table of Contents

1 Introduction to new exploration technologies 2

1.1 Different types of exploration 2

1.2 New exploration techniques from 2000 to 2021 3

2 Details of how RSS/NMR technology works 4

2.1 Seismic Reflection 4

2.2 How does RSS/NMR technology work? 8

3 Strategies for Using RSS/NMR 9

3.1 Applications in Green Field 9

3.2. Results reported to the Client 10

4 Use of RSS-NMR 12

4.1 Case 1: Pre-exploration of new fields 12

4.2 Case 2: verification of existing wells 13

4.3 Case 3: Re-exploration of a block in production or mature field (brownfield) 13

4.4 Case 4: Mature field to be reactivated (refurbish browfield) 14

5 The ERR (Energy Rate of Return) applied to the re-exploration of mature fields 15

6 Economic considerations in the oil industry 16

7 Certified reserves interface between production and CASH 16

7.1 RSS/NMR is the tool that can help in the recertification of reserves 16

8 Conclusions 17

RSS NMR
THE SIMPLE WAY OF EXPLORATION
By Fands-LLC

Registered Office
rss-nmr@fands-llc.biz
Land line +17863528843
Naaman's building suite 205
3501 silverside road
Wilmington Delaware 19810 USA

1 Introduction to new exploration technologies

- **Past**

Seismic reflection began to be developed to locate deposits starting in the 1930s. Dynamite was then used to create acoustic shocks. Designed since the 1960s, 2D images and since 1985 3D images now accompany seismic prospecting campaigns as soon as the probability of finding a deposit is sufficient to justify their use.

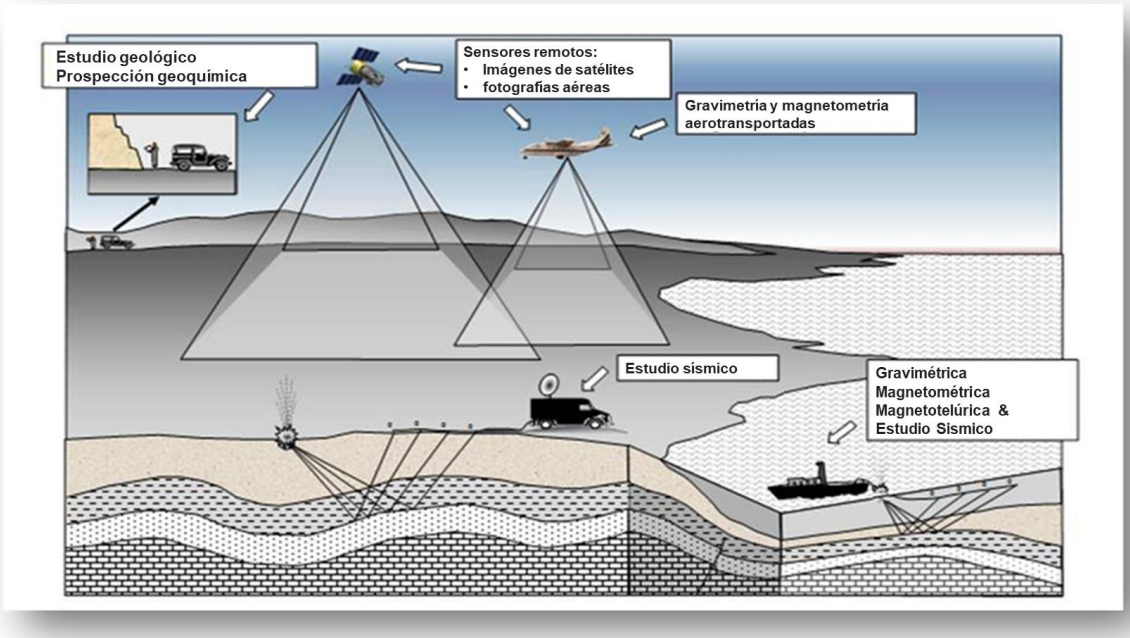
Since the 2000s, self-contained drill bits have been used to orient oblique drilling toward the horizontal. This gives access to thin hydrocarbon formations, but which extend for several kilometers. Then we discovered that oil fields often communicate with each other over considerable distances, for example, in the North Sea. The tool was missing to be able to give a macro view of these sites that at first glance seem independent, but in reality are connected in networks.

- **Present**

Prospecting/exploration will play a decisive role in the global energy future, which today is uncertain due to the lack of a clear vision of the real reserves available and the extraction of hydrocarbons from the bedrock at economically viable prices. Current technological development should not only help reduce costs, but, above all, be friendly to the environment and local residents.

Thanks to RSS/NMR technology ("RSS-NMR SEVSU-Poisk" © Copyright SEVSU-Poisk Group), we are able to carry out an agile and complete study of the oil field through remote studies, that is, without human presence on the ground.

