



**Results of the Demonstration Power Plant
on the
Pleasant Bayou Geopressured Resource**

Richard G. Campbell

The logo for TIC (Technology Integration Center) is located in the top left corner. It features the letters 'TIC' in a bold, black, sans-serif font, set against a white background that is part of a larger, stylized graphic element. Below the 'TIC' text, there is a small, illegible string of characters.

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Pleasant Bayou Power Plant

Overview:

- * Nominal 1 MW hybrid cycle power plant
- * Built in late 1980s to run on brine and gas from Pleasant Bayou Well No. 2
- * Start-up & testing Oct-Dec 1989
- * Demonstration run Jan-May '90

Pleasant Bayou Power Plant

Overview: (cont.)

- * 10,000 BBL/day brine at 290 F
- * 22 SCF/BBL gas (87% CH₄, balance mostly CO₂)
- * Half the total flow of the well
- * Generated 980 kW total (690 kW from gas engines + 535 kW from binary cycle turbine – 270 kW parasitic load)

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Opportunity for

Pleasant Bayou Power Plant

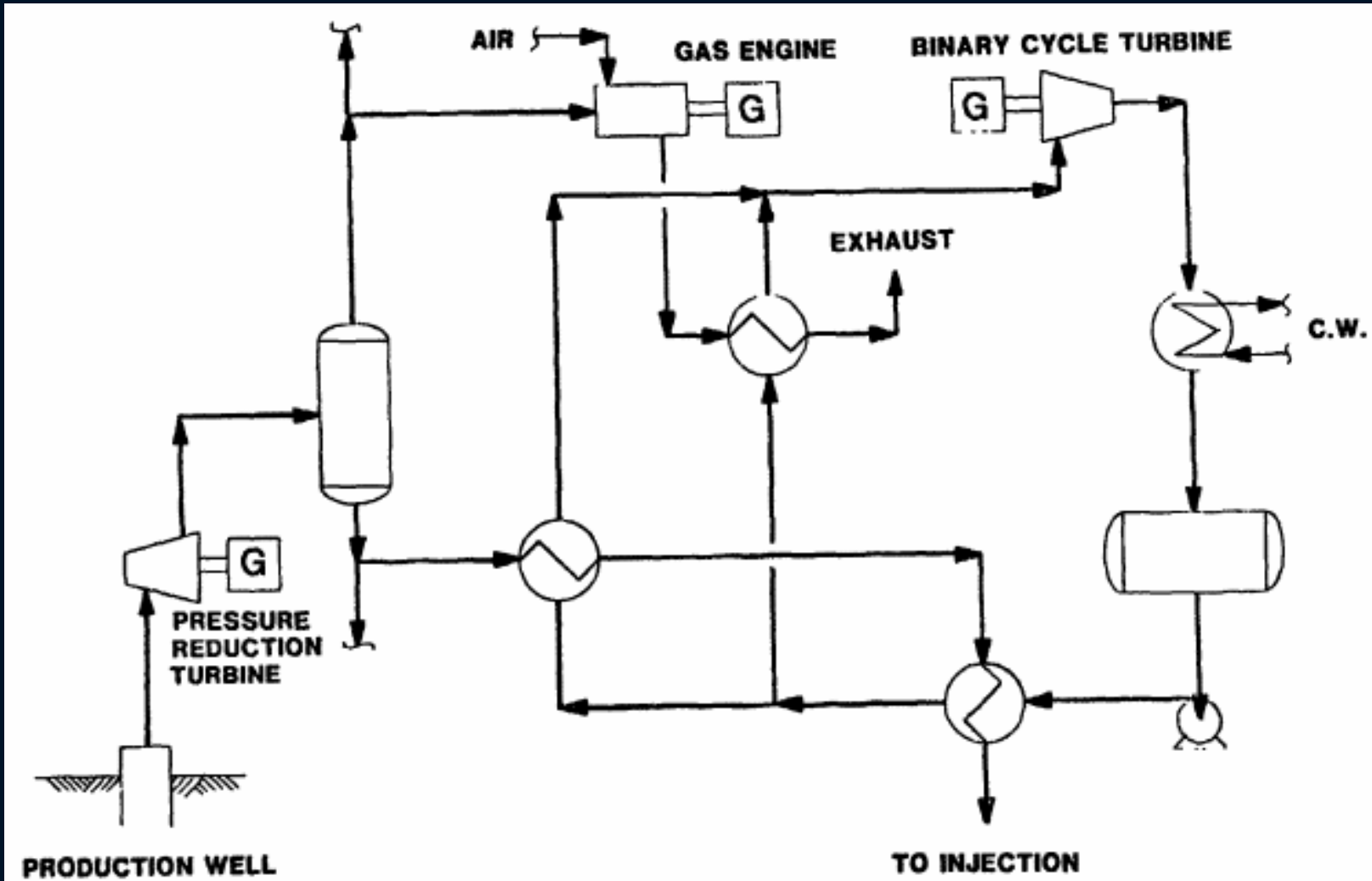
Participants:

