Geothermal Resources of the Salton Sea

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Division of Oil, Gas, and Geothermal Resources

Salton Sea Advisory Committee Meeting

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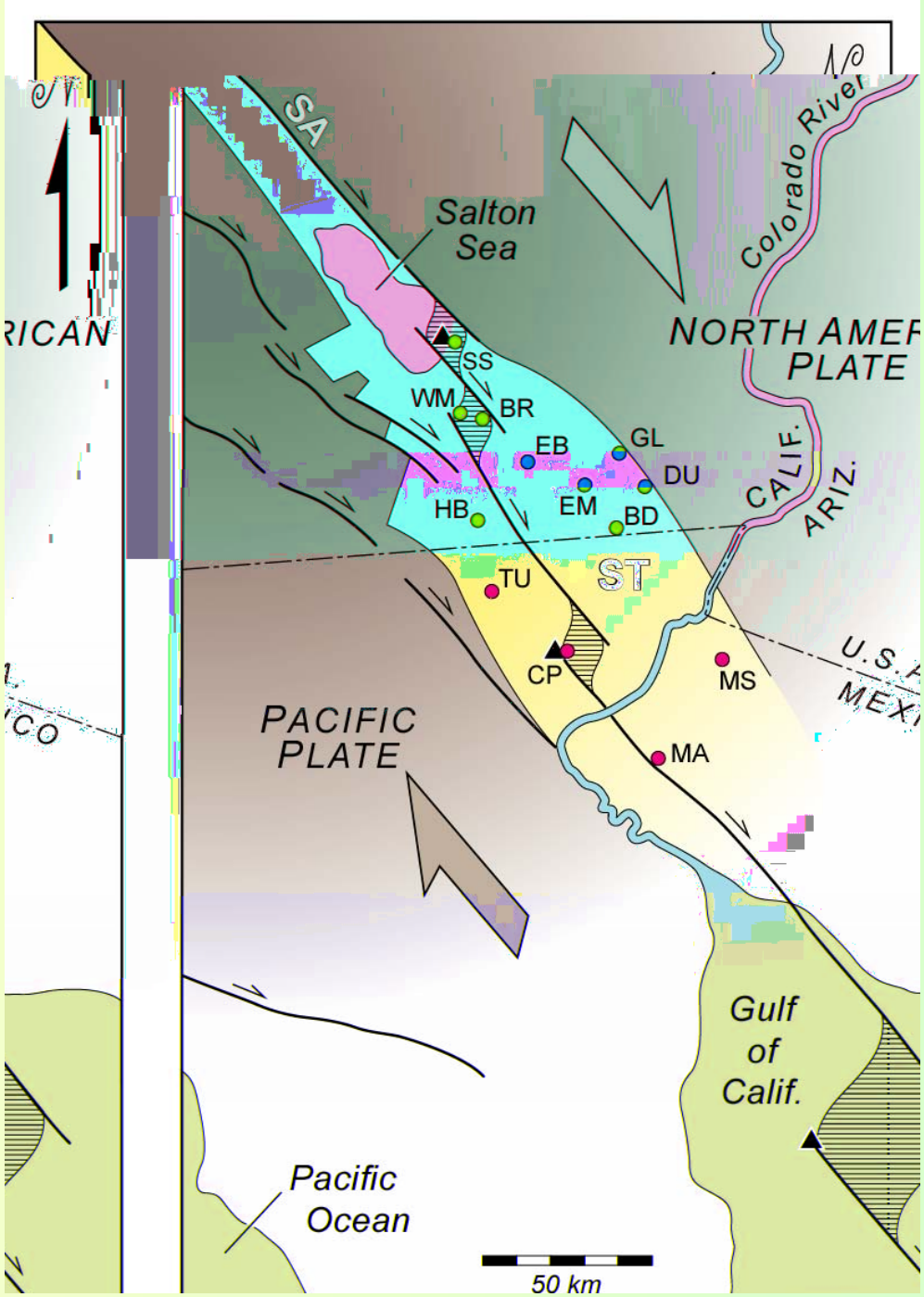
Geothermal Resources of the Salton Sea

- Geology of Salton Trough
- Surface Features of Salton Sea Geothermal System
- Salton Sea Geothermal Field
- Potential Applications of Using Geothermal Energy for Desalination