1.1 Different types of exploration

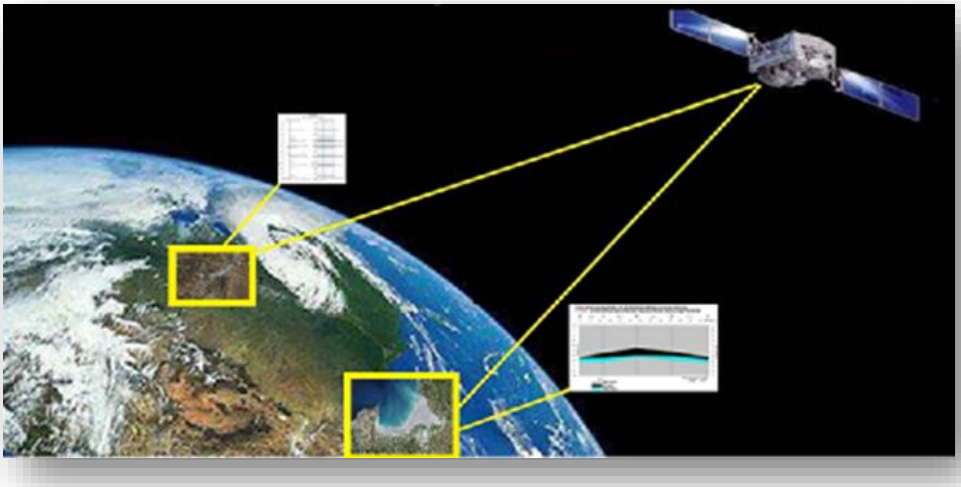


1.2 New exploration techniques from 2000 to 2021

1.2.1 OBN (Offshore)

1.2.2 RSS/NMR

("RSS-NMR SEVSU-Poisk" © Copyright SEVSU-Poisk Group) (onshore and offshore up to 6 kilometers deep)



RSS NMR
THE SIMPLE WAY OF EXPLORATION
By Fands-LLC
Registered Office
rss-nmr@fands-llc.biz
Land line +17863528843
Naaman's building suite 205
3501 silverside road
Wilmington Deleware 19810 USA

2 Details of how RSS/NMR technology works

We answer concerns about RSS/NMR technology: **How does it work compared to seismic reflection?** That is, what is the difference between the existing remote methods and our remote method - Phase1 Diagnosis?

They are technologies that do not compete in anything, the new ones surpass the old ones, as happens in computing.

For comparison, let's take the seismic technology used by all oil exploration companies. Seismic equipment generates a high-power signal that is directed underground. Firstly, this powerful signal does not carry any information and, secondly, it dissipates in all directions and therefore must be very powerful to reach depths. When it reaches the depth limit, it is reflected and recovered by receivers on the surface. The signal that does not penetrate the interior of the substance is considered an anomaly. Then an extensive interpretation of the data obtained is necessary. We talk to many interpreters who have different opinions on the same object. That is, some type of anomaly is discovered, which may or may not be a deposit. Only drilling can confirm the presence of the deposit. Statistics say that only 30% of the wells reach the objective, that is, the seismic efficiency is not higher than this percentage. The main property of seismic is reflection.

How does RSS/NMR technology work? The transmitter sends a narrow band signal that is specific to the substance (oil, gas), that is, the signal includes information about the substance sought. The signal is re-emitted when it reaches the target and on the surface we receive again, with certainty, information about the presence of oil or gas. This phenomenon is called resonance of the sought substance. We do not need interpretation, it is a direct discovery of the deposit. The accuracy is 90%.

Basic principles

- **Reflection seismic** is the process of reflection of the anomalies to be interpreted later.
- **RSS/NMR** is a resonance confirmation signal of the substance being searched.
- **RSS,** is the process of resonance of satellite images in a nuclear reactor
- **NMR** is the resonance process in the oil field.

2.1 Seismic Reflection

2.1.1 Processes and Methodology

For comparison, the seismic technology commonly used by oil exploration companies, which has reflection as its main property.

The main characteristics of seismic are:

1. Seismic equipment generates a high-power signal that is directed to the subsoil .
2. This powerful signal does not transmit information.

3. This signal dissipates in all directions and, therefore, must be very powerful to reach the deepest depths.
4. When it reaches an underground obstacle, it is reflected and collected by the receivers (geophones).
5. Then an extensive interpretation of the data is necessary, which takes a lot of time and can also generate errors.
6. 2D seismic reflection is archaic, 70% of the fields explored worldwide are based on this technique. For this reason, the re-exploration of mature fields using RSS/NMR technology is an alternative to prolong the useful life of the oil field.