- Funding by US DOE and EPRI
- Well drilling and rework by Eaton Operating Company
- Fluid handling by Institute of Gas Technology
- Power plant by Ben Holt Company

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Hybrid Cycle Flow Diagram

The logo for TIC (The Institute for Coal Technology) is located in the top left corner. It features the letters 'TIC' in a bold, black, sans-serif font, set against a white background that is part of a larger, stylized graphic of a power plant or industrial structure. Below the 'TIC' text, there is a small, illegible string of characters.

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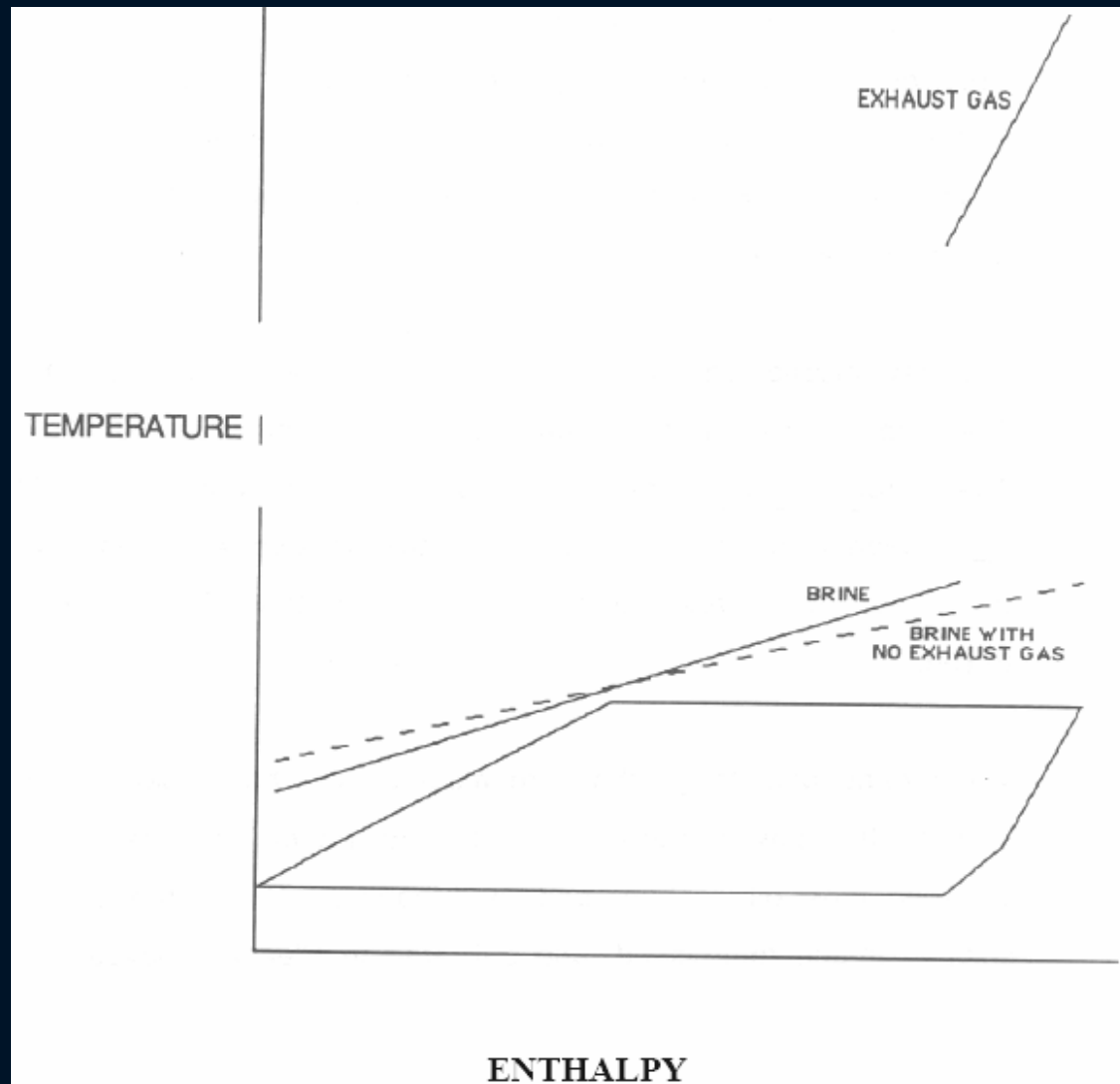
Hybrid Cycle:

