

Meeting @ CFE

2 Mayo 88

1. Raro call to DL for luggage

Arturo Montezosca - CFE in Mexico City

2. CFE is operating a base recording station @  
LA - recording  $308 \pm$  average daily variation.3. High altitudeav ~~100~~ km/hr = 90 mph 150 km/hr $\times 4$  hrs/day on line = 600 km/day $\times 5$  days = 3000 km6 days for high alt. $40 \times 45 = 1800$ in larger area,  $50 \times 45 \text{ km} = 2250 \text{ km}^2$ .Altitude: 500m above terrain.4. Low altitude -av ~~60~~ km/hr  $\times 3$  hrs/day on line = ~~180~~ km/daySize  $10 \times 12 \text{ km} = 120 \text{ km}^2$  ~~1200~~  $\div 5/\text{km} = 600 \text{ km}$ 5 days helicopter if fly bird 200m AT. $600 \text{ km} / 180 \text{ km/day} = 4$  days of flies + recon.5. To Morelia - Morelos was born in ~~the~~ Sept.Sept  
~~the~~ 30.Morelos - one of the people who  
forgot for and helped win independence from Spain.

6. Para ahuite - good area NE of LA

7. Mrs Cuabres area w of LA, 5 km W of  
high altitude sunny, large antibiotic is known --  
V-leams tracks are cloudy - antibiotic

### 3. Big changes in CFE coming

Old manio, was head of CFE, made speeches, was appointed amb. to Belgium. He was supporter of Alarzo + govt. delacruceid was interested in him as a possible presidential candidate, but was passed over. Idea now is that Alarzo will prob be released when new prez comes to power.

In Rosa's group (geol, geoch, geoph) 7 people to go. 2 gp, possib. Camp. Lar x lined to CP.

3 May

1. Lama - 500 kg w/o pilot. capacity max. @ 3000 m. ]
  - volume of cabin -
  - 70 days maximum

represent 540 hydrothermal <sup>Systems</sup> zones. ]

= 1500 thermal springs in Mexico - region essentially finished. Satellite image interpreted. State by state basis. evaluated. Priorities defined, and in 2<sup>nd</sup> stage visited high priority areas. Evaluated via geol + geochm. read if area has enough info for prefeasibility studies - 42 areas were rated high for prefeasibility studies. Geol, geochm + geoph in 42 areas rated  $\geq 1$  as highest. <sup>to drill</sup> Currently or have drilled ~~3~~ 4: Cerro Prieto, LA, Los Hornos, La Primavera; Araró; San Marcos (S of Guadalupe) y Tres Virgenes; Las Derumborras S de CP. + studies in Chihuahua in Rio Grande rift.

geol results

CP = 620 uwe LA = 30 uwe carnethy

San Marcos - near La Primavera; results not good  
180°C temps w/ poor permeability. Lots epidote + schea  
so they suppose it is an old area, remnant of an  
older system.

Las Durambarras -

Araró -

Tres Virgenes

Araró - Two wells, one in primary anomaly blew out.  
needed 5 km, got epidote, schea, low p.

Las Durambarras - hit low, had probs w/ drilling. will drill  
again.

Mexicali - drilled 40-50 wells 250-600m deep,  
finally well in granitic basalt 1500m w/ low temps <200°C.  
Now reviewing info.

- but have many more areas than there possible for  
binary

Tres Virgenes - have started deep drilling - large  
area shallow high temp. But may be old.  
Chem geoth say +280°C. First well had max  
175°C in granites. will do studies 5 km w/  
where there is acidic volc rocks. Place great emphasis  
in all Mexico on getting structures & depth.

to 2500m.

