



HEDAP Global Energy Management

SOFIA COAL PROSPECT

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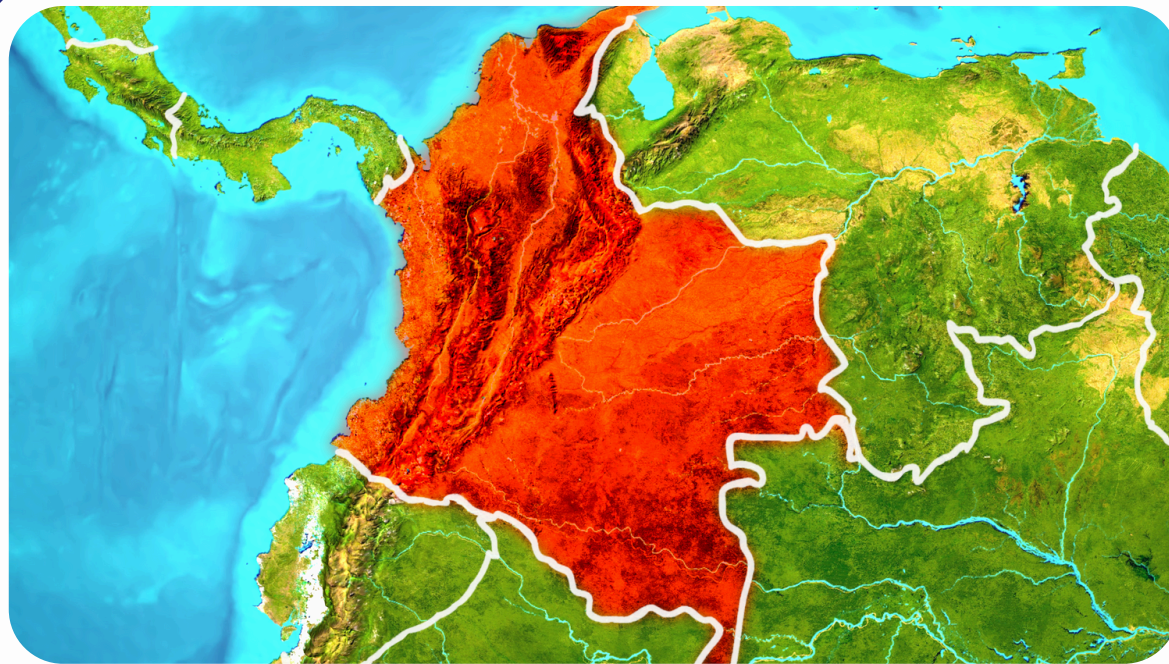


Overview

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Location



Colombia

Colombia is the 11th largest coal producer in the world producing 80% of the coal on the continent and having the second largest reserves after Brasil.



Northern Part

Colombia is at the present the world's fourth largest exporter of thermal coal and in recent years accounted for more than 5% of the world exports

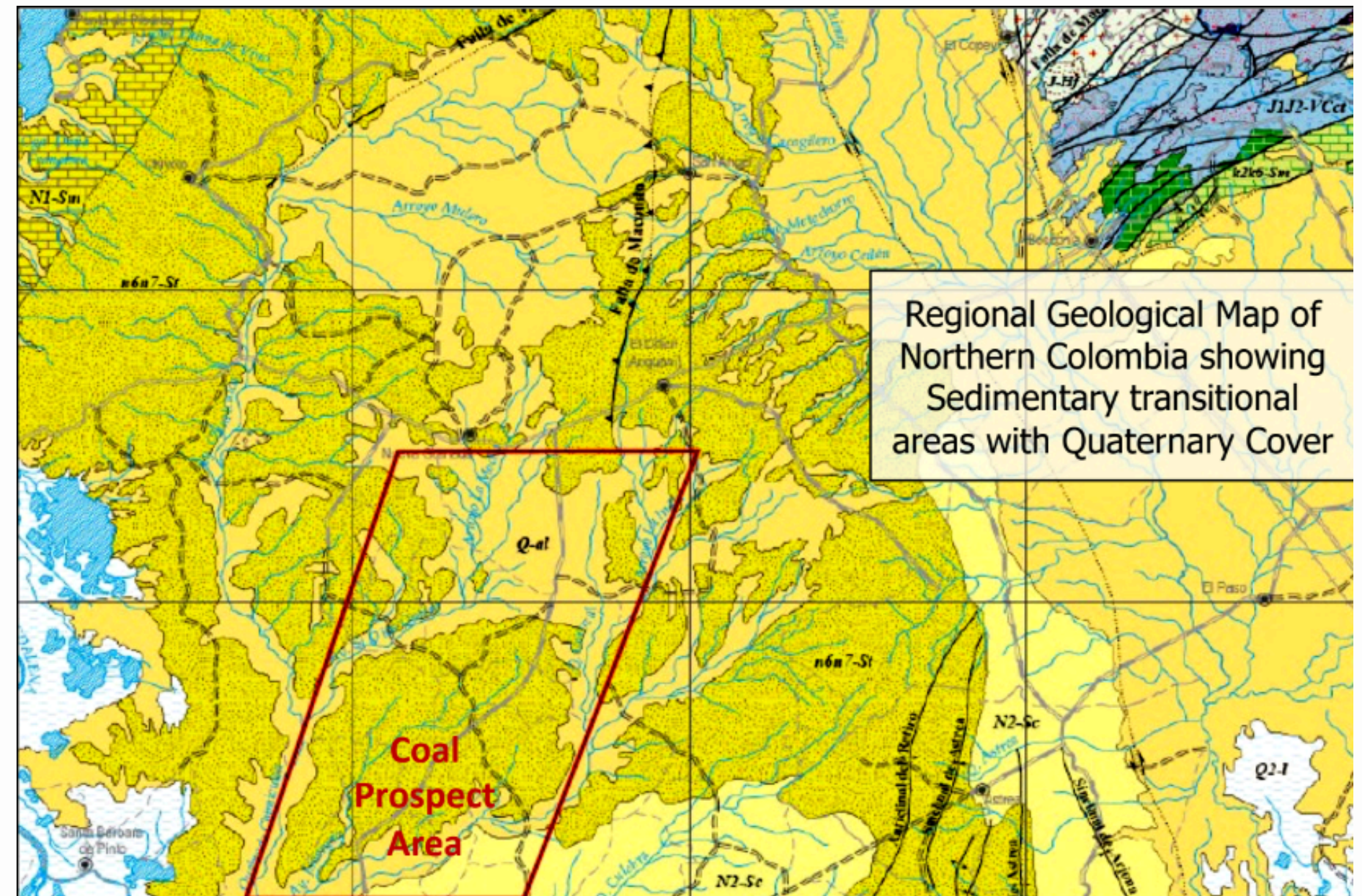


Magdalena

The coal present in the Magdalena Department presents a enormous regional advantage for its strategic location and benefits of short distances to the coast plus the already existence of shipping facilities.