History of the development of exploration and production technologies

1883	Anticline theory	Prehistoric period of exploration
1900's	Rotary Drilling	1st period 1850 - 1930
1914	Seismography studies	exploration based on outcrops and surface indices
1924	Well logging based on rock and fluid quality	
1930's	1st well in the sea (offshore) extension to the sea (>10 meters deep)	
1930	Point seismic with 1D type image	

1930's - 1940's	Geophysical generalization of 1D	2nd period 1930's 1950's
1950's	Precise geological correlations from 1950	“Random” exploration of oil fields
	Improvement of seismic and logging tools	

1960's		
digital computer	2D image of the subsoil (search for anomalies to study)	3rd period 1950's 1970's
continental rift	Better structural knowledge (1969)	" Semi-calibrated " scan
Diography	Properties of rocks and subsurface fluids	

2D Migration (1970)	Calibrated digital seismic	
Directional drilling		4th period 1970's 1980's
Rock Eva ideas	"mother rock and HC formation" more complete methodology	"Calibrated" scan
Stratigraphic analysis	Prediction improvement	

1983 3D seismic	Better drilling target accuracy	5th period 1980's 1990's
1985 petroleum system	Allows the best definition of areas with potential	Optimized production exploration

1990 to 2010	6th period 1990's 2010's
2D AND 3D simulation of basins and reservoirs	
Prediction of movements and location of fluids	Exploration "streamlined production exploration using improvements in older technologies"
Seismic predictions and 4D monitoring of fluids and reservoir extensions	

2010 to 2020

Emergence of new very localized and very selective exploration technologies that are the revolution compared to the old 2D/3D seismic technology (systemic exploration mode)

7th period 2010's

"New techniques for highly localized selective exploration or for very large surfaces

(Pre-seismic evaluation)

Offshore **OBN used by Total Energie to re-explore old deposits to modify production network**

https://ep.totalenergies.com/en/expertise/reservoir/ocean-bottom-nodes-obn-wide-offshore-seismic-acquisition-campaign-improve

RSS-NMR exploration using satellite images that allow delimiting the presence of hydrocarbons up to a depth of 6 km (onshore/offshore) on very large surfaces in a very short time.
The great novelty is that the product is searched directly instead of looking for anomalies. It is a technology that is not limited to hydrocarbons and that determines the prediction zone of hydrocarbons, but also water, metal or gems.

The ideal technology to determine the presence of the desired product over large areas.

2.1.2 Investment necessary for reflection seismic projects

The means to be implemented for a seismic reflection are:

- **Office work**

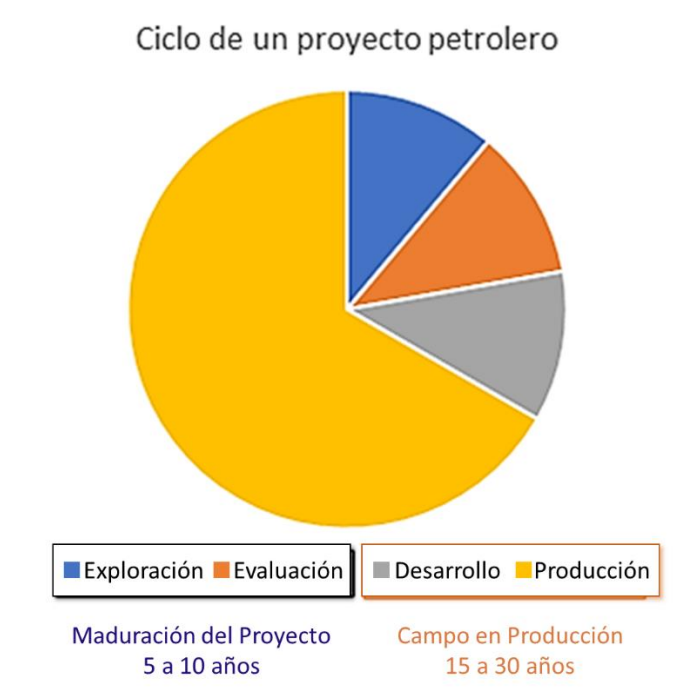
A seismic project is very heavy because you must have permits, EIA, and comply with the established procedures and standards before entering the area, and sometimes you cannot enter the area because it is a natural park, or because the geography and the relief does not allow it. The political, social or public security situation (guerrilla, drug trafficking) are also limiting.

These office jobs are very intense and require more work from staff during the start and management of the project during its completion.