- Operates on two different fuels
- Integrated operation to get optimum use of both fuel sources
- Studies funded by EPRI show that efficiencies for optimized hybrid cycles are much higher than for power plants operating on the two fuels independently

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Hybrid Cycle Temperature-Enthalpy Diagram

The logo features the letters 'TIC' in a bold, black, sans-serif font, centered within a white inverted triangle. The triangle is set against a dark blue background with a grid pattern. A teal-colored banner is positioned below the triangle, containing the text 'Opportunity for' in a white, sans-serif font.

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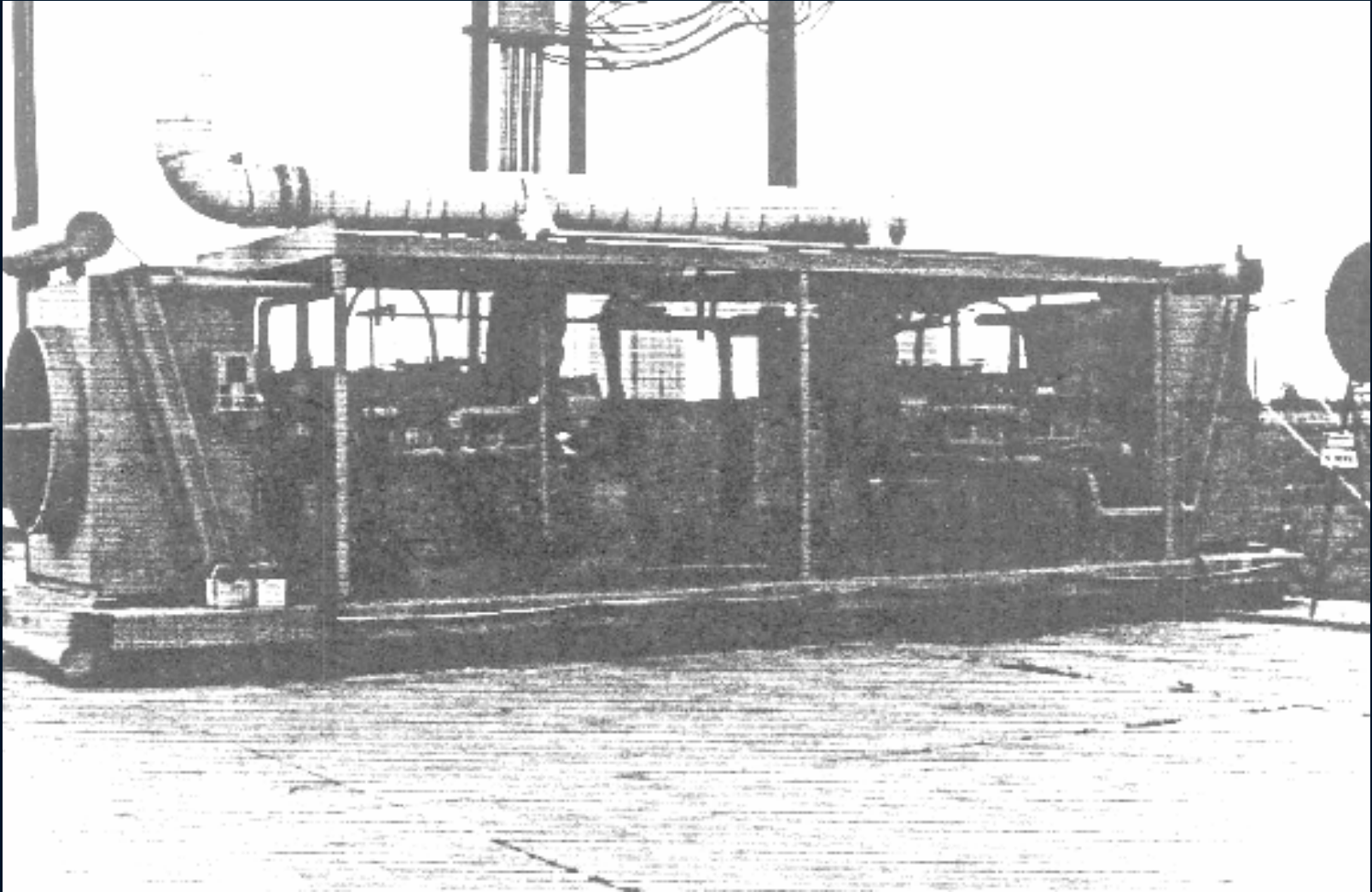
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Major Equipment