GEOLOGICAL MAP

- Regional geological map of northern Colombia illustrating sedimentary transitional areas with Quaternary cover.



Satellite Imagery Indications

Synthetic Aperture Radar (SAR) and
Spaceborne Imaging Radar C-Band (SIR-C)
indicating Coal Prospect in Yellow Zones.

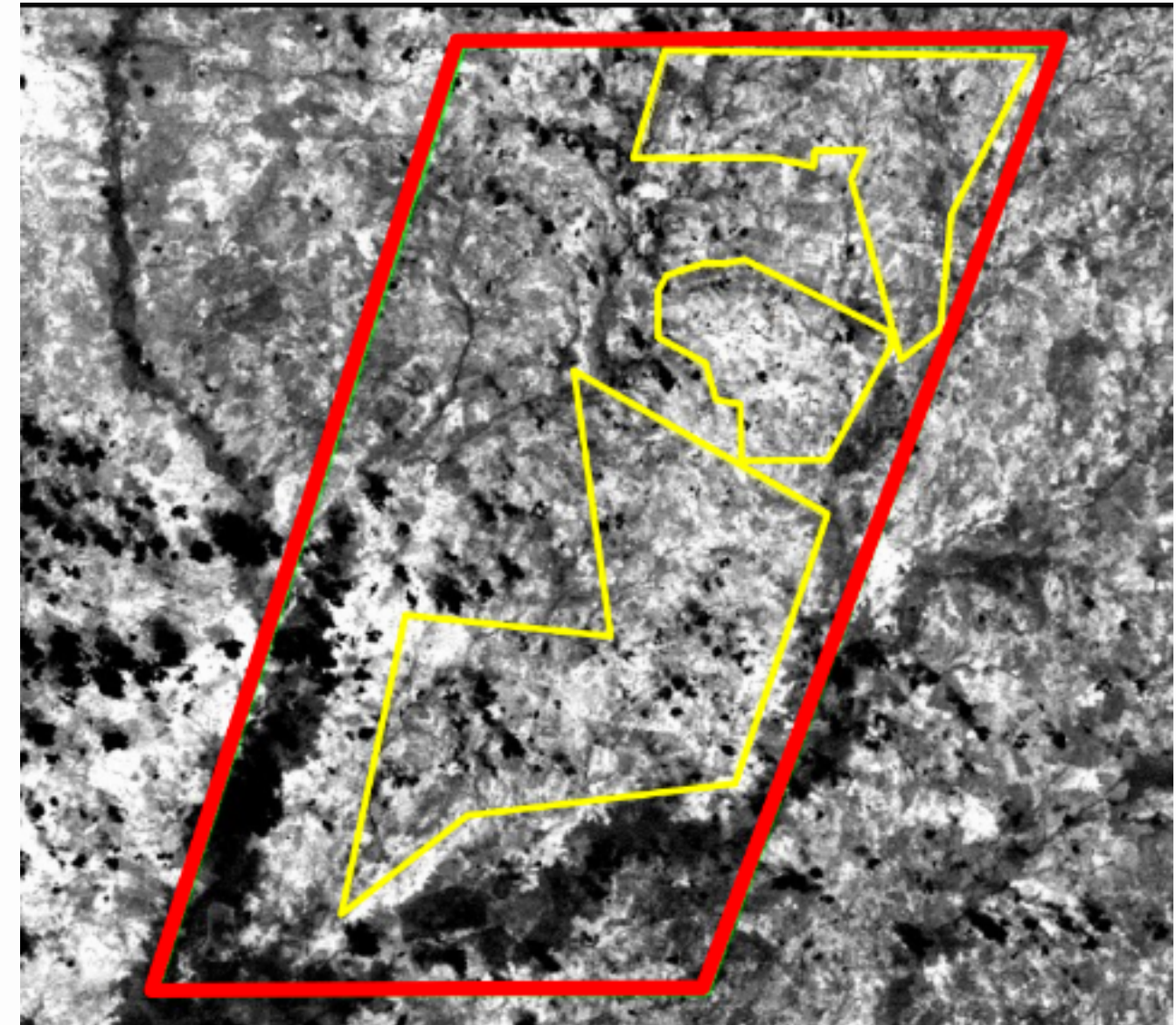
Dark areas in yellow zones
Indicate potential coal deposit



Satellite Imagery Indications

LANDSAT Thermic Image indicating
Coal Prospect in Yellow Zones.

White areas in yellow zones
Indicate heat changes in potential coal deposits.