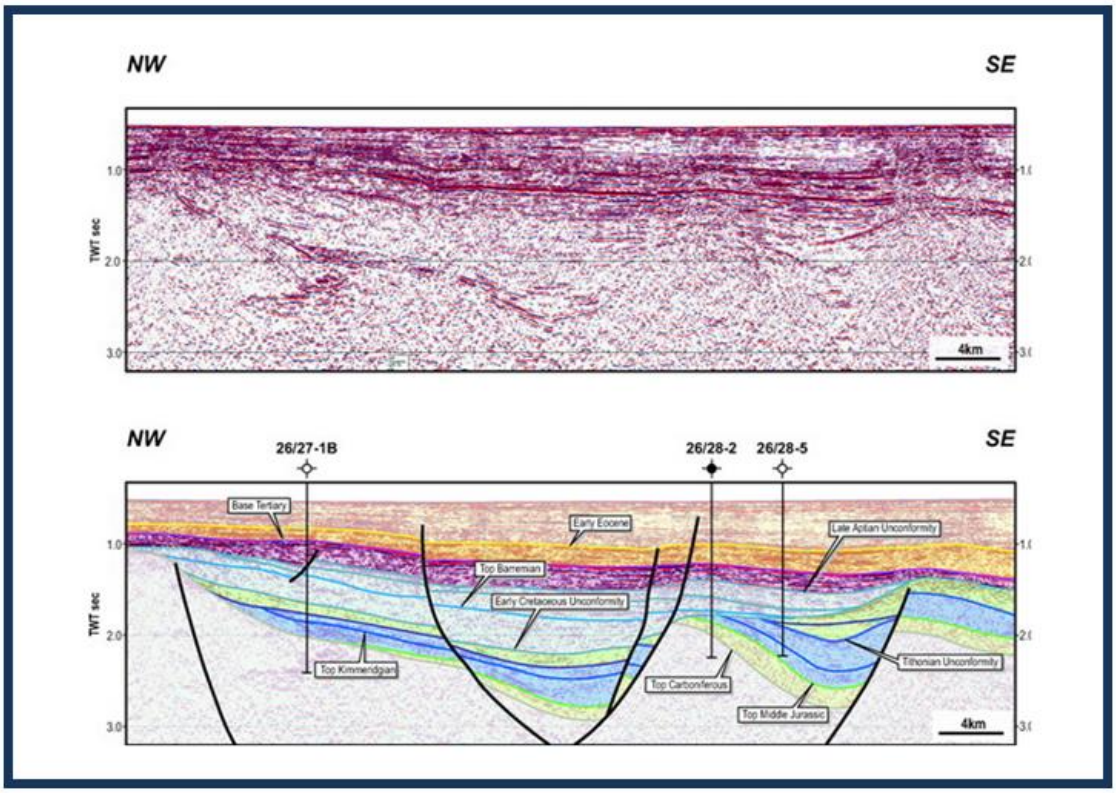
- **Field work**

The seismic needs:

- Personnel in the field with their own logistics to work with;
- Opening of main runways;
- Trenching;
- Well drilling and installation of explosives;
- Heliport, fuel tanks, waste management, environmental restoration.



Result with reflection seismic



2.2 How does RSS/NMR technology work?

RSS/NMR technology is an innovative approach for the identification and remote and terrestrial studies of hydrocarbon deposits, minerals, gems (searched by bedrock) and sources of recoverable fresh water at depth.

Remote sensing of areas and reservoirs is provided by RSS (Resonance Spectral Survey) using resonance spectral processing of analog spatial images. No permissions or approvals are required as images from open access spaces are used.

NMR (Nuclear Magnetic Resonance) or NMR (Nuclear Magnetic Resonance), provides a point-by-point study of deposits from the ground using the magnetic resonance method.

More information about this method can be found in the article www.geosci-instrum-method-data-syst.net/5/551/2016/ . NMR requires approval and permission to carry out a shipment in the Customer's territory.

This is called the resonance of the material being sought. We do not need interpretation because this is the direct discovery of a deposit, which is why our exploration is done in a very short time, 60 to 90 days. The Client must provide the coordinates of the contour points of the exploration area in WGS84 geographic coordinates, the target of the search (e.g. hydrocarbons) and the depth interval of the exploration.

Our method can be developed in three phases :

It works quickly and gives good results in 60 days for phase 1 and 105 days for phases 2 and 3 if we carry out the in-situ study.

For mature fields (browfield) we redo an exploration without disturbing the production process. It is actually easier to modify a mature field production network than to develop a Greenfields project (time, permits and investment of money).

- The **first phase** is the RSS remote sensing method, we obtain the resonance data from satellite images in the nuclear research reactor. Analog satellite images of the studied area are processed by highly qualified personnel in a nuclear research reactor. The accuracy is 90%, three times higher compared to seismic. Very economical process carried out remotely, that is, unlike seismic reflection, we are very respectful of the environment and social. It is important to highlight that the Client can choose to carry out only Phase one.

