

SESSION 14

A COMBUSTION-GEOTHERMAL HYBRID POWER PLANT  
FOR A GEOPRESSURED WELL

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## BACKGROUND

### EPRI RESEARCH PROJECTS ON GEOPRESSURED ENERGY RESOURCES:

- REPORT EPRI AP-1457 "GEOPRESSURE ENERGY AVAILABILITY (1979-80)
- STUDY OF HYBRID CYCLES FOR GEOPRESSURED POWER PRODUCTION (1981-82)
- UPDATE ASSESSMENT AFTER DOE WELL TESTING (1982-83)
- PROJECT FEASIBILITY ASSESSMENT FOR PLEASANT BAYOU SITE (1983)

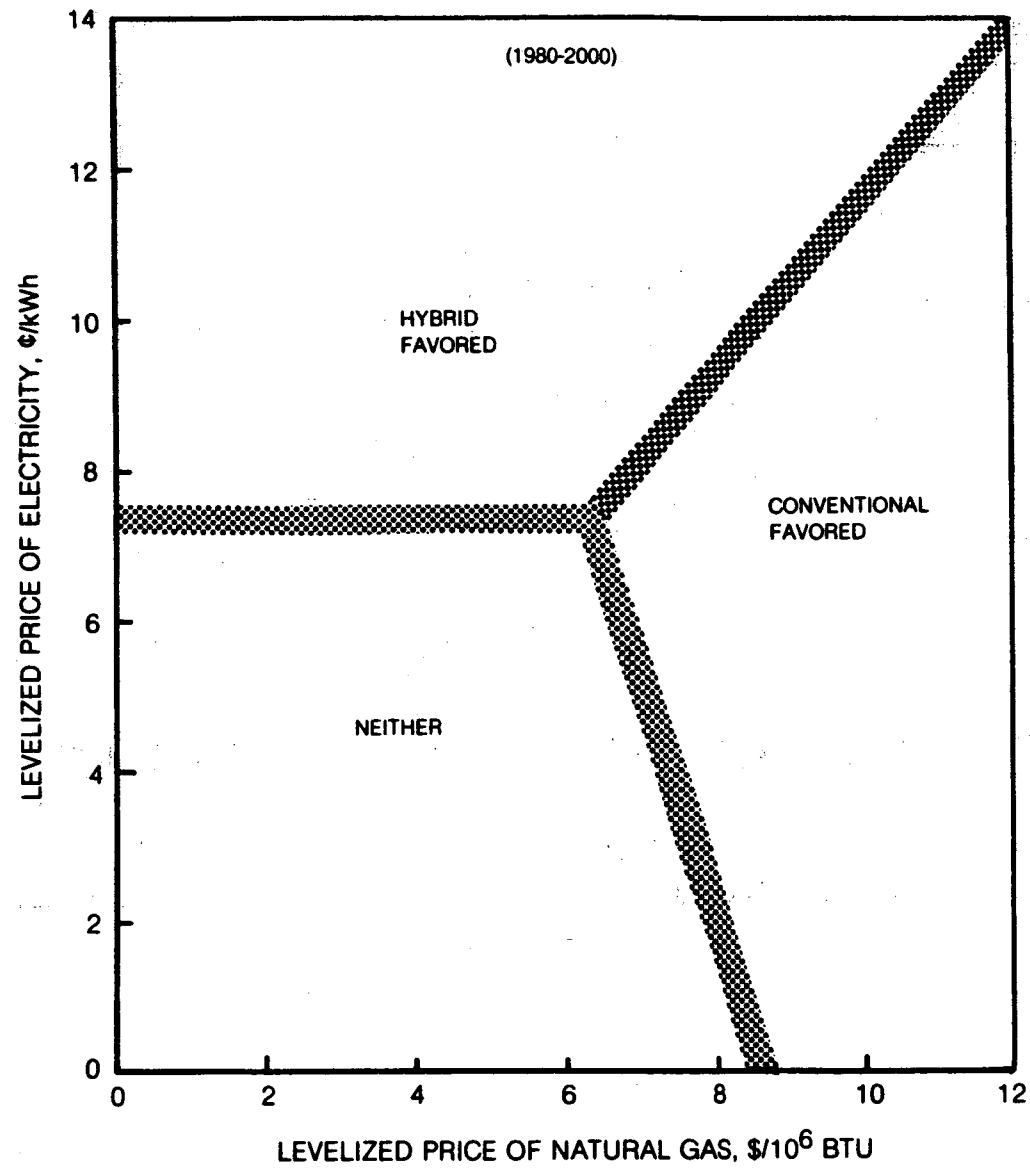
### CONCLUSIONS:

- RESOURCE SIZE SIGNIFICANT BUT WELLS TOO EXPENSIVE FOR GAS PRODUCTION
- COMBINED CYCLE PREFERRED APPROACH TO POWER GENERATION
  - HYDRAULIC (PRESSURE REDUCTION) TURBINE
  - COMBUSTION WITH WASTE HEAT RECOVERY
  - GEOTHERMAL ASSISTED BY WASTE HEAT
- LONG-TERM FLOW TEST WILL ASSIST FUTURE RESOURCE ASSESSMENT
- HYBRID PROJECT APPEARS FEASIBLE NOW ON GEOPRESSURED WELL
- HYBRID TEST DATA USEFUL FOR HYDROTHERMAL APPLICATION