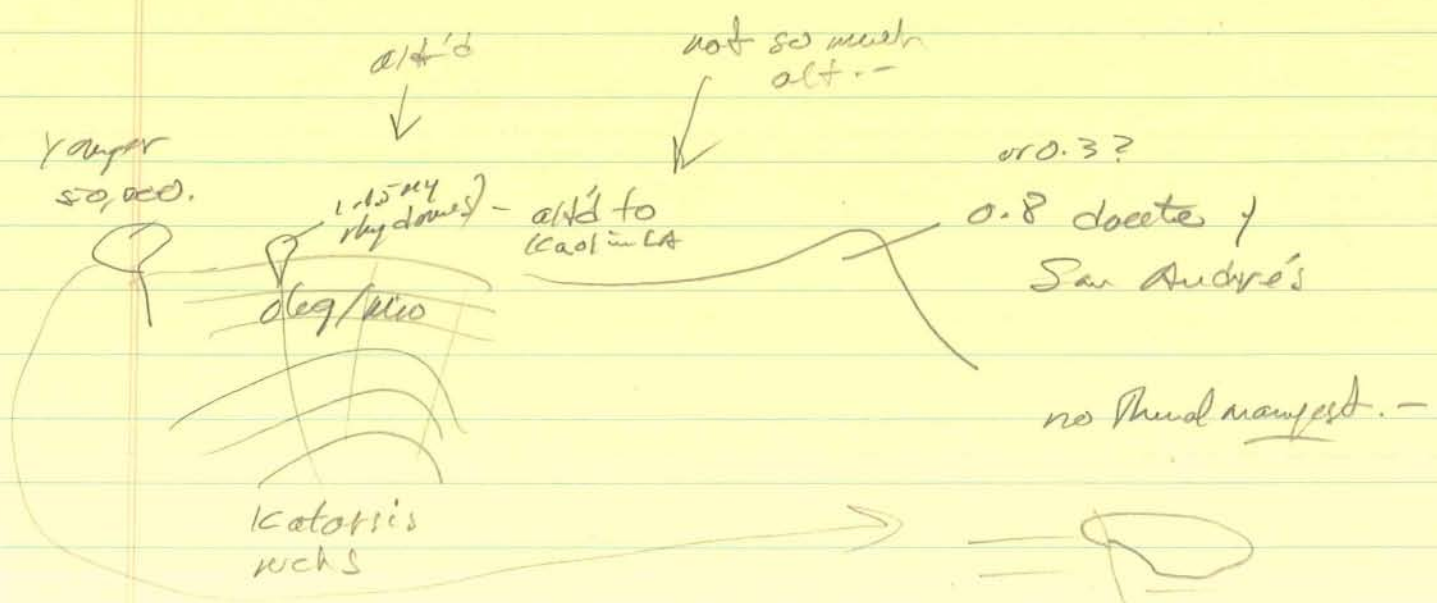
- normally program wells to 2000m. How found that reservoirs are deeper than 1500m. Some areas (LA, CP) have shallower prod. in sub areas.

Feel they get more info from 2-3 deep wells than from shallow wells.

- Pore believes location of magm. ch/heat source. what is important is structure connecting source to reservoir rock and structure of reservoir.

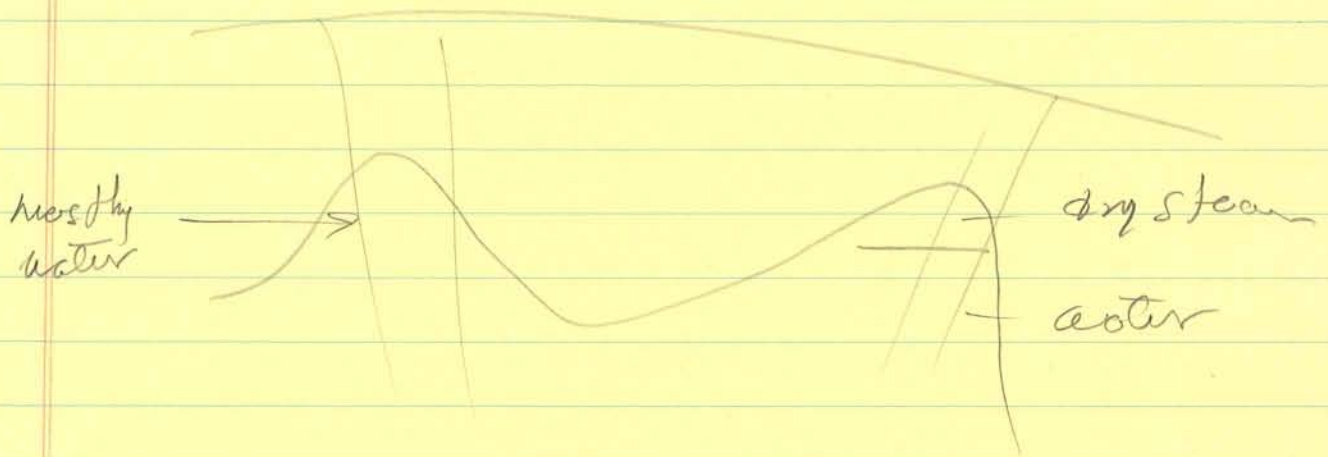
- In CP, older related magm. ch to heat source - But they drilled and did not confirm. Basalt dikes not related to heat source at CP.