- The **second phase** is a field NMR study. The research accuracy is also 90%. This technology includes two Nobel Prize-winning discoveries: NMR and the Kirlian effect. Precise results, without interpretation, the technology allows us to go directly to the target (oil or gas), because we are looking for these products with our signals.

- The **third phase** is the compilation of phases one and two.

3 Strategies for Using RSS/NMR

The applications of our methodology are key in the order of exploration operations, which consists of three phases, but it must be understood that phase 1 is a very cheap instrument that allows the capture of a quick image of a pre-exploration phase in new fields. (Greenfields). The novelty is that it is possible to re-explore a mature field (browfield) to delimit the points of interest without stopping production. From this study, the oil company will be able to modify its production system to increase its production.

3.1 Green Field Applications

3.1.1 Phase 1

- RSS/NMR avoids developing very costly seismic reflection.
- RSS/NMR is discreet and allows you to work without damaging the environment or creating false expectations in the inhabitants of the area.
- It is a very fast exploration time without mobilizing resources to the client's offices.
- In geopolitical terms, it is a strategic instrument for a company that believes in oil and wants to increase its production.

The RSS/NMR is the ideal tool to make the oil profile of a new area without many resources or expenses, discreetly and be ready for phase 2.

The RSS/NMR is first developed to delimit the oil fields, then it is the Client's decision to do a seismic reflection, a magnetotelluric or any other method, or continue with us with phase 2.

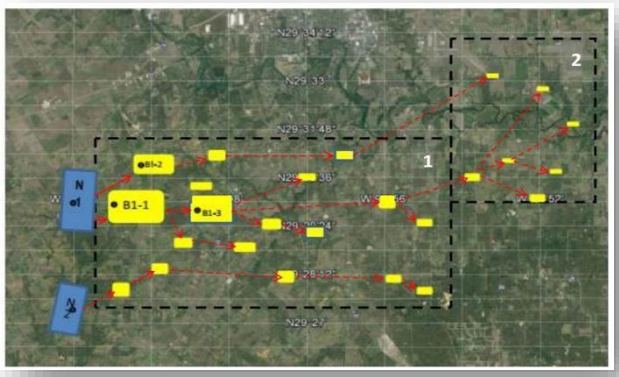
3.1.2 Phase 2

The work is carried out with a small team of personnel.

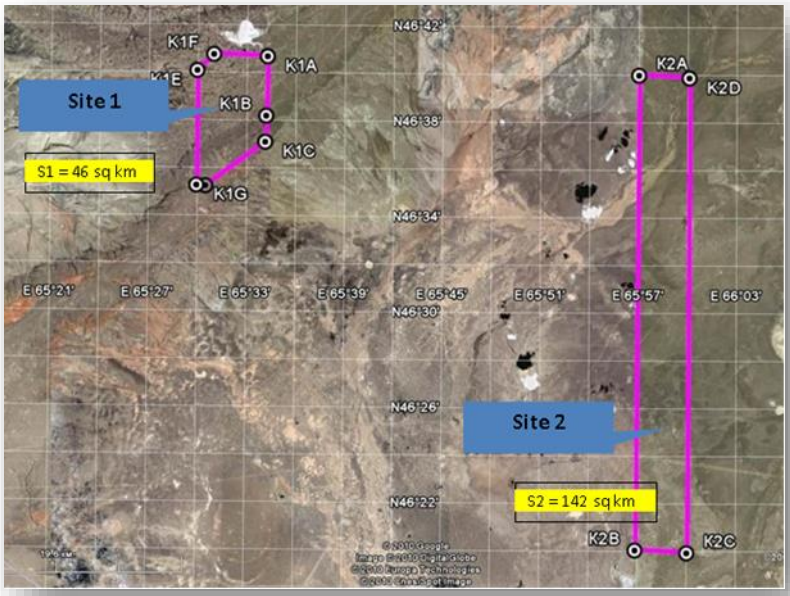
3.2. Results reported to the Client

RSS/NMR technology provides absolute data: (numerical horizons, thickness, depth horizons and gas pressure) of the bed of hydrocarbon reservoirs at a depth of up to 6 km. directly without interpretation, it is a direct reading.

RSS/NMR technology detects drilling sites of exact coordinates with a much smaller budget compared to conventional exploration methods (2D/3D).