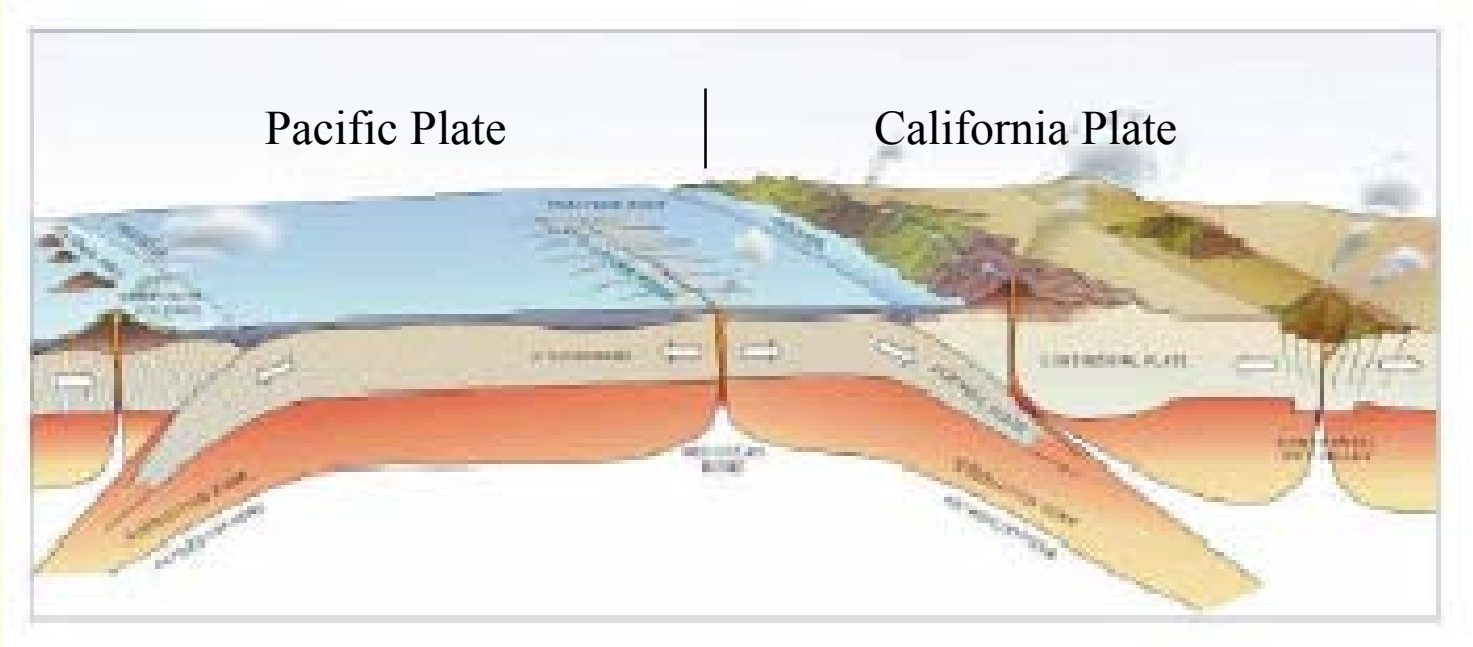
Geology of Salton Trough

- San Andreas Fault System
- Colorado River Delta

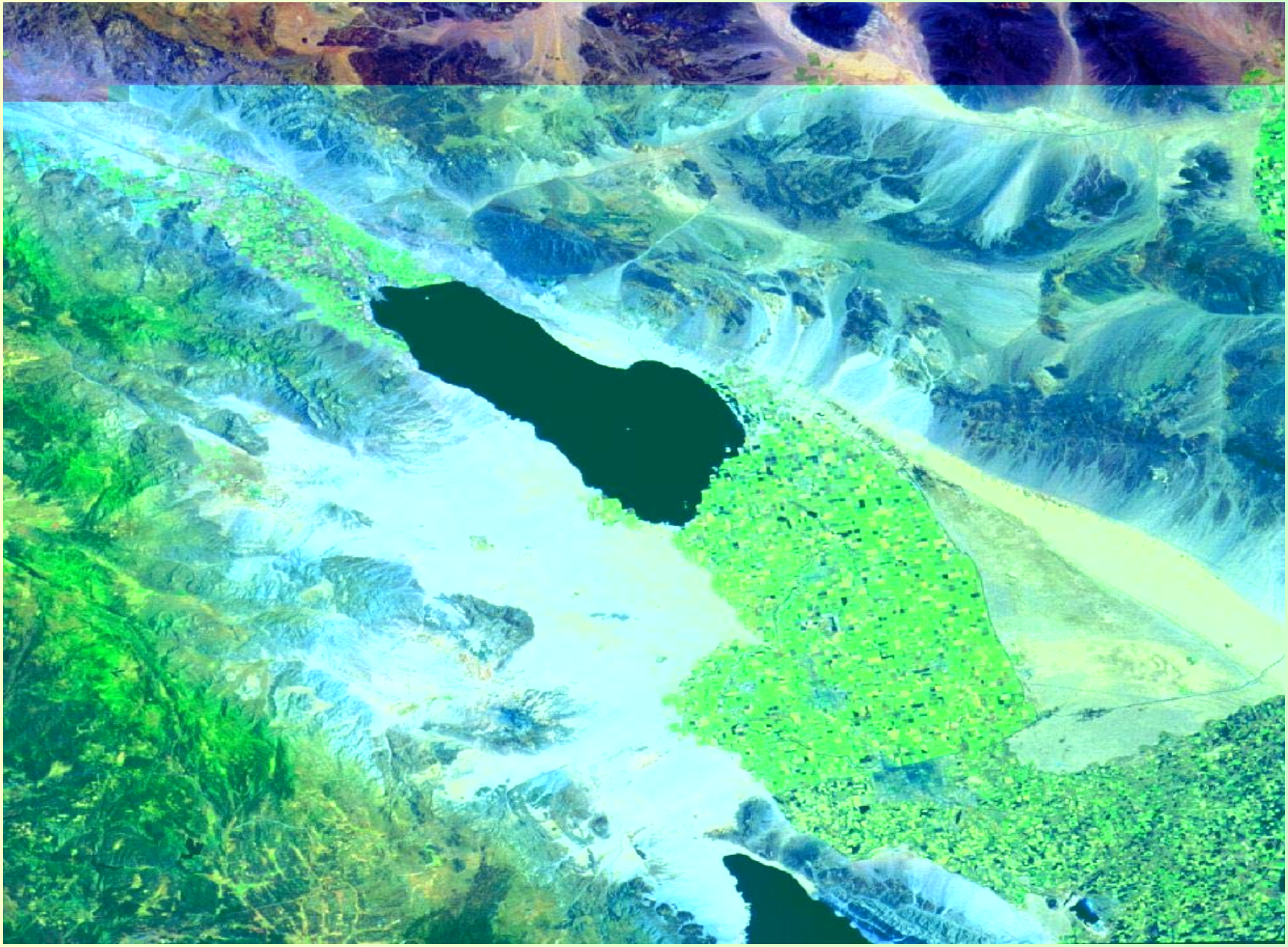

SA
Salton Sea
Colorado River
NORTH AMER
PLATE
RICAN
SS
WM
BR
EB
GL
DU
HB
EM
BD
CALIF.
ARIZ.
TU
ST
CP
MS
U.S.
MEX
MA
PACIFIC
PLATE
Gulf
of
Calif.
Pacific
Ocean
50 km