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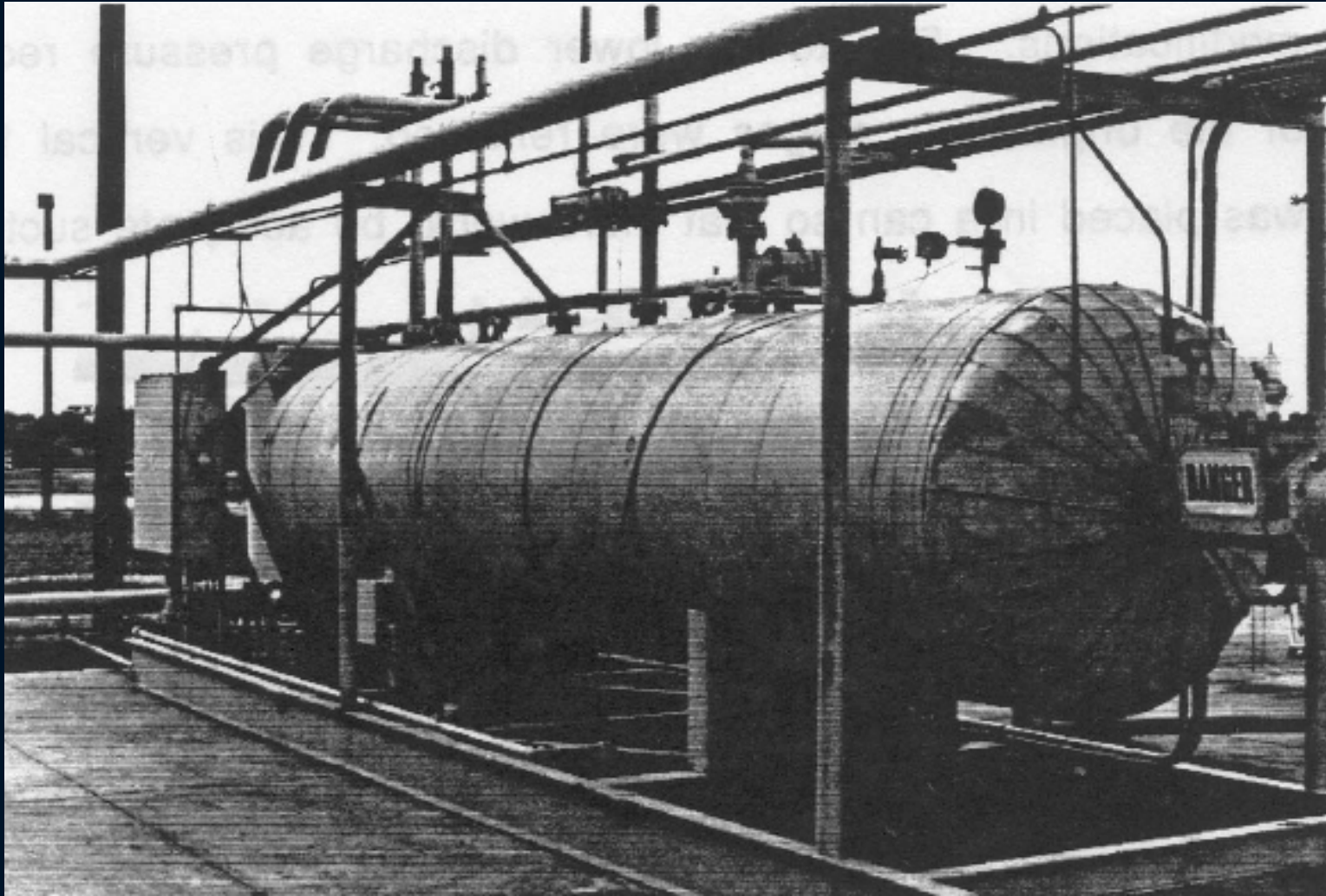