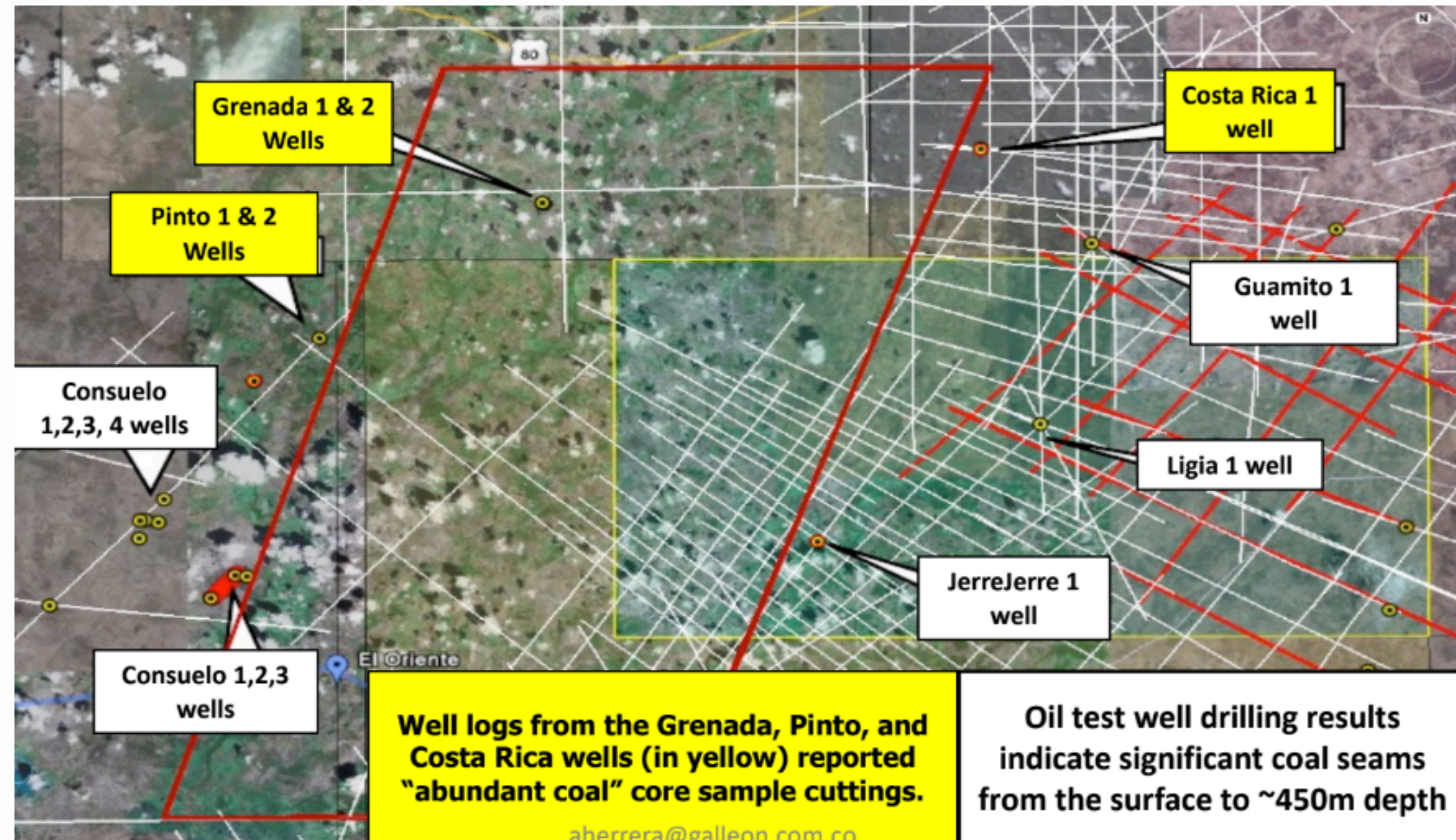


Region Oil Wells with Logs

Existing data (well logs and seismic lines)

Well logs from the Granada, Pinto, and Costa Rica wells (in yellow) reported abundant coal from core sample cuttings.

Oil test well drilling results indicate significant coal seams from the surface to 450 m depth.



Coal Zonule – Granada 1 & 2 Wells

Coal zonule .Granada 1 and 2

Oil well logs report the San Antonio formation being divided into three zones. The middle zone is described below:

2) Within the area under discussion the top of the coal zonule is marked by an abundance of soft coal which is also associated with numerous small gastropods and pelecypods of a brackish water fauna. The section, as seen in the Granada wells from 915 feet to 2315 feet, consists of a series of massive bedded soft coarse to fine grained fossiliferous sandstone, capped by 270 feet of black to grey platy fracturing carbonaceous shale. A sharp density break from 2.3 to 2.4 was noticed at the upper contact (see Plate II). The thickness of this coal zonule as penetrated in the Granada well was 1425 feet which was approximately the same as found in the Texas Company's Pinto No. 1 well.

San Antonio Formation

This formation outcrops over the entire extent of the Granada Concession and is found in the well to a depth of 3370' (3050' subsea). Within the area the formation has a thick sand development and an abundant brackish water fauna. The sandstones are usually very cross-bedded and consist of coarse to fine, subangular grains which are predominantly quartz. The shales which compose the upper part of the formation, very little of which was drilled in the well, are soft usually devoid of bedding, have a conchoidal fracture and weather to a bright red color. Gypsum veins and rosettes are common. The thickness found in the Granada N°2 well is 3370' and as result of microscopic work has been divided into three zones as follows:

1) the Pink zonule is the uppermost, and found in the well from 0' to 915' (596' subsea) and may be distinguished by the abundance of pink material and an absence of foraminifera. Megafossils are rare (3) this pink zonule outcrops over most of the concession which is stratigraphically higher than the surface of Costa Rica N°1 and consequently was not present in that well. The Texas Company's Pinto N°1 started in the pink zonule and encountered 2300', before entering the coal zonule (15)*. The surface geological studies indicated 5240' feet of pink zonule present within the concession, 890' were penetrated in the Granada N°1 well. Lithologically the zone consists principally of reddish brown, bluish grey, soft shale with occasional very fine gray sandstone interbeds.

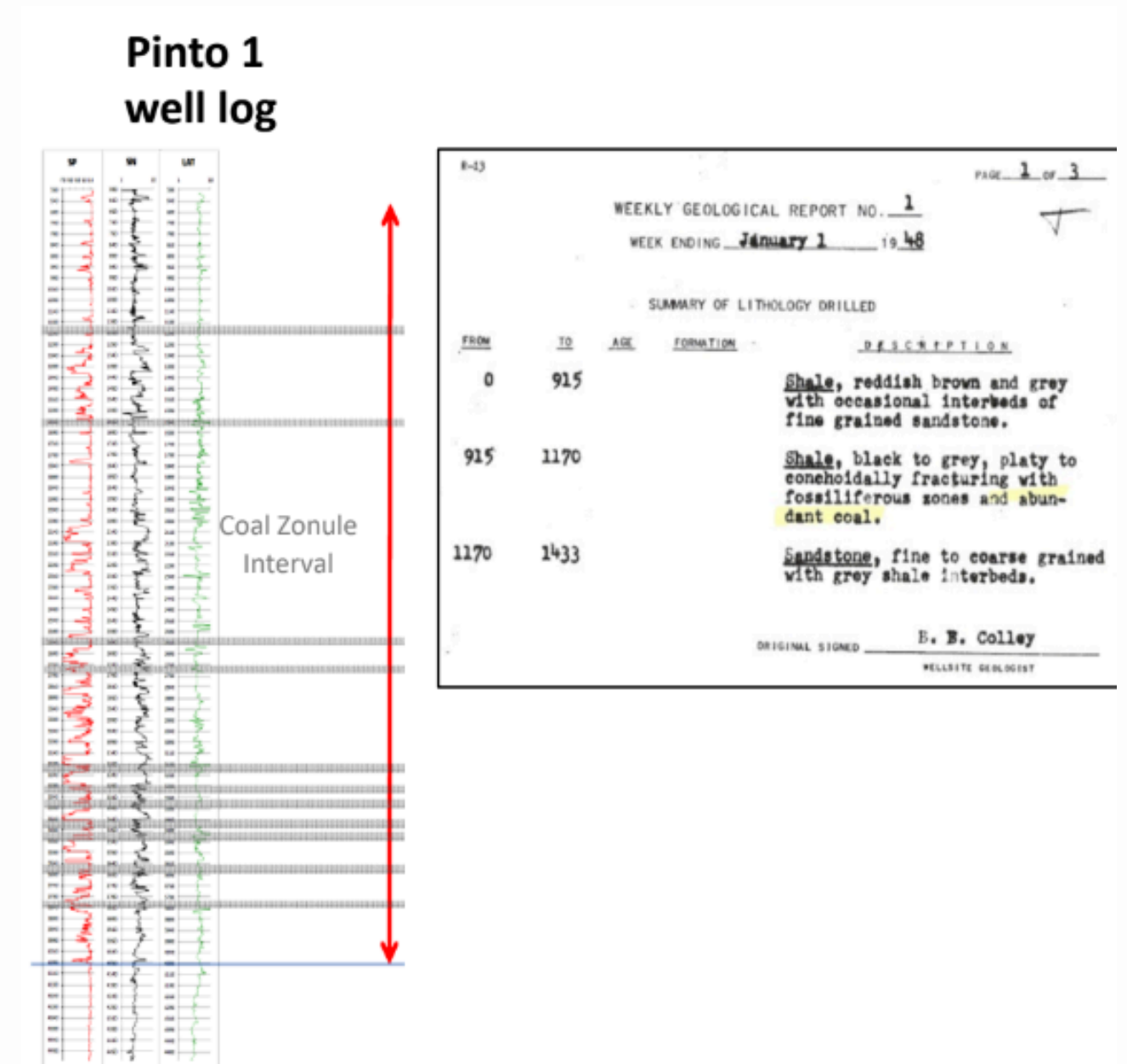
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3) The Botallie N°1 zone is present both in the Granada and Costa Rica wells. The surface outcrops in the concession are mostly confined to the area south and southwest of the well. The surface measurements in the vicinity of the Costa Rica well and the well itself indicated a stratigraphic thickness of 1263'