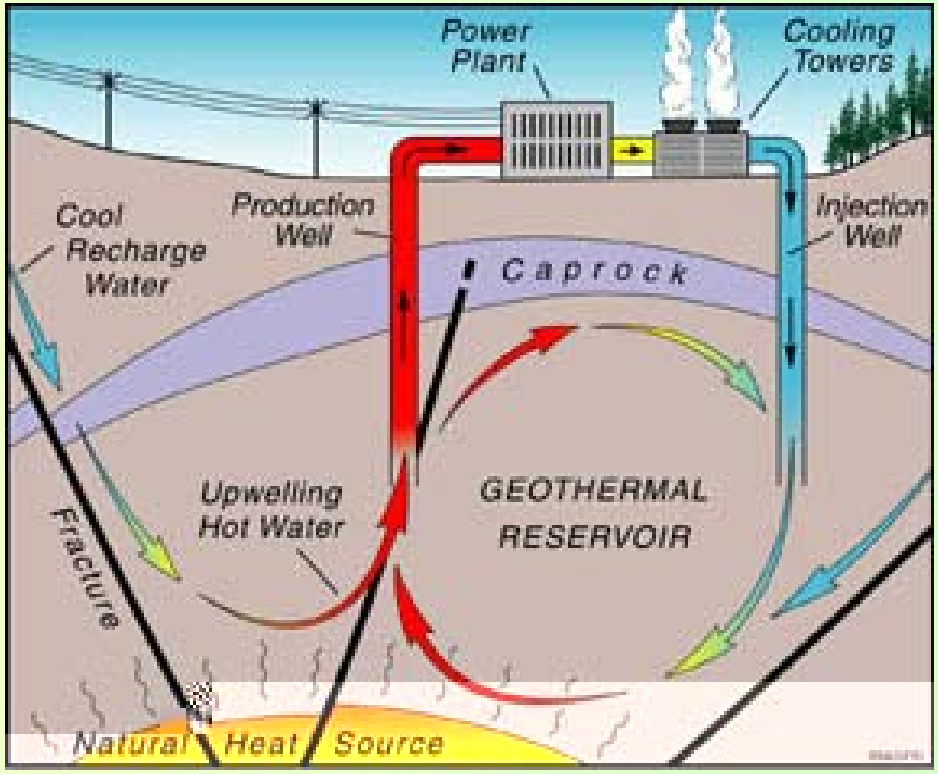
California Plate

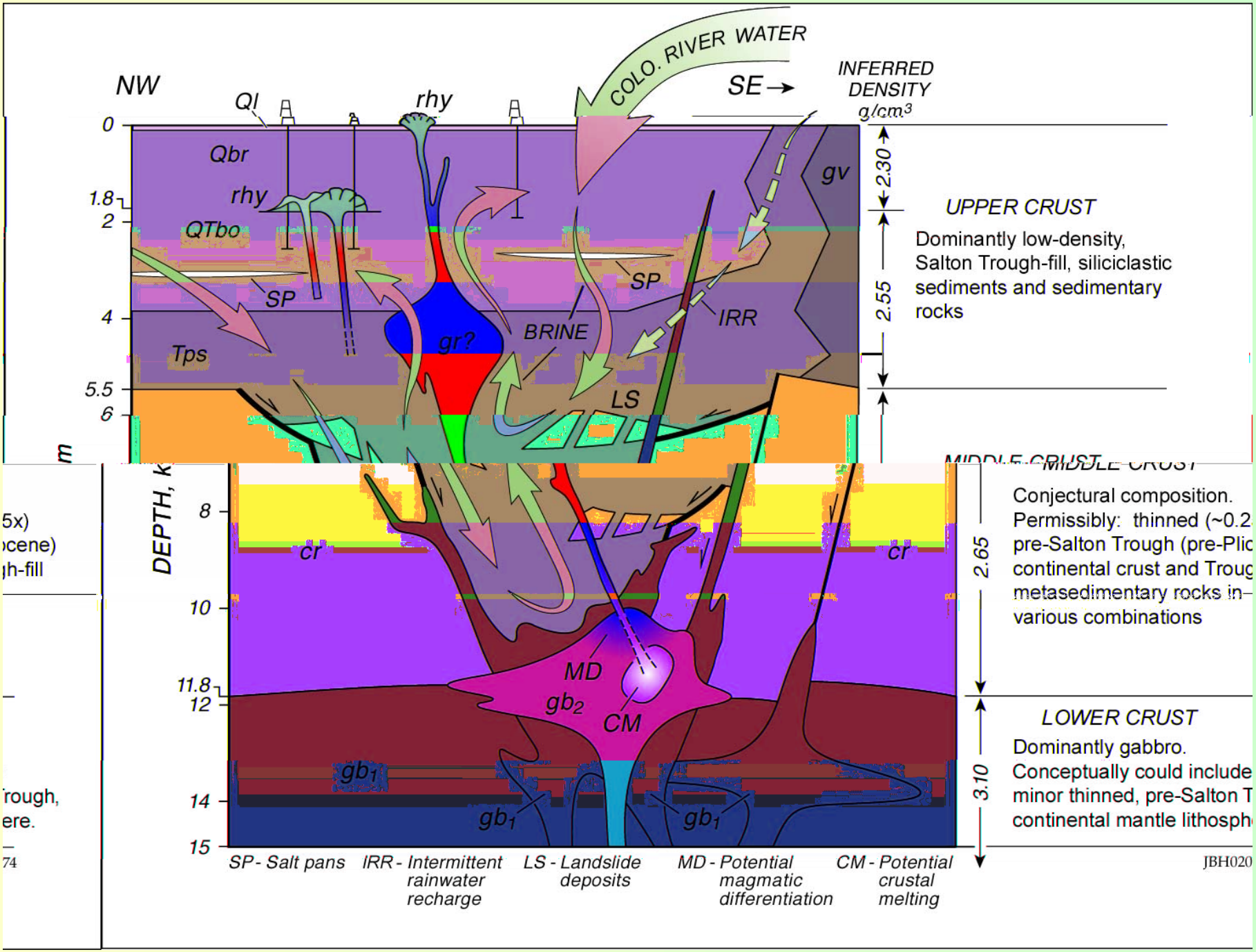
W E



N
Colorado River delta
Colorado River

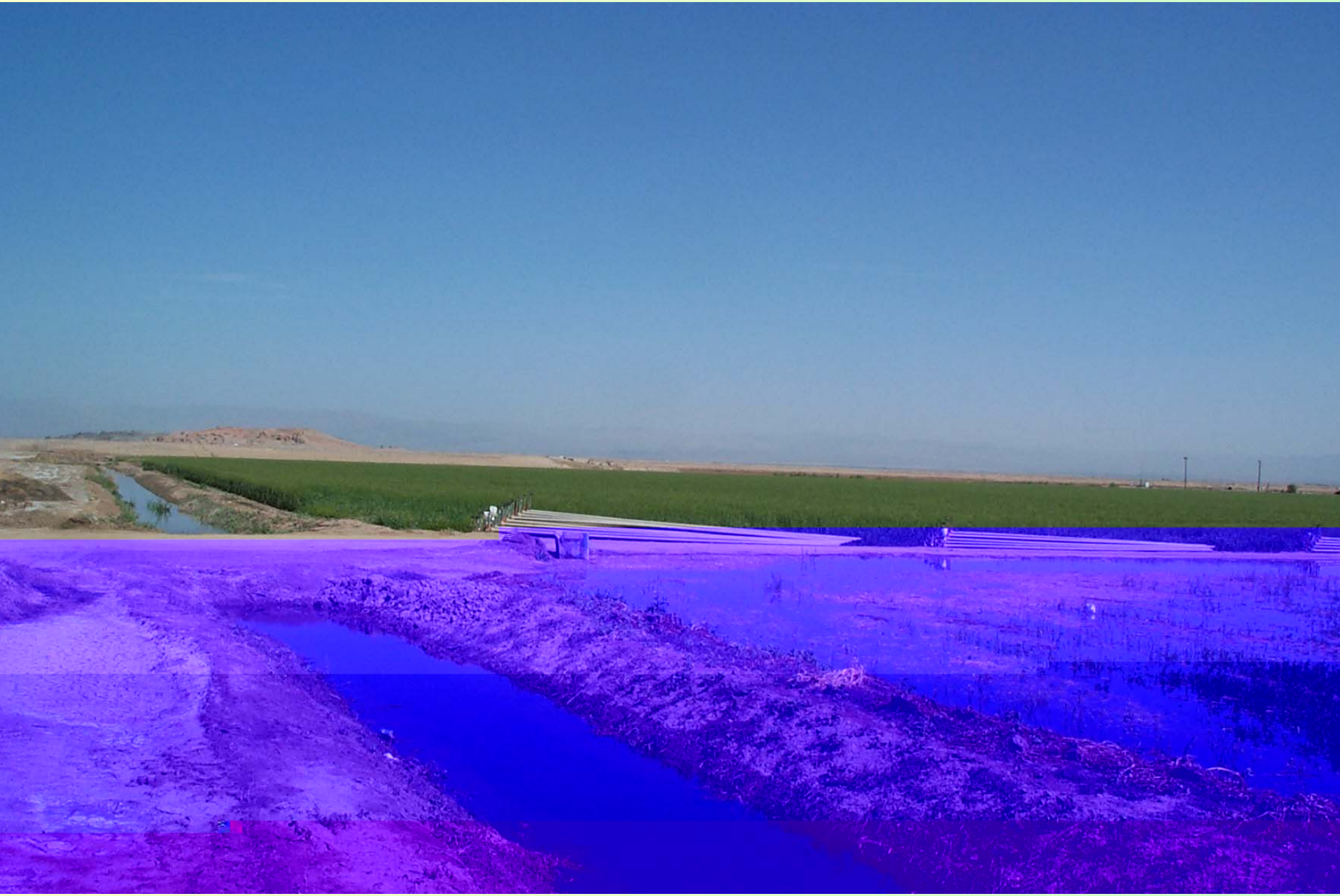