Gas Engines

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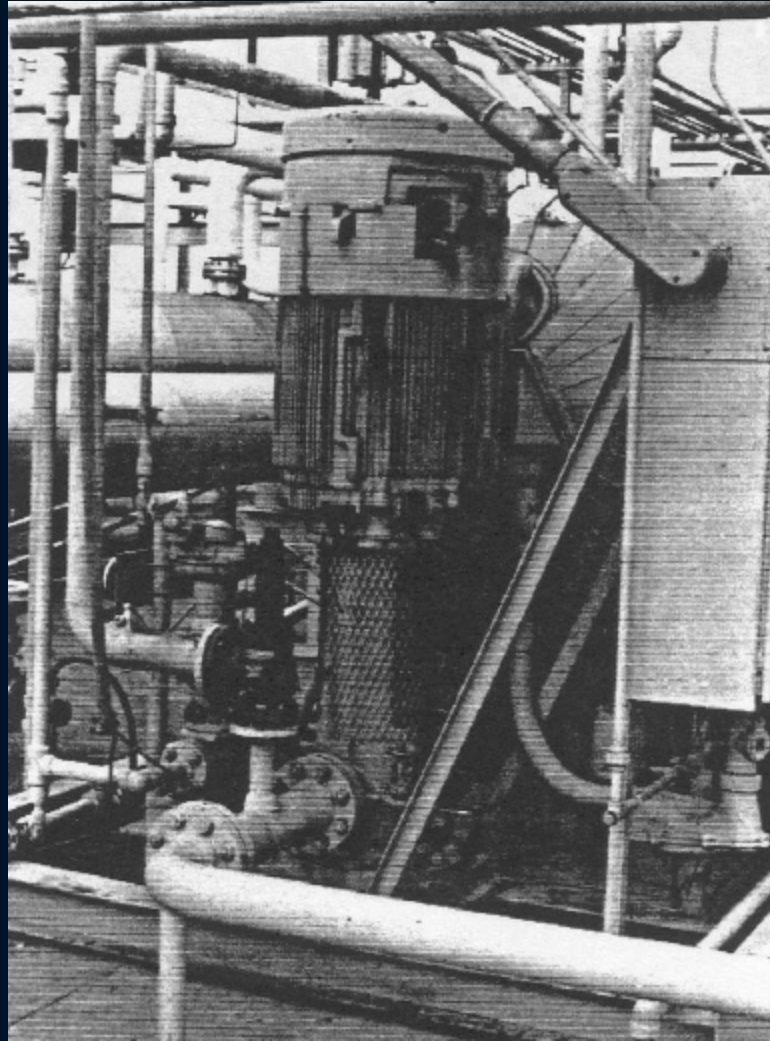