* No samples available for exact determination.

Coal Zonule Intervals Pinto 1

- Coal zonule intervals Pinto 1 and Granada 2 wells



Coal Zonule Granada 2 Wells

- Coal zonule intervals Pinto 1 and Granada 2 wells

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WEEKLY GEOLOGICAL REPORT NO. 1

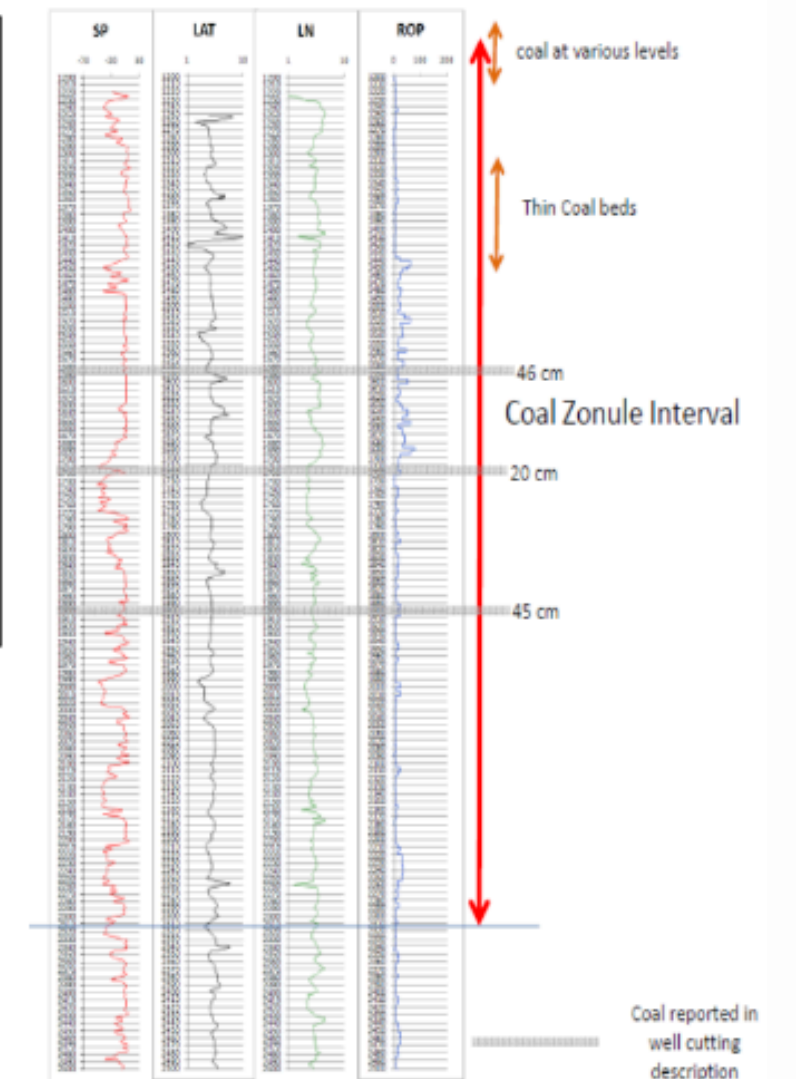
WEEK ENDING January 1 1948

SUMMARY OF LITHOLOGY DRILLED

FROM	TO	AGE	FORMATION	DESCRIPTION
0	915			Shale, reddish brown and grey with occasional interbeds of fine grained sandstone.
915	1170			Shale, black to grey, platy to conchoidally fracturing with fossiliferous zones and abundant coal.
1170	1433			Sandstone, fine to coarse grained with grey shale interbeds.

