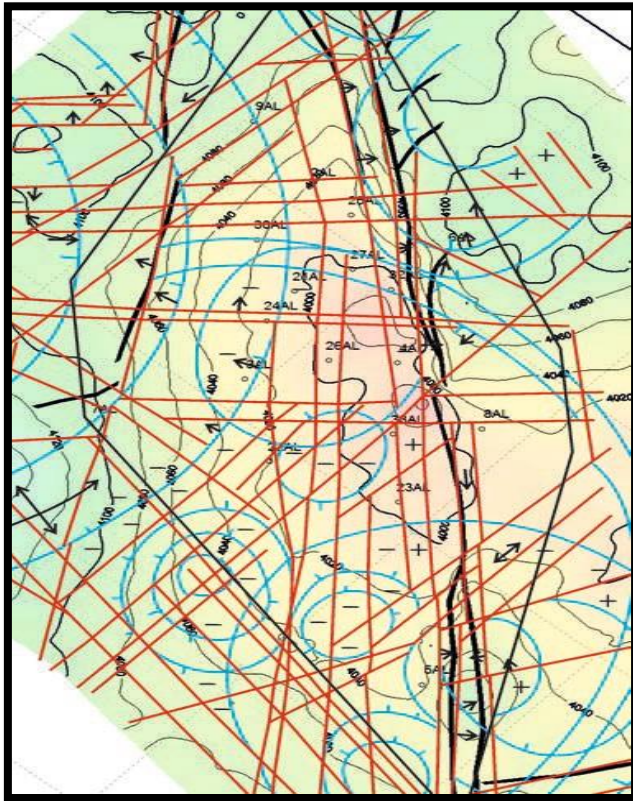
In the next few slides, OGD presents data and information provided by Customers to add credibility and support for the validity of our Direct Detection Technology in defining subsurface hydrocarbon-bearing zones and highly successful drilling locations.