Accumulator

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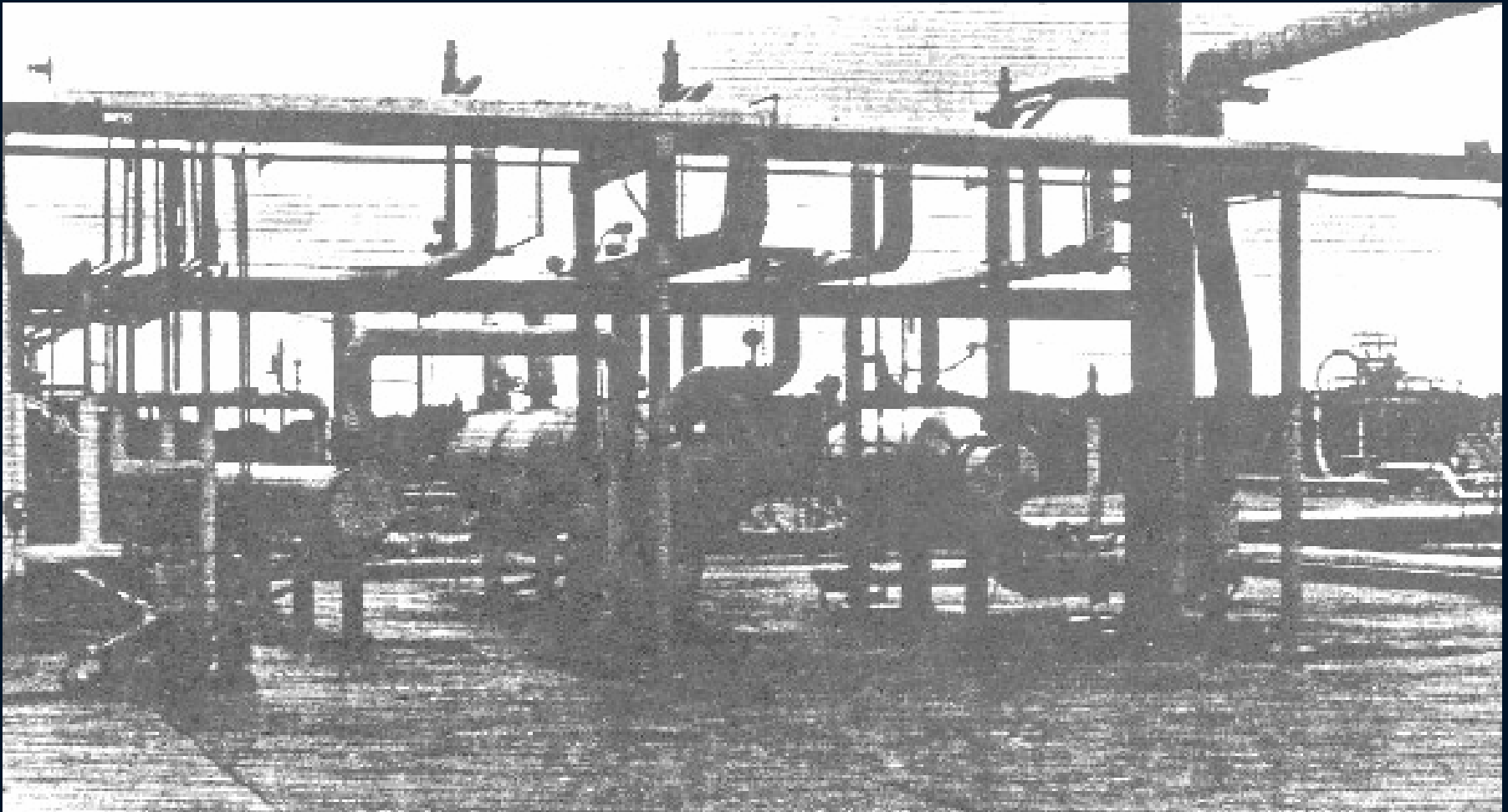