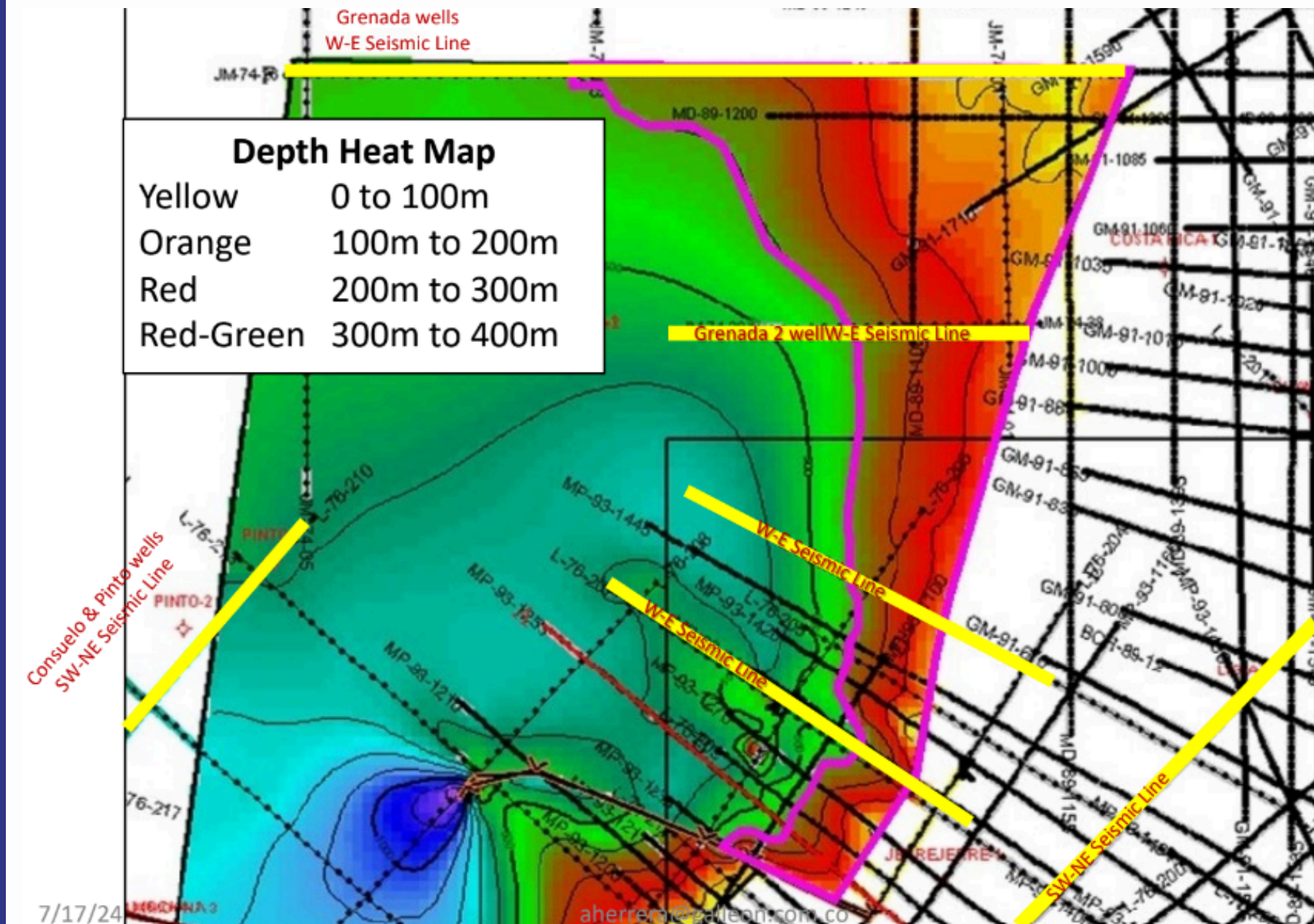
ORIGINAL SIGNED E. B. Colley
WELL SITE GEOLOGIST