# 3D Block Diagram with Customer's Analysis of 3D Seismics plus Well Drilling and Logging Data

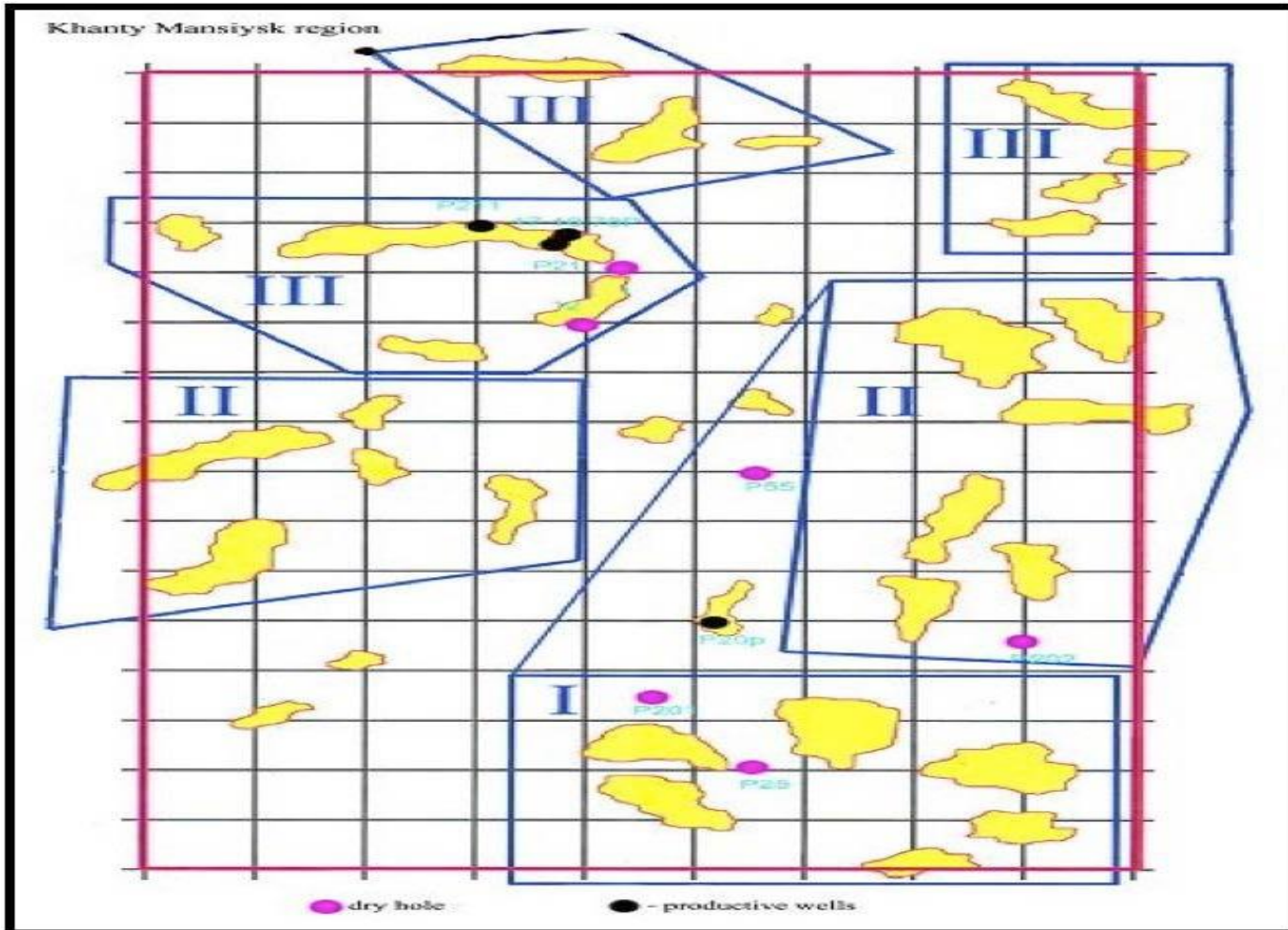




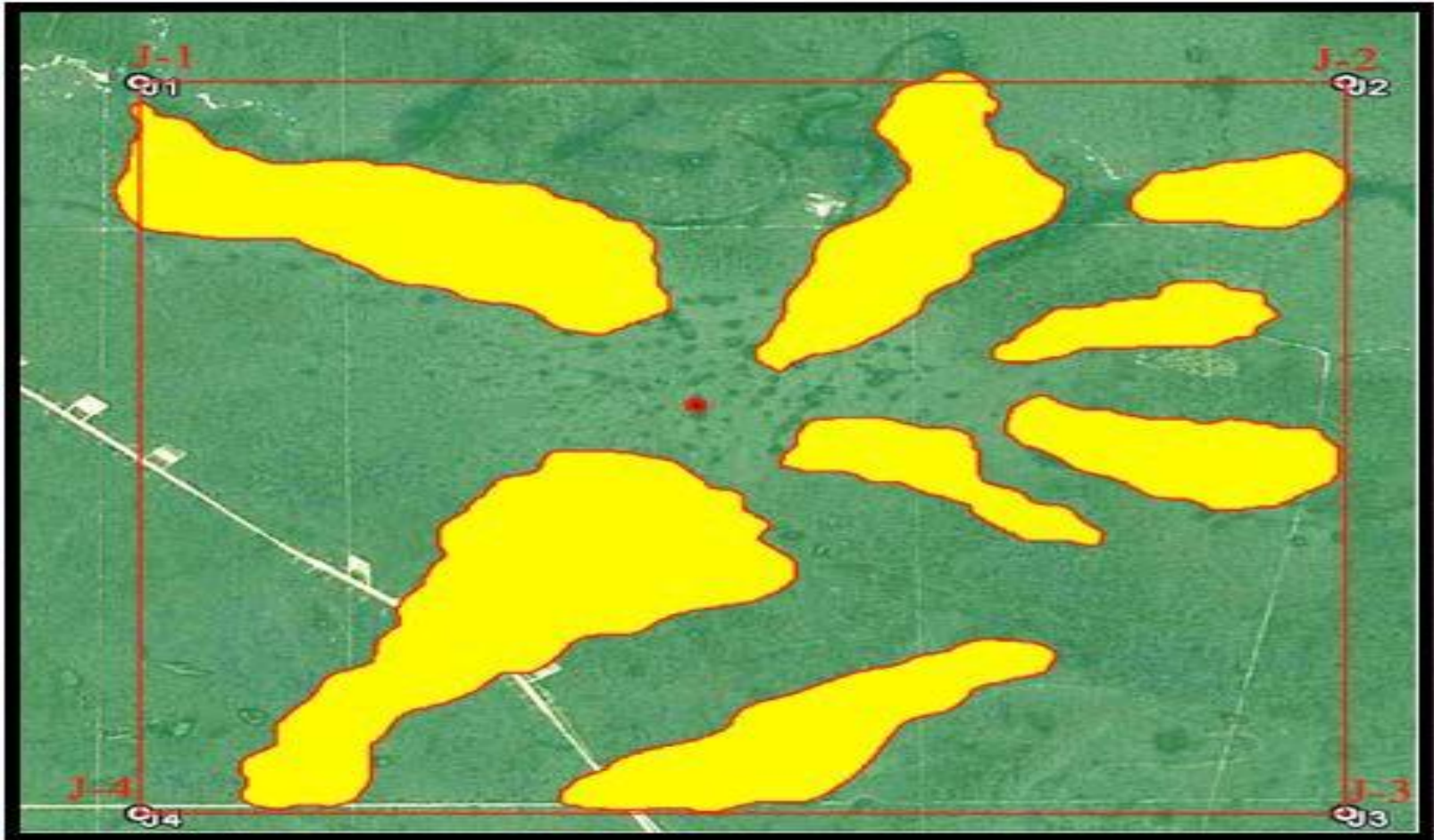
# Structural Map of top of Paleozoics in Kazakhstan with and without DDT Hydrocarbon Anomalies.



# Khanty-Mansiysk Hydrocarbon Prospect with DDT Anomalies and Location of 6 dry holes and 4 Producers.



# DDT Stage One Hydrocarbon Anomalies in Paraguay with Initial “dry hole” Exploration Well (red dot in center).



# Drilling Location for Initial “dry hole” Exploration Well in Paraguay with 3D Seismic Line Cut across the Jungle.



# Future Application of Direct Detection Technology

With the increase in horizontal drilling and fracking, E&P companies are continually trying to locate the “sweet spots” containing more significant and productive amounts of oil & gas.

With our improved DDT Stage Two Surveys and the better definition of areas of highest “intrinsic radiation”, OGD can identify and accurately define these hydrocarbon “sweet spots”.

Based on our success ratios and the lower costs and shorter time parameters, OGD is interested in joint-demonstration trials with any participating E&P company.

We will be pleased to answer any questions about DDT at our **Booth #109.**

# This Direct Detection Technology Presentation was Prepared and Submitted by

Jim Combs, Ph.D.;  
Jeffrey Drizin, Ph.D.; and  
Oleg Yatsyuk, Ph.D.

Oil and Gas Discoverer, LLC  
4331 South Mingo Road  
Tulsa, OK 74146

URL: [www.oilandgasdiscovererllc.com](http://www.oilandgasdiscovererllc.com)

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