Isobutane Circulating Pump

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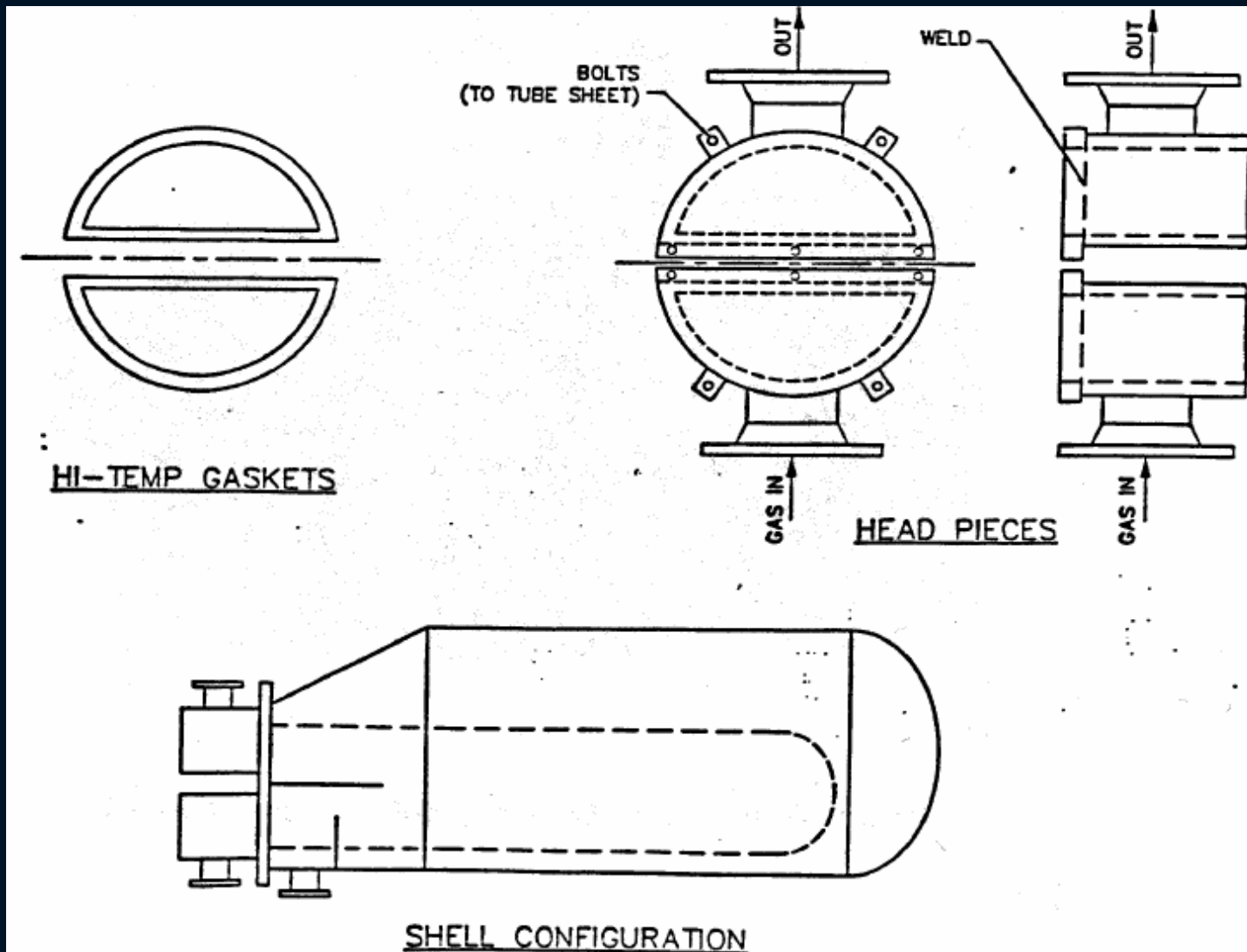


