5/31/79

w/ John Sonderegger

State Coupled Program

G+B recommend at Marine Dell Ray for compendium of age dates for each state

DF suggests Isochron West

Geochem

No low T° geothermometer in carbonate-bearing systems
big problem according to JS

JS - working on programs assuming EQBM w/ gypsum or fluorite

G+B Butte has AA - will get an ICP

Canvas - low T° H_2O has higher As content
good probability of mixing

T Wants to do stable isotope on SO_4
to explore mixing model possibilities
i.e. Warm Springs - SO_4 (gypsum) from MM vs SO_4 in soln from oxidation of sulfides

T_3 potential problem w/ drawdown in Mm systems -
induce recharge closer to system → lower T°
speeding up residence time of fluid
Warm Springs 77°C / 50 gpm
want to upgrade to 500 gpm

Ennis - anomaly may be larger than originally thought

Hot Springs as tourist attractions

G+B PR problems - West Yellowstone day up YNP
vocal community freaks

T_5 Gradient mapping from PI data
hot spots in anticlinal crest of MM and/or in valleys
JS wants to remove this structural overprint

Take over of abondened oil wells
à la Keith Brown's talk
esp. in eastern Montana
probably not realistic in exploration holes
O.K. in abandonment stage

T_3 Degradation of resource
How much heat can you remove w/out mining it
can only match recharge rate

~~T_6~~ T_6 Reservoir T° + size Analysis in Mt. → will fold into 790 - update
JS promised to Keith Brown
Problems: assumed porosities
volume assumption

T_4 JS planning thermal - isopach map of Mm in eastern MT.
question of water quality
highly reduced $H_2S_{(g)}$ - bearing H_2O (boiling!) in eastern MT.
stratigraphic control on water quality
evaporites
(Miss valley Sulfides ?!)

Warm Springs
JS - wary of lack of exploratory drilling phase
i.e. jumping into production hole phase

Ennis
Drilling there will probably be successful
on the right scale
(home heating)

5 gpm 160° C H_2O to heat large 2000 sq ft house in Winkler
can probably use less

A.I.
send to JS →
JS - lack of info about GRC
how to get on mailing list

Montana land ownership / BLM
O.K. except in east (~~FARE II~~)
1/2 of eastern MT is BLM esp. mineral rights
(surface occupancy not that bad)

NURE holes 7 holes planned
Pete Workeck
MBM&G cased & pump tst
4 holes completed as water wells - 2 gradients from ~~in~~ February
1,000 - 2900
2 holes cased completed as geothermal holes
one abandoned
Bob Leonard bought the casing
& is doing the logging
not a heat flow measurements
MBM&G has partial sets of cuttings & cores
would have to clear through DOE to use cuttings
possibility of preserving cuttings at USL
A.I.
Ask for OFR →
NICK ~~BR~~ ABRAMIUK (Bendix) Bad. Jct.
DAVE KENNSEY: will be working w/ the samples
Bob Fields is logging the core (or having a student)
G&B
JS - has a temp. probe on order 1500'
won't sink in mud
(neither will B. Leonard's)

MERDE

Montana Commercialization Baseline Document
JS - wanted to know what his role will be

G+B Annotated bibliography of geothermal in Mt.
In progress
not sure how (what focus) will publish in

USGS
Drilling at Ennis
T+ Reconn in W. Yellowstone
hydrologic + gechem, geophys
will select 2 drill sites next winter 990 ft $50K
drill 1000' gradient hole summer 1980
but don't know how thick the valley fill
worked w/ Bill Berge | Phillips on this
i.e. indicated no conflict in working here
want to penetrate below the gravels into volcanics

Pete Norbeck - will bid ~~at~~ on Wakem Springs.
on State Board of WW Drillers
→ get copy of JS's Wakem Springs specs

A.I. → find out about Cooke City - which holes aren't artesian
find out where Bill Oriel is
MBM+G Field Agent
company contacts
but not actively pursuing

T2 This Summer:

- Centennial - finish up
- Cabinet Areas
- S. of Townsend
  - Rudersburg Basin - Plunkett Sprg.
    - pumping more there should be possible out of Tertiary - must have Mm component
    - will study hydrology + geophys (seismic, gravity, resist.)
    - two fault-bounded springs in Mm
- Ennis
- Warm Springs (support)
- West Yellowstone
- eastern Mt. inventory

Land Problems: Commissioner of State Lands
10 Lease applications required before will hold a lease sale

More Spees on contracts →
fewer bids
more expensive

T1 Montana Map
↑ 1:500,000 vs. 1:750,000
1:500,000 base for rough plotting
PI plotted 1:250,000 / compiled 1:500,000
JS wants T&R grid, culture grid
shaded relief optional if doesn't obscure data