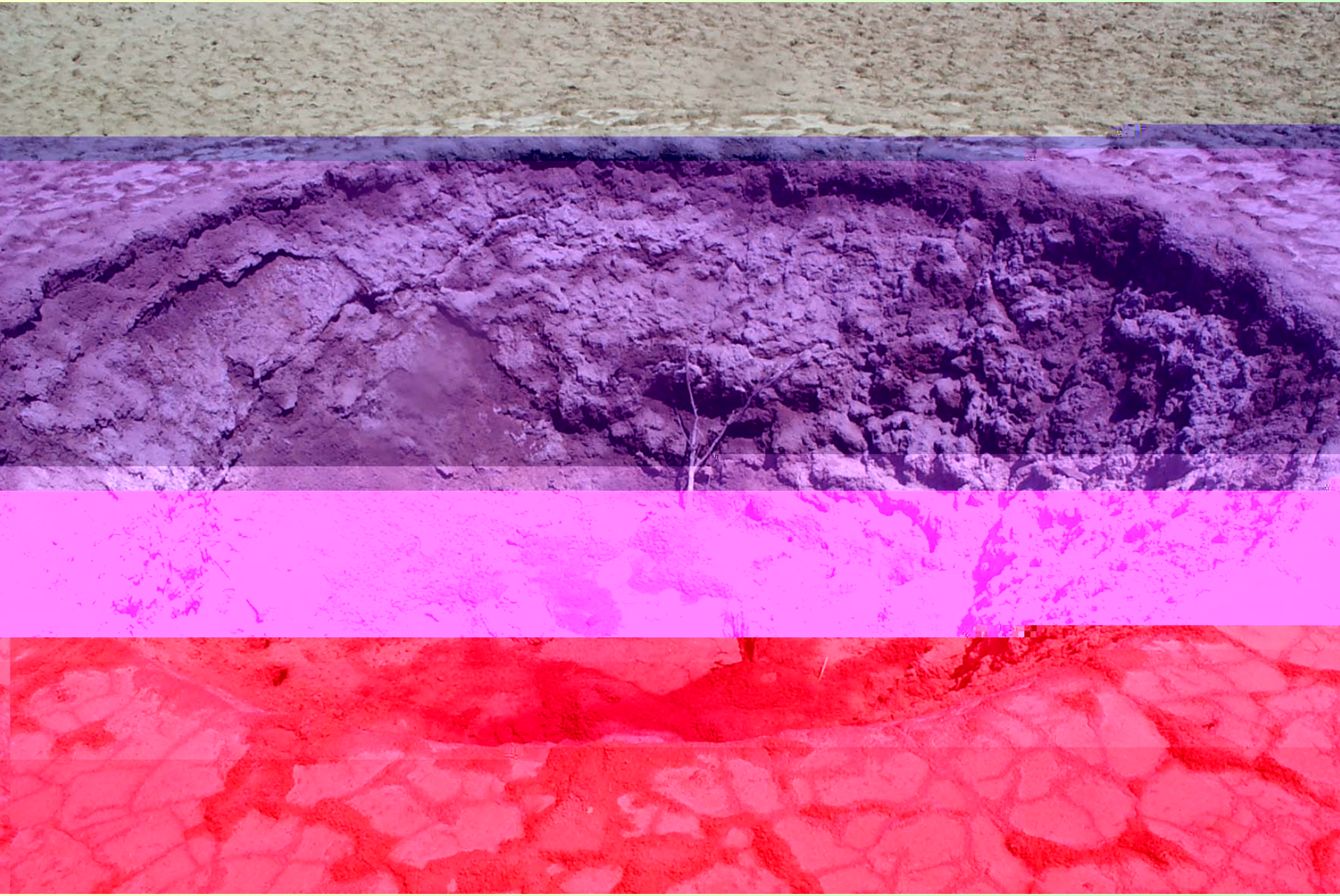

Power Plant
Cooling Towers
Cool Recharge Water
Production Well
Injection Well
Caprock
Upwelling Hot Water
GEOTHERMAL RESERVOIR
Fracture
Natural Heat Source