## PROJECT OBJECTIVES

- EVALUATE THE COMBUSTION-GEOTHERMAL HYBRID POWER CONVERSION CONCEPT AT THE PLEASANT BAYOU GEOPRESSURED WELL.
- OBTAIN GEOPRESSURED RESERVOIR AND FLUID DATA IN LONG-TERM (3 - 5 YEARS) FLOW TEST

# ECONOMIC COMPARISON OF GEOPRESSURED POWER SYSTEMS



## HYBRID: EFFICIENCY AND FUEL ADVANTAGES

### CYCLE:

- O HYDROTHERMAL RESOURCE, 392°F (200°C)
- O GAS TURBINE TOPPED, 2-STAGE FLASH

### DEFINITIONS:

- O W = WORK OUT OF HYBRID PLANT USING GIVEN FLUID AND FUEL QUANTITIES
- O WG= WORK OUT OF SEPARATE GEOTHERMAL PLANT USING SAME FLUID FLOW
- O WF= WORK OUT OF SEPARATE FOSSIL PLANT USING SAME FUEL

### EFFICIENCIES:

TOTAL SYSTEM

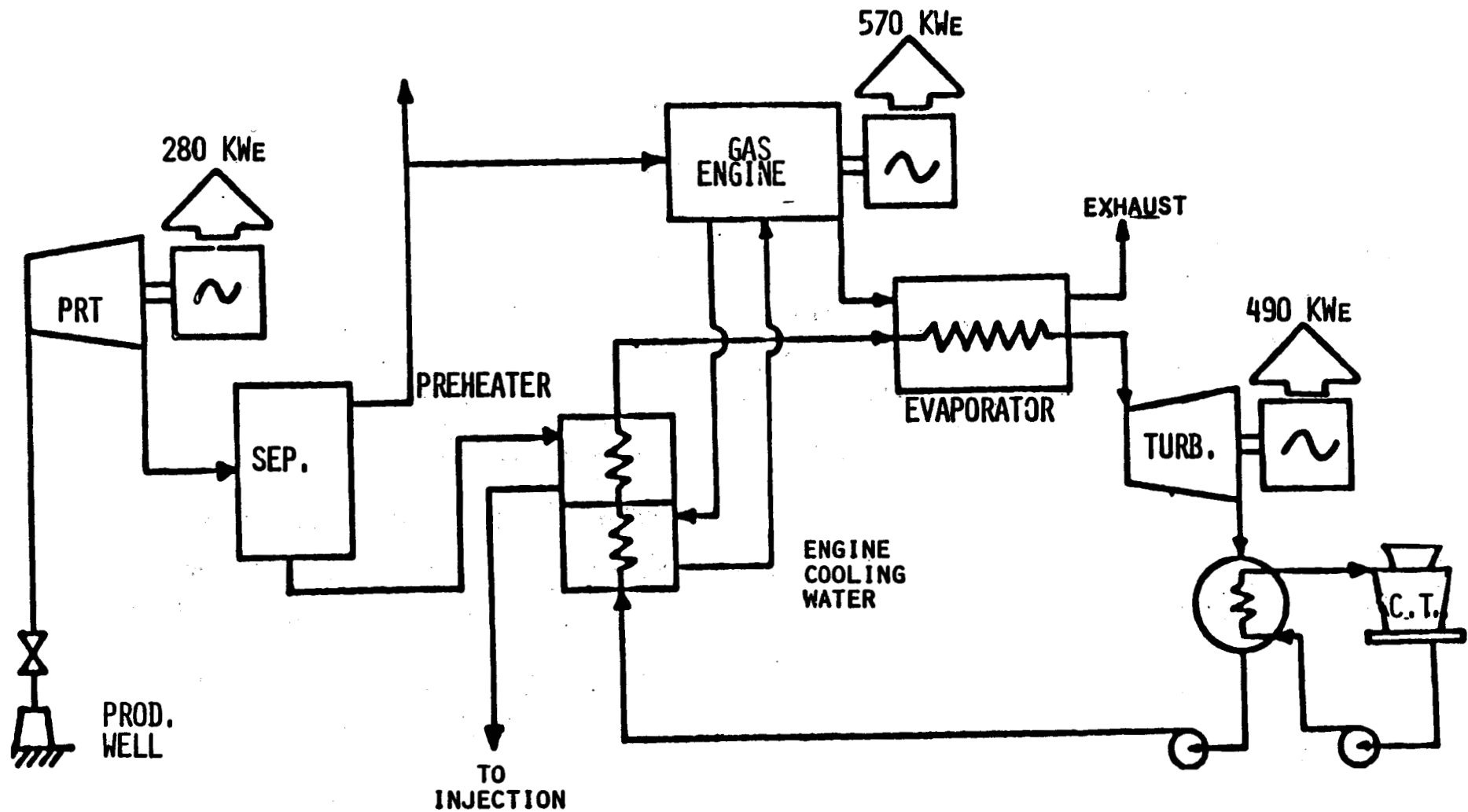
$$\frac{W}{WF + WG} = 1.15$$

FUEL

$$\frac{W-WG}{WF} = 1.34$$

GEOTHERMAL

$$\frac{W-WF}{WG} = 1.28$$



**GEOPRESSURED HYBRID POWER CYCLE  
(GAS ENGINE BINARY)**

## DESIGN BASIS

- O PLEASANT BAYOU NO. 2 PRODUCTION WELL
- O 20,000 BARRELS PER DAY BRINE PRODUCTION
- O GAS SEPARATION AT 200 PSIA
- O HALF OF GAS (175 MCF/DAY) TO HYBRID CYCLE
- O HALF OF BRINE TO HYBRID CYCLE