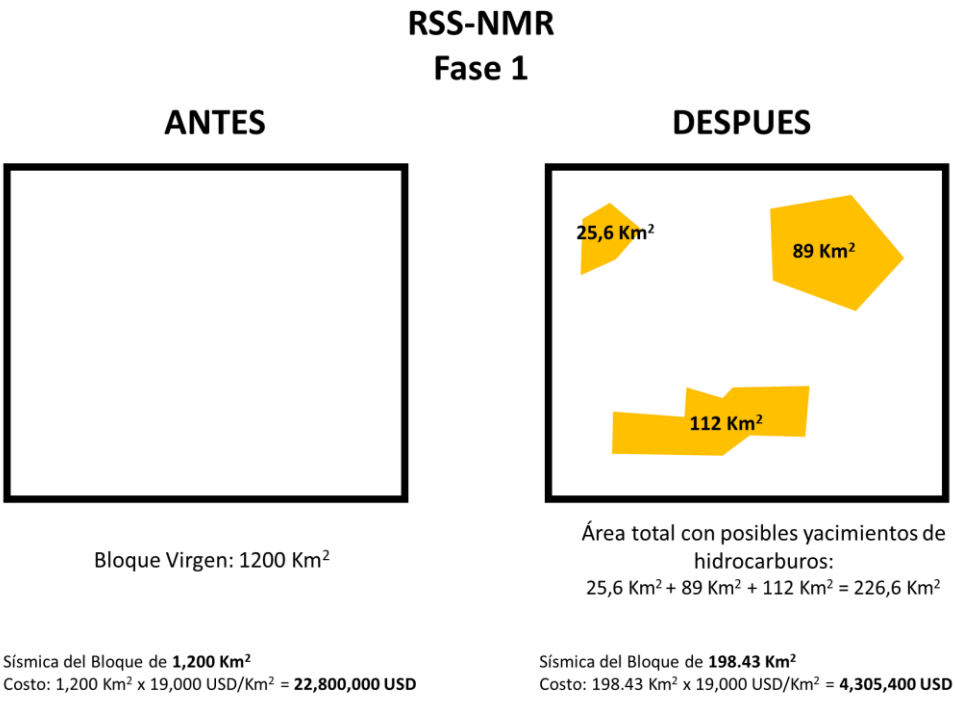
RSS NMR
THE SIMPLE WAY OF EXPLORATION
By Fands-LLC
Registered Office
rss-nmr@fands-llc.biz
Land line +17863528843
Naaman's building suite 205
3501 silverside road
Wilmington Delaware 19810 USA



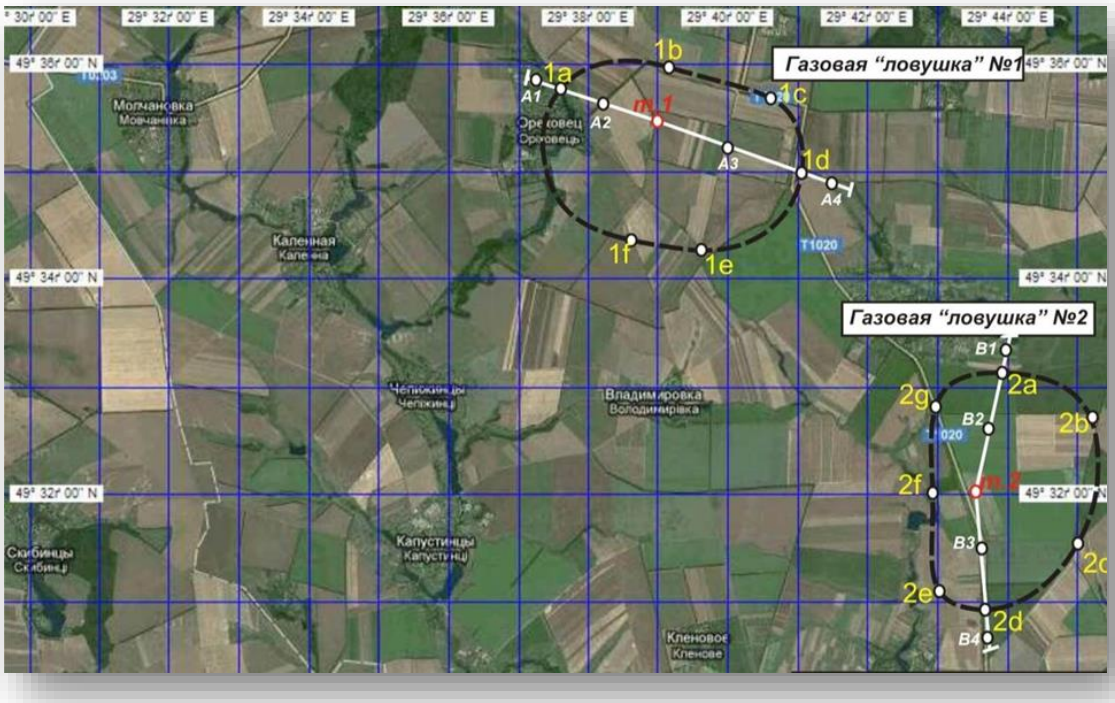
Yam of points	Coordinates of measurement points	Occurrence depth of oil horizon, H (m)	Thickness of oil horizon, ΔH (m)
If you № 1 (upper part)			
p. 1.1. (western part)	N 460 39' 54" E 650 30' 18"	H1=2500÷2800 m, oil H2=3800÷4100 m, oil	300m 300m
p.1.2. (eastern part)	N 460 40' 30" E 650 33' 36"	H1=2530÷2830 m, oil H2=3830÷4130 m, oil	300m 300m