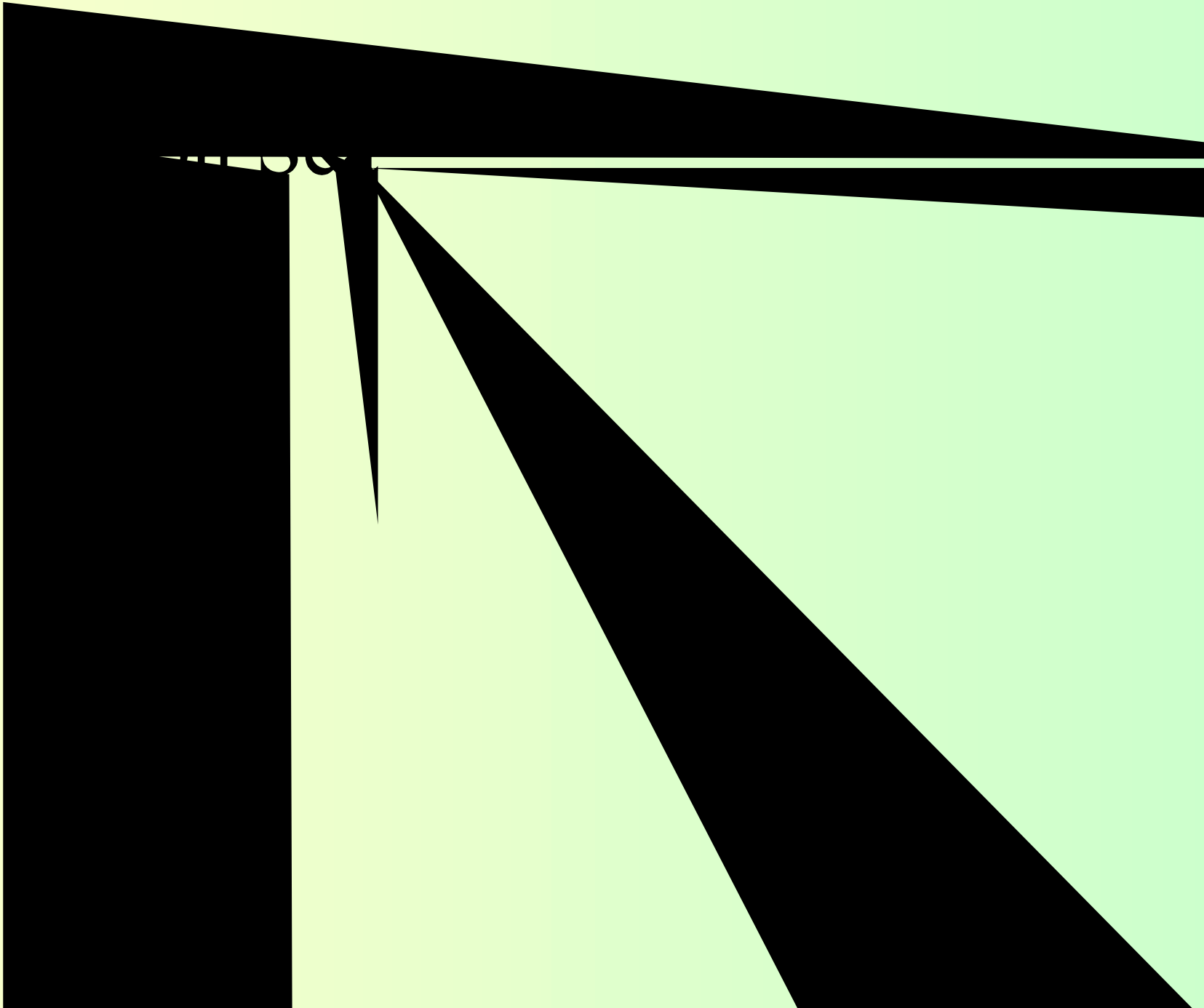

NW
SE →
COLO. RIVER WATER
INFERRED DENSITY g/cm³
Ql
rhy
Qbr
rhy
QTbo
SP
Tps
gr?
BRINE
SP
IRR
LS
gv
0
1.8
2
4
5.5
6
2.30
2.55
UPPER CRUST
Dominantly low-density, Salton Trough-fill, siliciclastic sediments and sedimentary rocks
DEPTH, km
8
10
11.8
12
14
15
cr
cr
MD
gb2
CM
gb1
gb1
gb1
2.65
3.10
MIDDLE CRUST
Conjectural composition. Permissibly: thinned (~0.2 pre-Salton Trough (pre-Plic continental crust and Troug metasedimentary rocks in various combinations
LOWER CRUST
Dominantly gabbro. Conceptually could include minor thinned, pre-Salton T continental mantle lithosph
SP - Salt pans
IRR - Intermittent rainwater recharge
LS - Landslide deposits
MD - Potential magmatic differentiation
CM - Potential crustal melting
JBH020

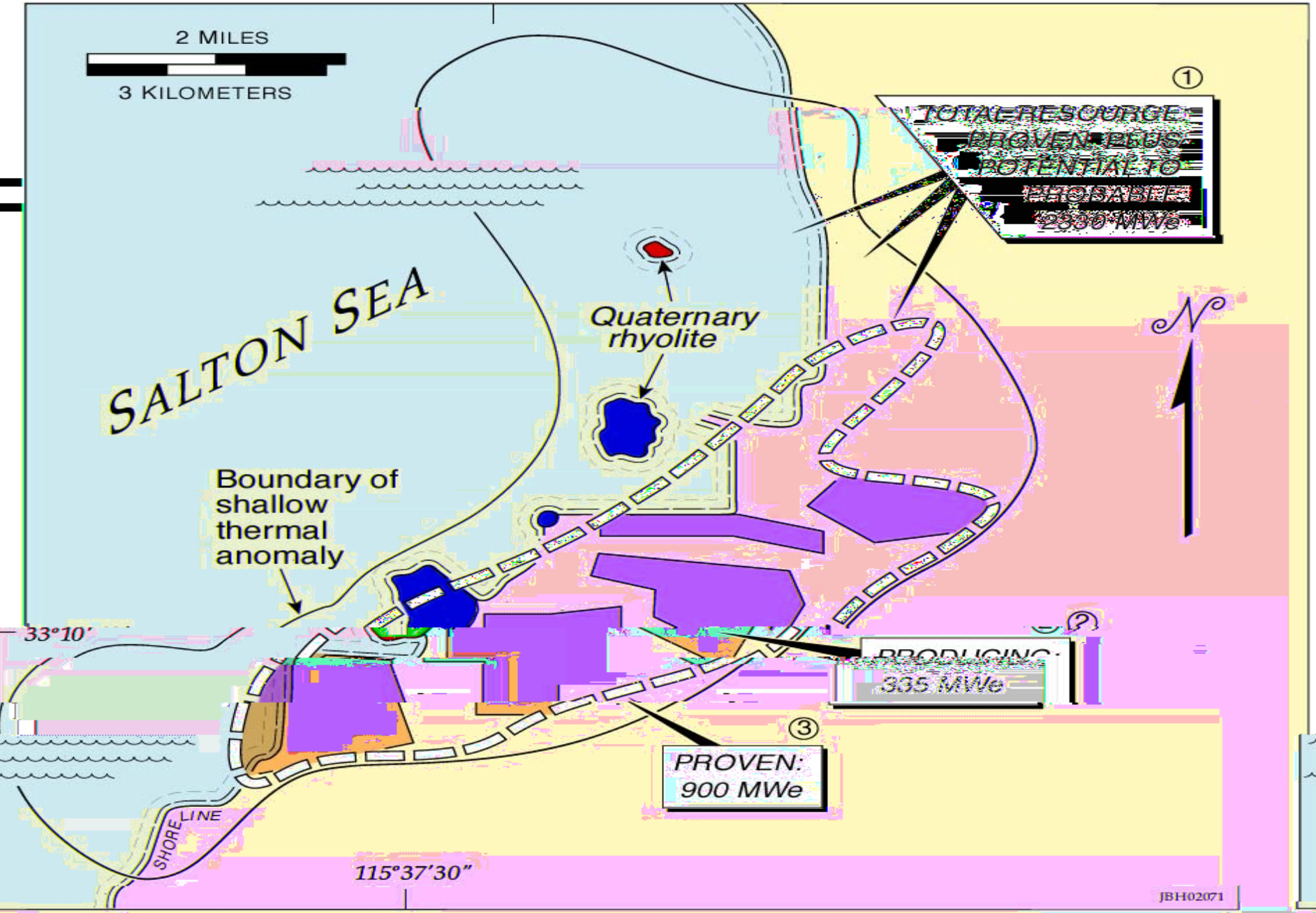
Surface Features of Salton Sea Geothermal System