Granada 2 well log



Indicative Model based on Seismic and Oil Well Reports

- Indicative model based on seismic and oil well reports



Hacienda Ginebra Outcrop



Intial probe

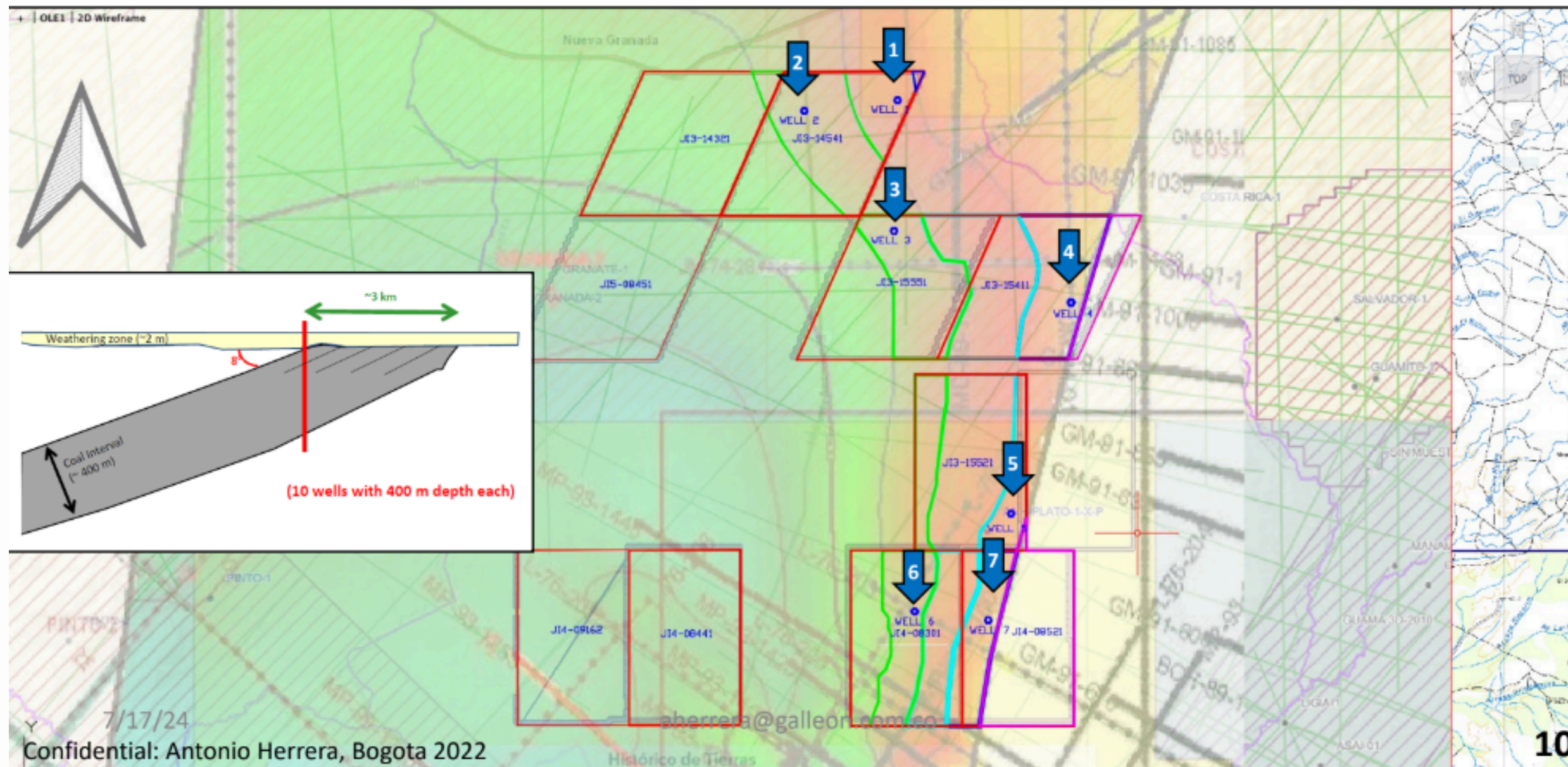


Coal probe



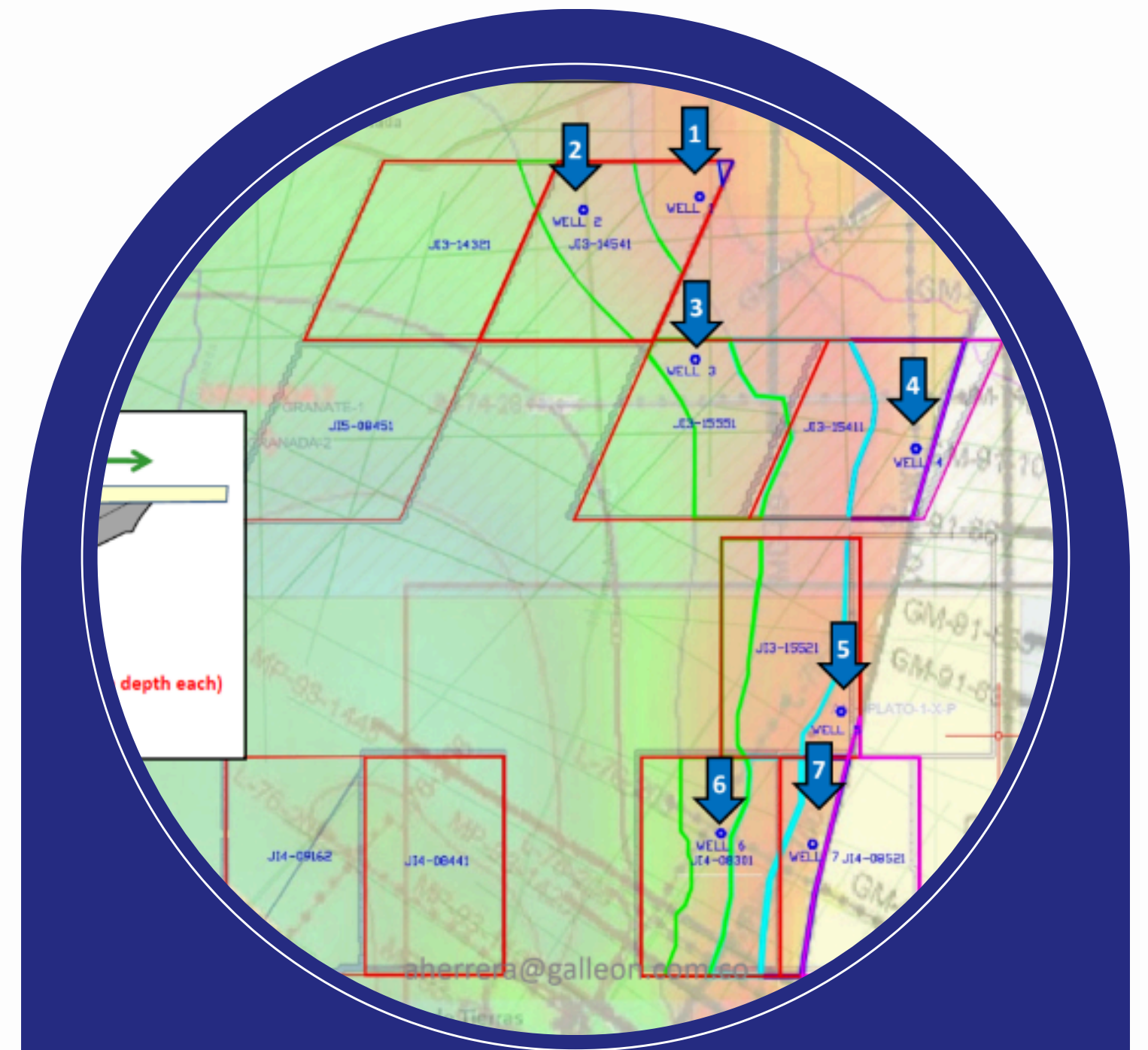
Rock prove

Proposed Geological Test Wells 1

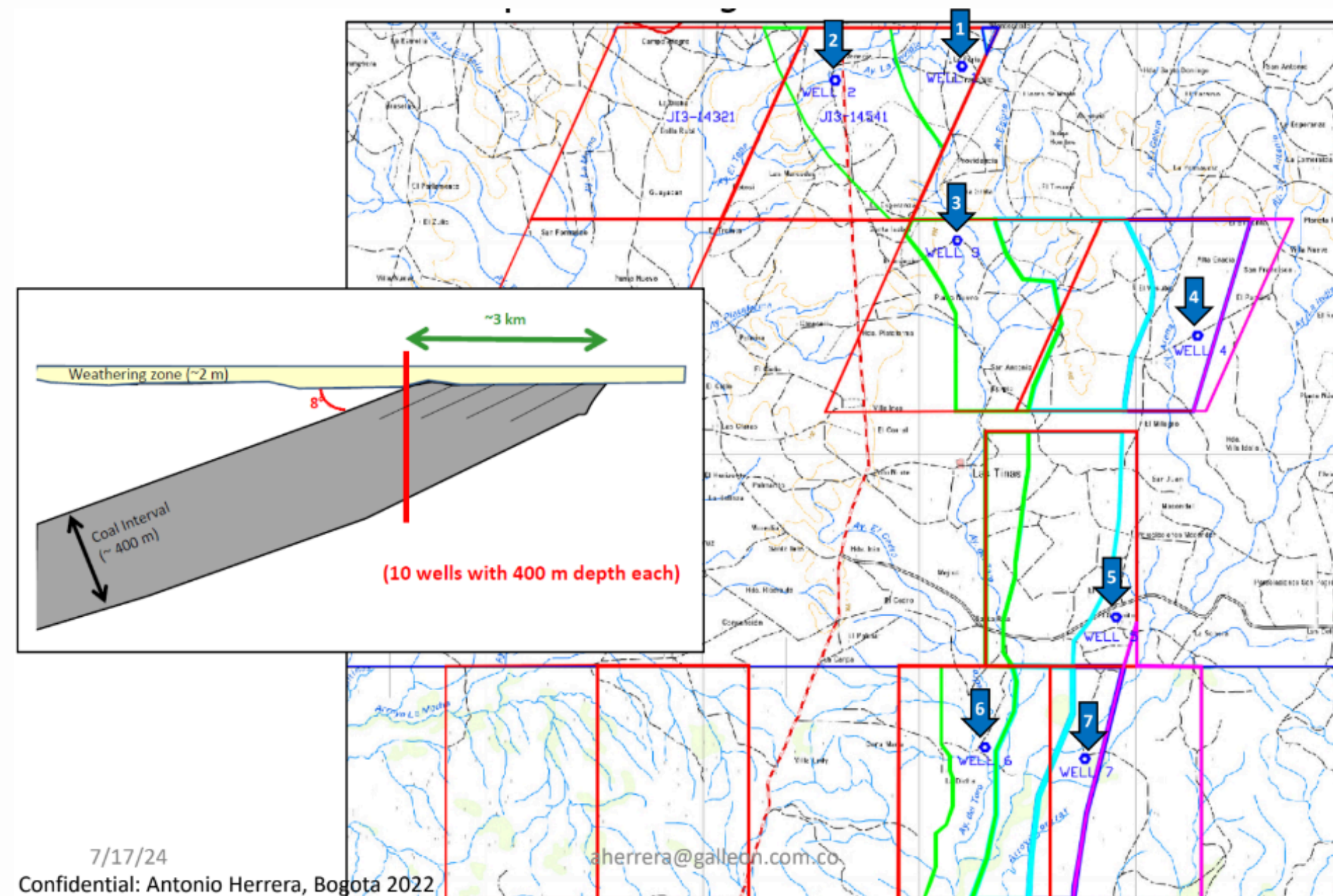


Proposed Geological Test 1

Proposed geological test wells