- LA maybe 300-800k yrs -- so it is older. Ande's dike, no -- reservoir. But rhyolites similar to Anaco, but age is 0.9-1.1 mya -



primary control is E-W -- dome is a fluid mag. syst that controls hydroth syst.

11-5 Pipe



only production come from good structure.

## MAG SYSTEM CHECK / INSTALL

1. Sensor orientation in bird. Changed for Asc? tried should be horiz: i.e. glue ring vertical.
2. Procedures needed to be worked out
  - (a) Cockpit communications - Ross: list
  - (b) Take off / Landing deploying bird.
  - (c) Battery changes re refuel times, i.e. batteries @ Los Mochis or airport.
  - (d) Line sequences / numbers

# UURI

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16 May 88

Mi Amigo Razo -

This note is to document some final items before Ross and I leave for Salt Lake City.

1. I believe that we need to have the originals of both the TV tapes and the magnetometer records in UURI. The TV tapes contain digital magnetic and terrain clearance data, and I believe the recovery of these data using a computer will be more reliable from the originals. The magnetometer records will require further annotation and checking - more than we were able to do in Morelia. We would appreciate it very much if you could ship those originals that we left in Morelia for copying.

I propose that when we have used the originals for compilation of the maps, we will send them to CFE for permanent storage. I believe that all originals for our joint project should be stored in Morelia because you are much more likely to use them in the future than we are.

2. The copies of the TV tapes that you are keeping at CFE should be of good quality for recovery of the flight path. But I am worried a little bit about the quality of the copies of the magnetometer records. Some of the lines and marks on the originals are so light that they may not copy well, especially with a copy machine that is not sensitive to blue. If your copies are poor, please let us know and we will make every effort to make a better quality copy for you when we have done our additional checking and annotation.

3. I believe that recovery of the flight path for the high-altitude survey will be a problem. Because of the smoke good images of the ground were not obtained for some parts of the flight lines when we were far above the surface. In addition, it is much more difficult to recover flight lines directly onto a map than it is onto a photo because the photo shows detail that matches the TV picture, whereas a map does not. If we each have problems in flight-path recovery, it may be wise to try to get photos. Perhaps there are government photos already available. Let us talk on the phone about this.



4. we will undoubtedly need to talk on the telephone often about this project as it progresses.

Finally, Ross and I want to thank you very much for the great hospitality and friendship given to us by you and the other people of CFE. We also thank you for the very excellent help and cooperation in doing the two aeromagnetic surveys. It has been a real pleasure to come here to Morelia and work with the people of CFE.

Rozo, you have a staff that you can be proud of. Your people are all hard-working and of high technical capability. We wish CFE luck and success in further geothermal development in Mexico, and we look forward to our work with you in our joint CFE/DOE projects.

Tu Amigo, Miguel

## FOR LUURI

1. Original magnetometer records.
  - LUURI will check, make needed corrections and make copies for CFE.
2. Original TV Tapes
  - LUURI will check, attempt to recover digital data and send copies of digital data to CFE.
3. Photo mosaic of Low Altitude Survey Area
4. Map or photomap of Low Altitude Survey with planned flight lines.
5. Map of High Altitude Survey with points along lines as marked by Lira during flight (as an overlay?)
6. 1:250,000 Base Map for High Altitude Survey Area
7. Copies of records of magnetic field variation from magnetic monitor at Cos Azules.