- Rhyolite Domes
- Mud Pots/Volcanoes





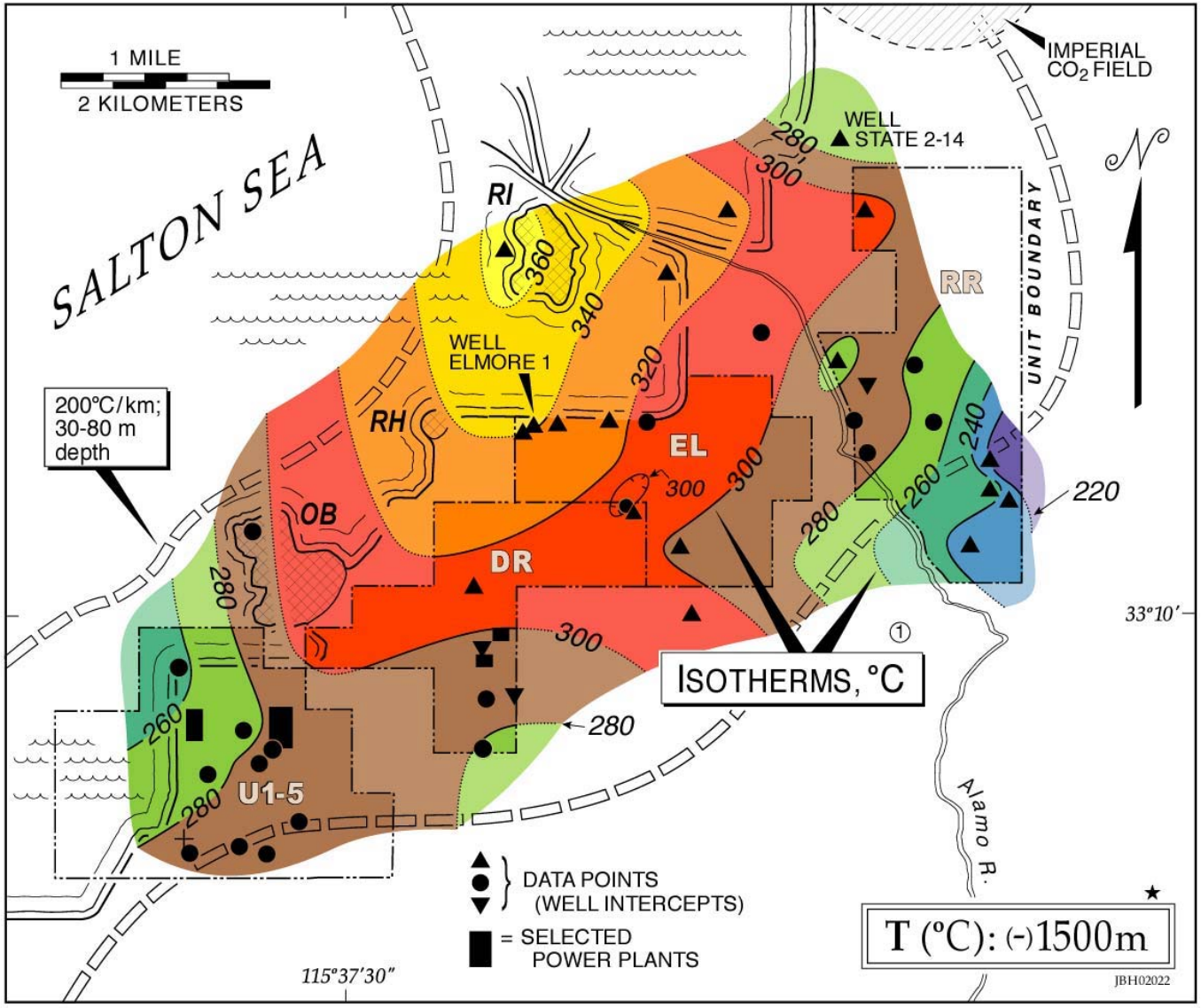




① Beneath shallow thermal anomaly

② Five parcels within proven sector

③ Sector enclosed by open-dashed line



① Dotted where projected between or beyond unit boundaries

NOTE: Ground level = (-)69 m