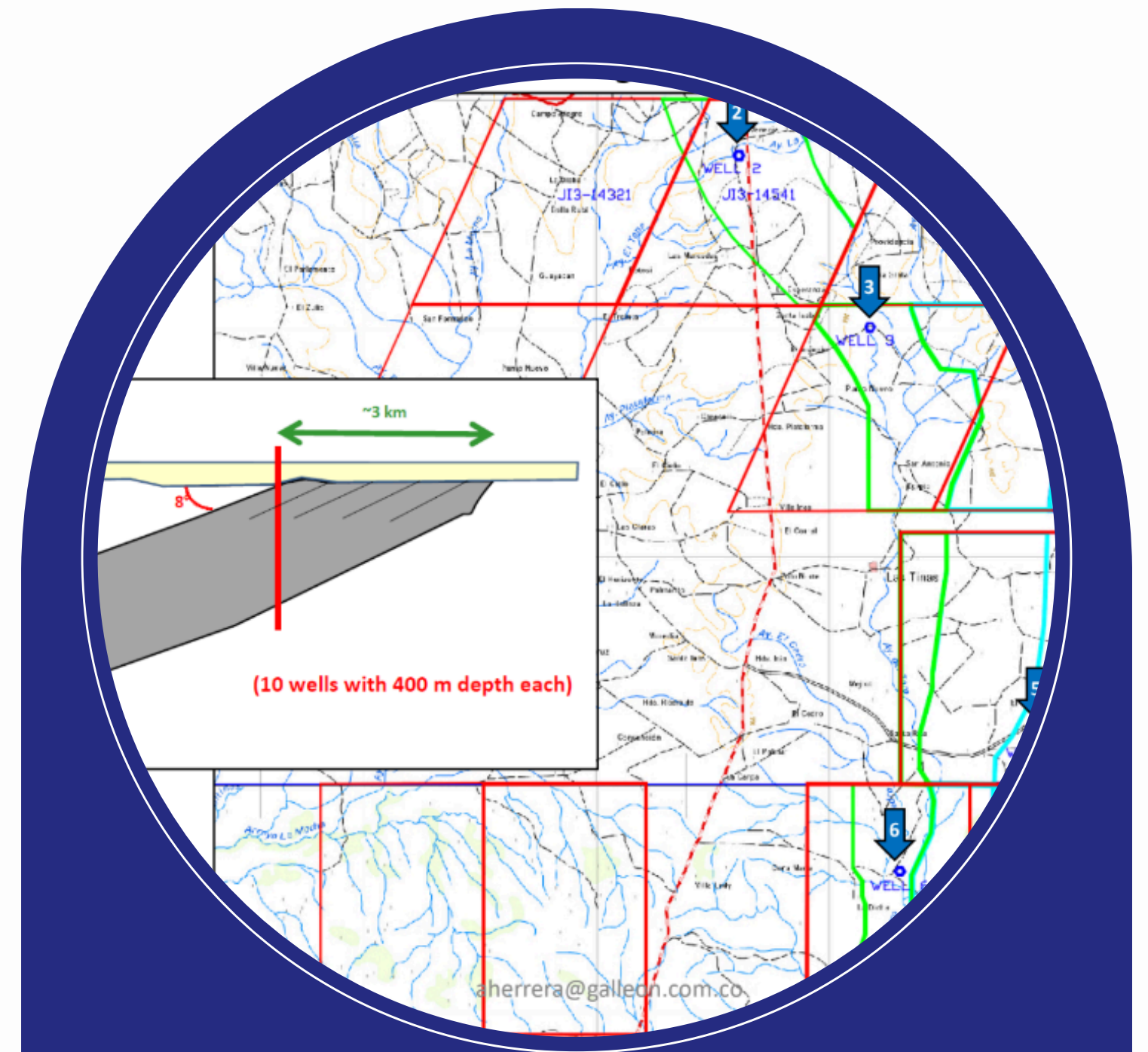


Proposed Geological Test Wells 2



Proposed Geological Test 2

Proposed geological test wells

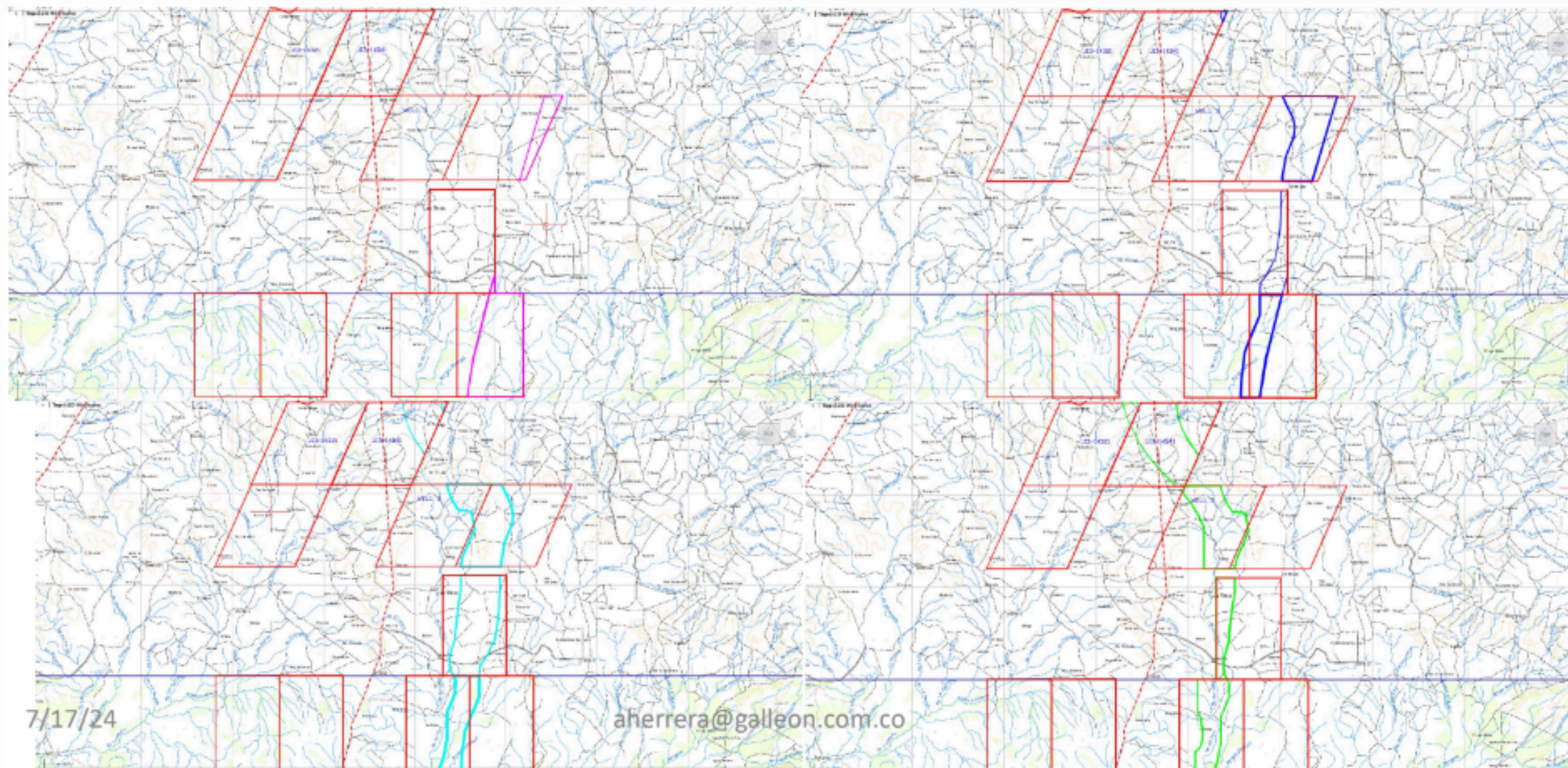


ESTIMATED RESERVES PER DEPTH MM TONS

ESTIMATED RESERVES 07112024

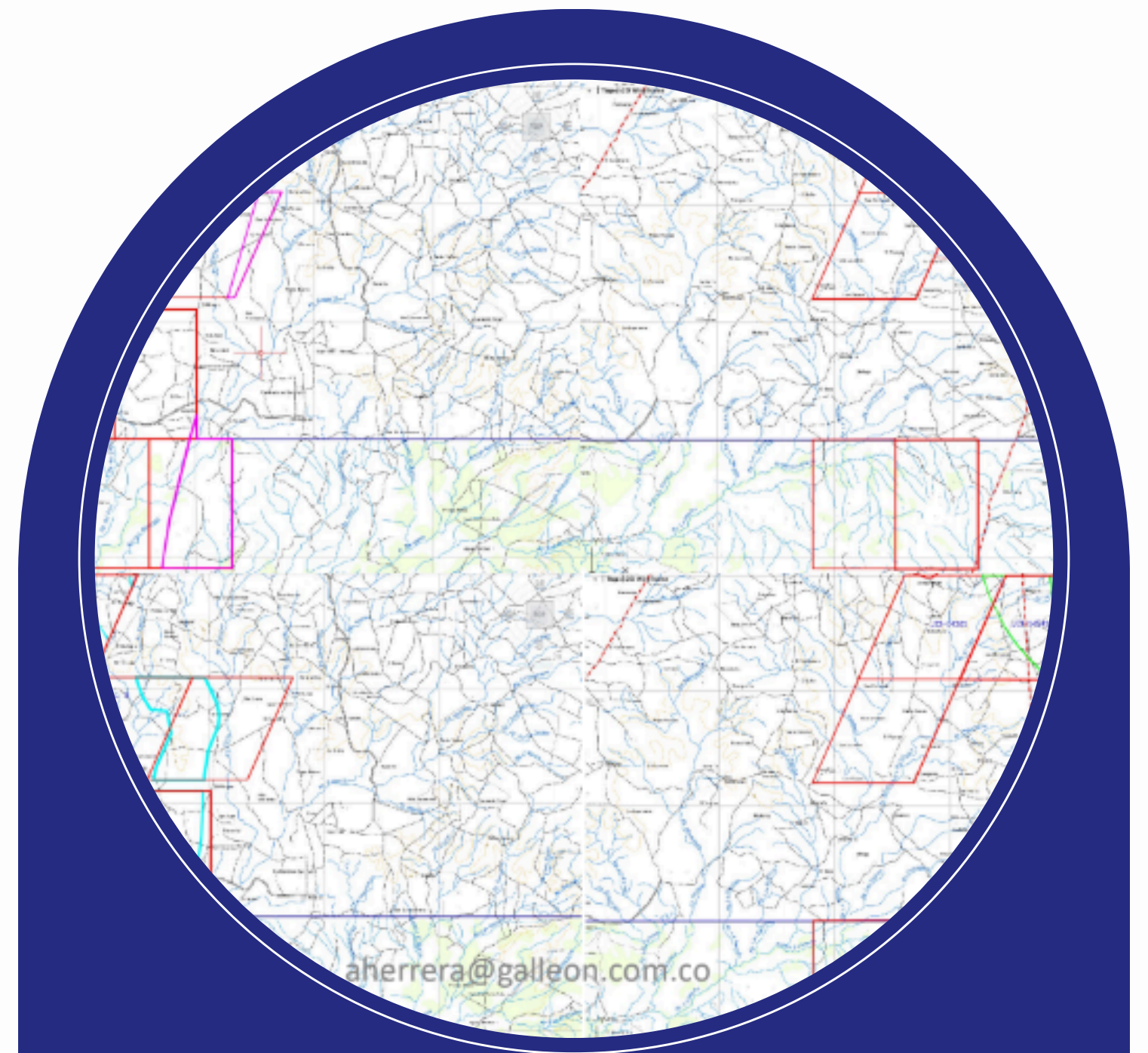
	DEPTH	A1(Hectares)	A2(Hectares)	A3 (Hectares)	A4 (Hectares)	TOTAL AREA (HECTARES)	COAL RESERVES (40 mts total seams)
	0-100 (MAGENTA)			282	1301	1,583	633,200,000
	100-200 mts (BLUE)	11	867	362	593	1,833	733,200,000
	200-300 mts (CYAN)	389	1,078	1,154	651	3,272	1,308,800,000
	300-400 mts (GREEN)	1,057	938	388	701	3,084	1,233,600,000
TOTAL	0-400 mts	1,457	2,883	2,186	3,246	9,772	3,908,800,000

ESTIMATED RESERVES PER DEPTH MM TONS



Estimated Reserves

Estimated reserves per depthMM tons





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