4 Use of RSS-NMR

4.1 Case 1: Pre-exploration of new fields



Pre-exploration by RSS/NMR allows you to limit the costs of seismic exploration, and phase 1 drastically reduces costs.



4.2 Case 2: verification of existing wells

Once the Client has identified the drilling point after interpreting the 2D/3D data, the best alternative is to provide us with that drilling point, with the aim of carrying out a more detailed analysis, in which the following results can be obtained:

- Determination of the presence of hydrocarbons at the survey point in a given depth interval.
- Identification of the type of hydrocarbons (petroleum, natural gas).
- A terrain map with reservoir and fault contours identified within a 1 to 3 km radius around the drilling point.
- Determine the areas of maximum signal response on the contours of the identified deposit.
- Determine the number of useful horizons.
- Determination of the depth of occurrence of each horizon.
- The pressure of the gas in the horizons.
- Presence of formation water and its thickness.
- Deep column construction at the drilling point.
- Identify the presence of hydrocarbons in the vicinity of the control point in the absence of hydrocarbons at a given point.
- Verification of dry wells due to failures and /or 2D/3D seismic interpretation errors, for which we re-examine the dry well location area in a radius between 1 to 3 km.

4.3 Case 3: Re-exploration of a block in production or mature field (brownfield)

If the Client needs to re-examine their block in whole or in part to decide to change their production mode with new facilities, production or injection wells, etc., they will obtain the following results:

- Reservoir contours at surface level of oil and gas fields;
- Limits on the extent of trapping;
- The number of horizons in each reservoir,
- The depth of the horizons,
- The presence of a gas cap above the oil horizon,
- tank pressure,
- Presence of water under the oil horizon,
- Vertical sections of hydrocarbon reservoirs,
- Structural maps of roofs by individual layers,
- Estimated volume of gas and oil by layers,
- General evaluation of the field by preliminary calculation of the expected oil and gas resources in all reservoirs of the field,
- Mapping of the maximum signal response in each reservoir
- Identification of optimal drilling points.

4.4 Case 4: Mature field to reactivate (refurbish browfield)

The main objective of the study by RSS/NMR are the following:

- Detect, identify and delimit gas, oil and condensate deposits in operating or abandoned blocks.
- Re-draw existing reservoirs and highlight reservoirs or deposits that were not previously discovered through 2D/3D seismic.
- Evaluate the most promising areas of the block that were not previously put into production.
- The Client reassigns the part of the block to be re-explored, we again recommend studying the entire block.
- You can also observe the surroundings of existing closed wells, to reduce costs a secondary well can be drilled from a previously drilled and abandoned well.

As a result of phase 1, we will have the following results for each mature field:

- Maps of the blocks or mature fields (brownfield) studied, with the mapped reservoir contours of the detected deposits, more precisely, the contours of the deposits linked to the geographical coordinates.
- Zones of maximum signal response and isolines of signal responses in units of hydrostatic pressure, MPa.
- The deposits with greater perspective are delimited for a later detailed study (phases 2 and 3).

At the Client's request, we proceed to phases 2 and 3, which is a more detailed study of promising production or abandoned deposits, with the aim of obtaining more precise information such as the following:

- Reservoir contours at surface level of oil and gas fields;
- Limits on the extent of trapping;
- The number of horizons in each reservoir,
- The depth of the horizons,
- The presence of a gas cap above the oil horizon,
- tank pressure,
- Presence of water under the oil horizon,
- Vertical sections of hydrocarbon reservoirs,
- Structural maps of roofs by individual layers,
- Estimated volume of gas and oil by layers,
- General evaluation of the field by preliminary calculation of the expected oil and gas resources in all reservoirs of the field,
- Mapping of the maximum signal response in each reservoir
- Identification of optimal drilling points.

RSS-NMR
Fase 1: Campos Maduros

ANTES

Con datos de sísmica 2D del siglo XX

Bloque Virgen: 1200 Km^2

DESPUES

Con datos de la RSS-NMR

Después de la RSS-NMR el campo puede producir
4,689 bdp + 500 bdp + 26,500 bdp = 31,689 bdp

5 The ERR (Energy Rate of Return) applied to the re-exploration of mature fields

Starting from this difficult moment for our industry, we must analyze alternative solutions that mainly reduce the execution time and costs of exploration projects. Therefore, the TRE or EROI (Energy Return On Investment) will be the indicator that must be the baseline of our activities to decide if we will carry out a new project (Greenfield Project) or if we re-explore an old reservoir (Brownfield Project).