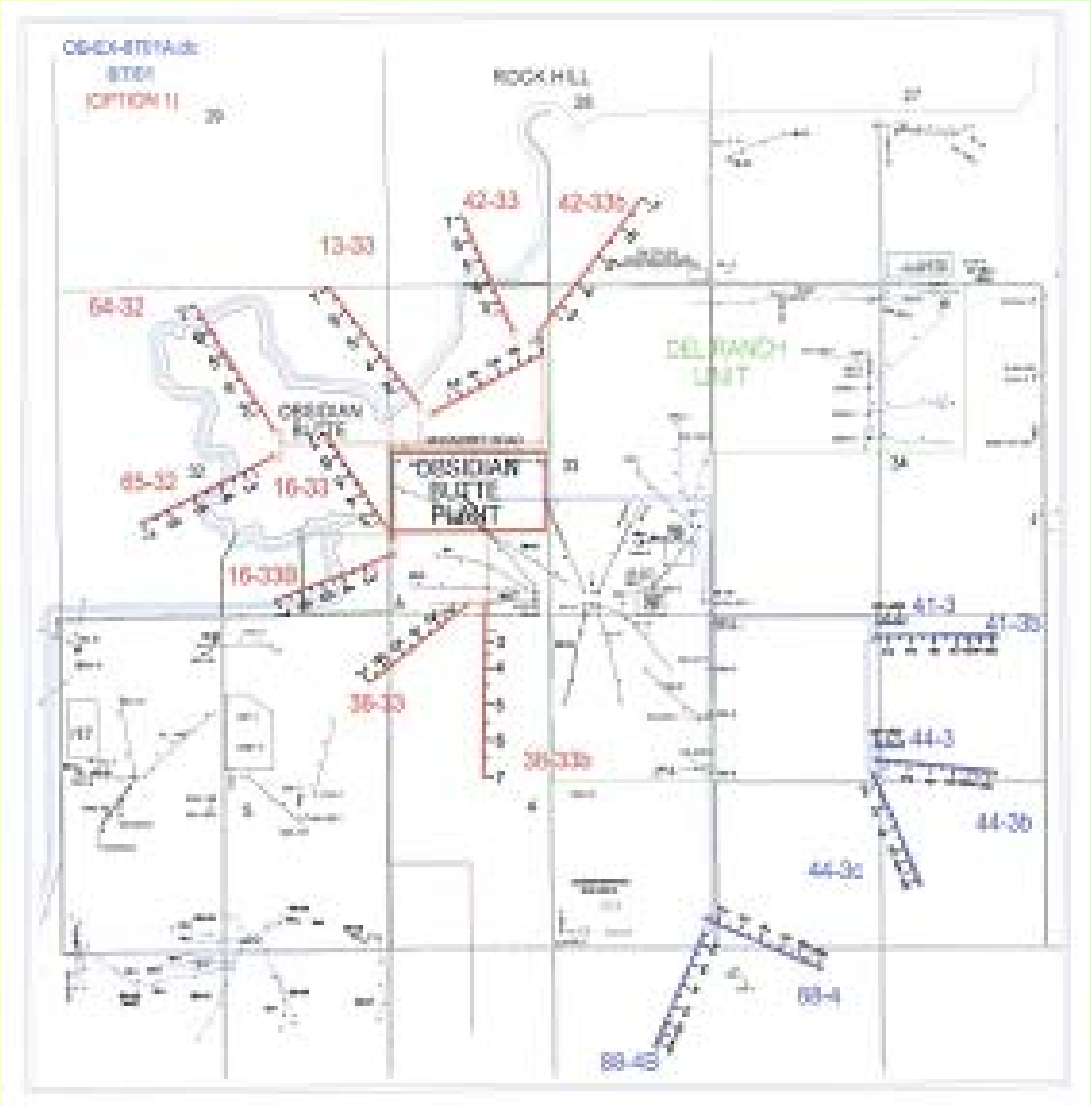
★(-)4922 ft

Total Dissolved Solids

(Typical Weight %)

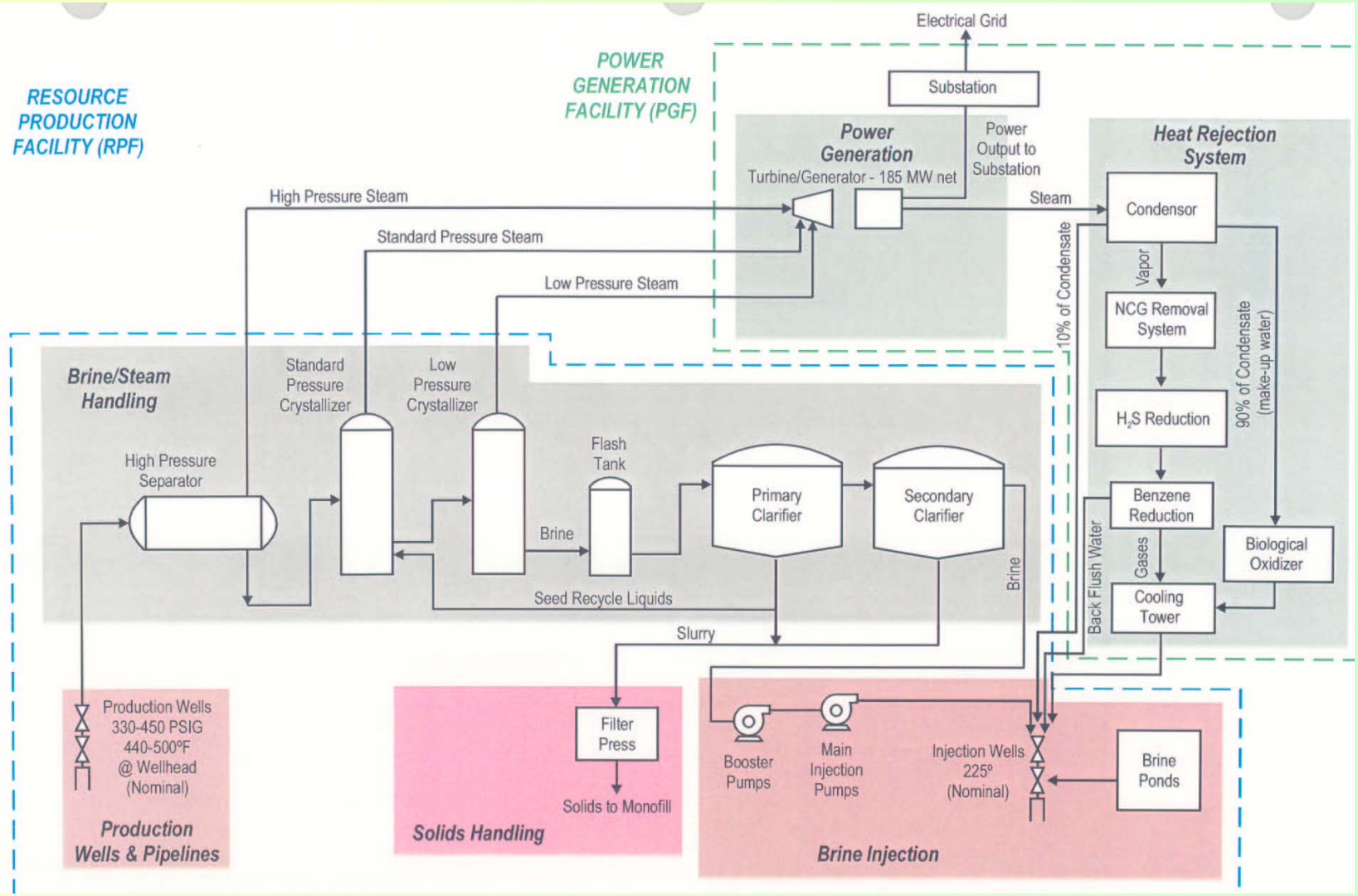
Chloride	15.40
Sodium	5.27
Calcium	2.65
Potassium	1.65
Carbon Dioxide	0.17
Iron	0.15
Manganese	0.14
Zinc	0.05
Silica	0.05
Other	0.16
Total Dissolved Solids & Gases	**25.69**

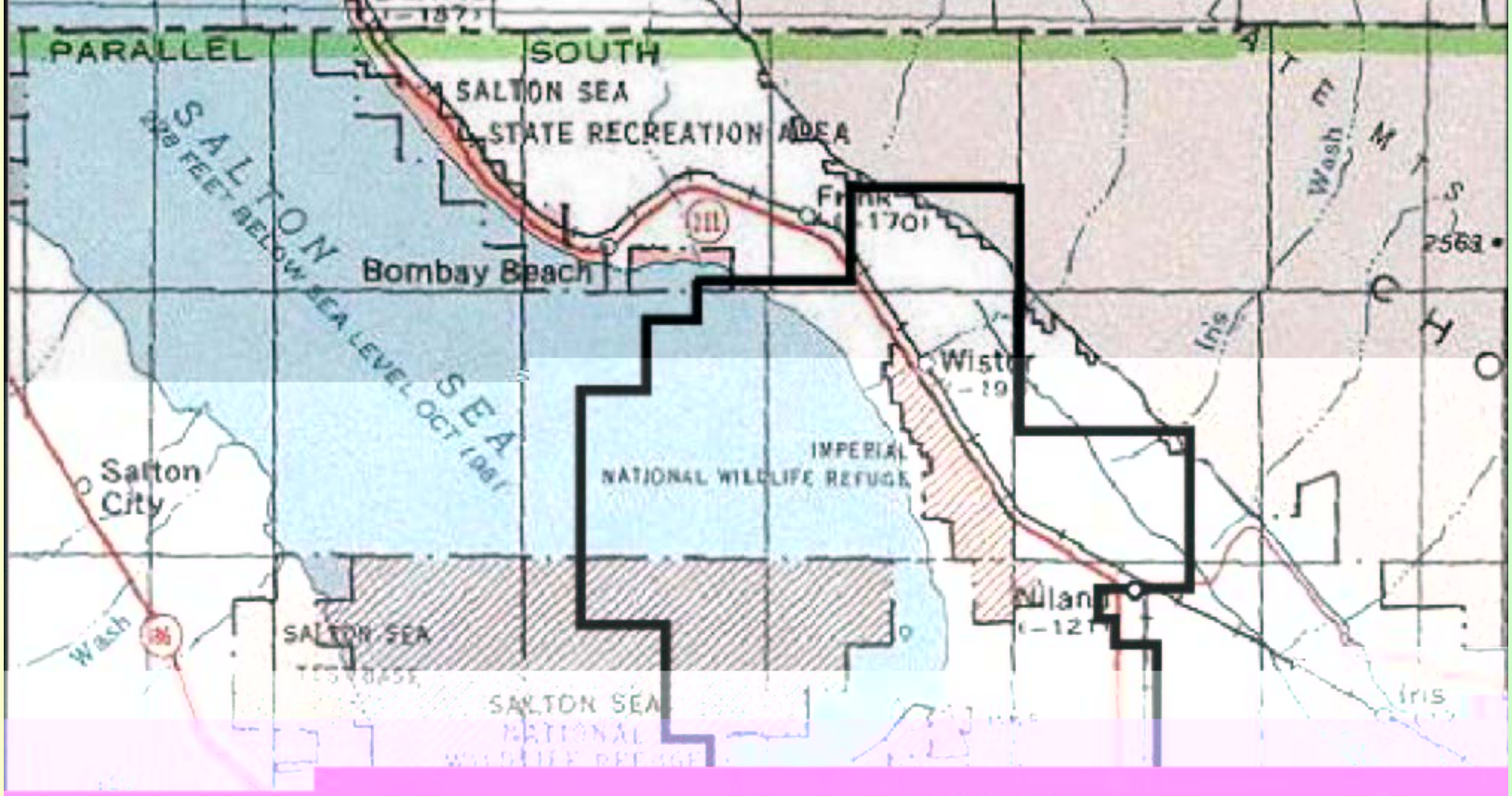
2
3
4
5
6
7
8


OPTION 11
ROCK HILL
42-33
42-33b
13-33
64-32
DEL RANCH UNIT
OBSIDIAN BUTTE
OBSIDIAN BUTTE PLANT
65-32
16-33
16-33b
41-3
41-3b
36-33
36-33b
44-3
44-3b
44-3c
68-4
68-4b

Potential Applications of Using Geothermal Energy for Desalination

- Vertical Tube Evaporation Technology
- “Dune” Delta T Principle


RESOURCE PRODUCTION FACILITY (RPF)
POWER GENERATION FACILITY (PGF)
Electrical Grid
Substation
Power Generation
Turbine/Generator - 185 MW net
Power Output to Substation
Heat Rejection System
High Pressure Steam
Standard Pressure Steam
Low Pressure Steam
Steam
Condensor
10% of Condensate
Vapor
NCG Removal System
90% of Condensate (make-up water)
H2S Reduction
Benzene Reduction
Gases
Back Flush Water
Biological Oxidizer
Cooling Tower
Brine/Steam Handling
Standard Pressure Crystallizer
Low Pressure Crystallizer
High Pressure Separator
Flash Tank
Brine
Primary Clarifier
Secondary Clarifier
Seed Recycle Liquids
Slurry
Production Wells 330-450 PSIG 440-500°F @ Wellhead (Nominal)
Production Wells & Pipelines
Filter Press
Solids to Monofill
Solids Handling
Booster Pumps
Main Injection Pumps
Injection Wells 225° (Nominal)
Brine Ponds
Brine Injection


PARALLEL
SOUTH
SALTON SEA
STATE RECREATION AREA
SALTON SEA
228 FEET BELOW SEA LEVEL OCT 1981
Bombay Beach
Frink
Wister
IMPERIAL
NATIONAL WILDLIFE REFUGE
Salton City
Wash
SALTON SEA
SALTON SEA
NATIONAL
Iris
Wash
2563

The End