It is summarized in a simple linear equation that ignores economic and temporal variations: A reference unit of product N allows producing Z (multiple or not) of N

1 x N = > Z x N

We obtain a result that allows us to make decisions without taking into account the interference of the economy of the moment, because it is based on a non-monetary value. For our oil industry we take the barrel of oil (159 liters) as a constant value of N. We will measure the drop in the profitability of our industry by going to new projects before re-exploring the old fields.

- 1 inverted barrel is used to produce 100 barrels in 1900, i.e. 1xN = > 100xN
- 1 inverted barrel is used to produce 35 barrels in 1985, i.e. 1xN = > 35xN
- 1 inverted barrel is used to produce 25 barrels in 2010, i.e. 1xN = > 25xN
- 1 inverted barrel is used to produce 18 barrels in 2020, i.e. 1xN = > 12xN

If the E&P company, both private and state-owned, wants to increase its profits, we suggest taking into account the following recommendations:

- Reduce investments in new projects.
- Re-explore old fields to generate short-term profit.

RSS NMR
THE SIMPLE WAY OF EXPLORATION
By Fands-LLC
Registered Office
rss-nmr@fands-llc.biz
Land line +17863528843
Naaman's building suite 205
3501 silverside road
Wilmington Deleware 19810 USA

6 Economic considerations in the oil industry

It is vitally important to ensure the permanence of the state or private oil company thanks to re-exploration.

“We, a nation rich in oil, within 20 years will not have a single barrel to sell abroad.” Vicente Fox Quesada former president of Mexico, year 2000

For an oil company, it is essential to know the reserves of a field as accurately as possible to establish the development plan that maximizes the recovery of hydrocarbons. For oil companies, reserves are assets to be developed and monetized. The acquisition of E&P rights, participation in projects and financing are decided based on the amount of oil or gas that can be accounted for, the volume that can be produced and the return on investment.

7 Certified reserves interface between production and CASH

For the oil industry, reserves are the heart of trust and credibility that ensure access to economic funds to develop projects that respond to growth in demand.

For the financial sector , reserves are a measure of the value of an oil company and therefore the basis of its credit capacity.

For exporting countries highly dependent on oil revenues, the certification of reserves is access to lines of credit. In the case of the country that produces hydrocarbons, it is important to know how much longer they will be able to continue using this non-renewable natural resource as a lever for development.

Oil is the most used commercial energy source in the world and will continue to be so for decades to come. It is therefore essential to know their availability to anticipate their replacement without anxiety or haste. Between proven, probable and possible reserves, one must choose before embarking on investments. Indeed, after having exploited the most concentrated and accessible resources, E&P are forced to exploit resources that are increasingly less concentrated or increasingly difficult to extract and that require more and more energy to be brought to the surface. Hence the ERR (EROI) that becomes less favorable.

An E&P that has a turnover with its production based on the exploitation of Brownfields and without a Greenfields project, runs the short-term risk of disappearing. This is mathematical because production will decrease and you will no longer have the means to finance your new explorations and put your new fields into production, whose costs will increase at the same time.

Greenfields costs, considering that the TRE makes the decision committees of the big oil companies think before approving a new project.

7.1 The RSS/NMR is the tool that can help in the recertification of reserves

With Phase 1, the exact characteristic of the deposit can be remade, at a global level, there is information that many old fields in production were put into operation, based on 2D seismic data.

To make an analogy, it is like building a website using photography on paper, which would be glued to the computer screen.

Total, the French E&P has perfectly understood the interest of redoing offshore, using OBN, a photograph of its reservoirs in production to optimize its North Oil field in Joint Venture with Qatar Gas https://www.ep.total.com/en_/expertise/reservoir/ocean-bottom-nodes-obn-wide-offshore-seismic-acquisition-campaign-improve

What is OBN https://www.youtube.com/watch?v=JCJKWJfTzL0

8 Conclusions

Making profits from oil in our times needs to focus on cheap, simple solutions that give quick results. The RSS-NMR is the ideal tool for oil companies that need to develop these new fields that ensure the long-term economic and energy future of the companies. Screening of a virgin block should be imposed to limit expenses on heavy systems.

But to finance these projects or, more than all, ensure the sustainability of the company, they must rework their old fields that need this re-exploration, or corrective seismic for recertification to have assets and futures in the Greenfields.

In that, the RSS-NMR is fast, versatile, risk-free and answers your questions quickly.