Heat Exchangers

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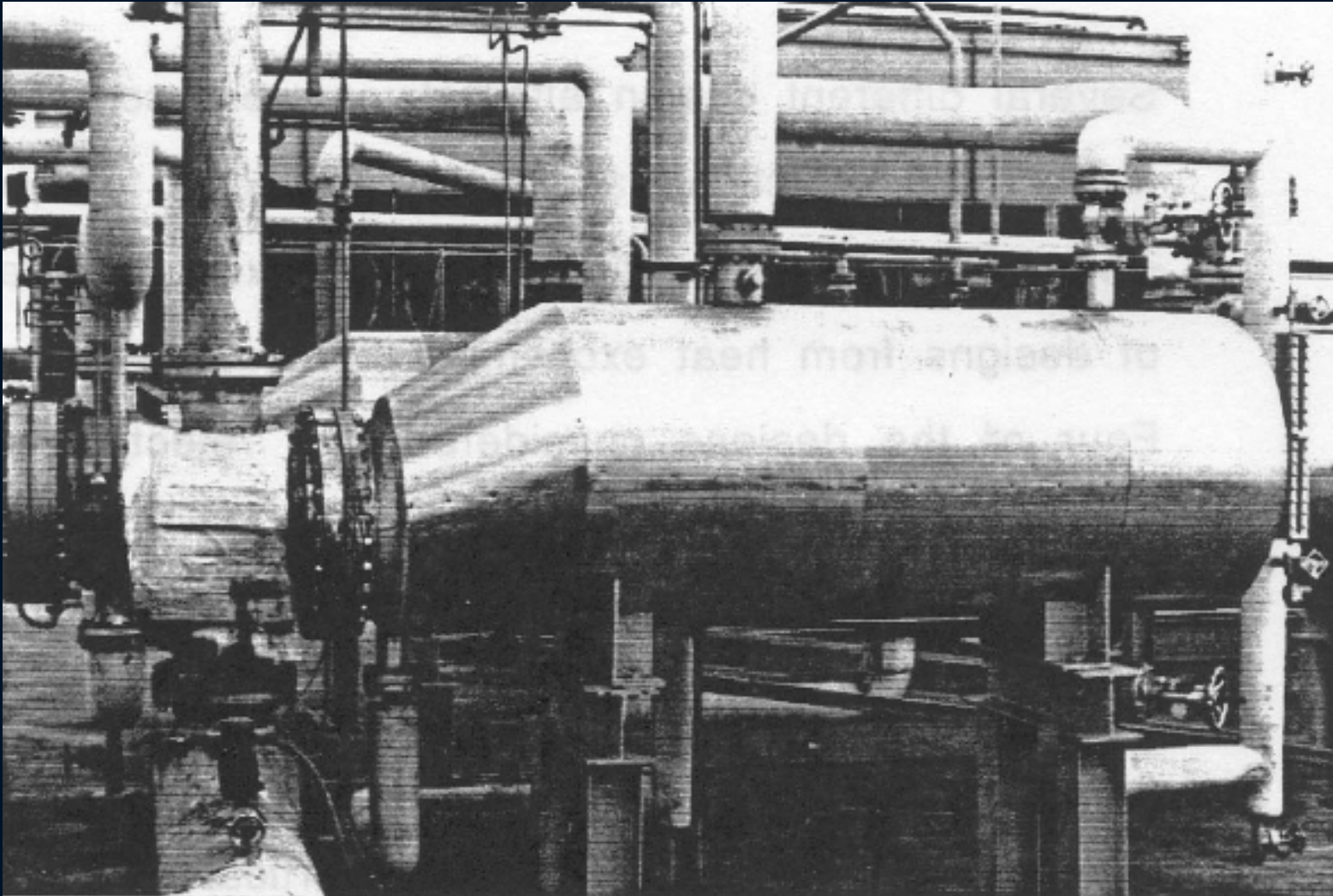


Exhaust Gas-to-Isobutane Boiler Design

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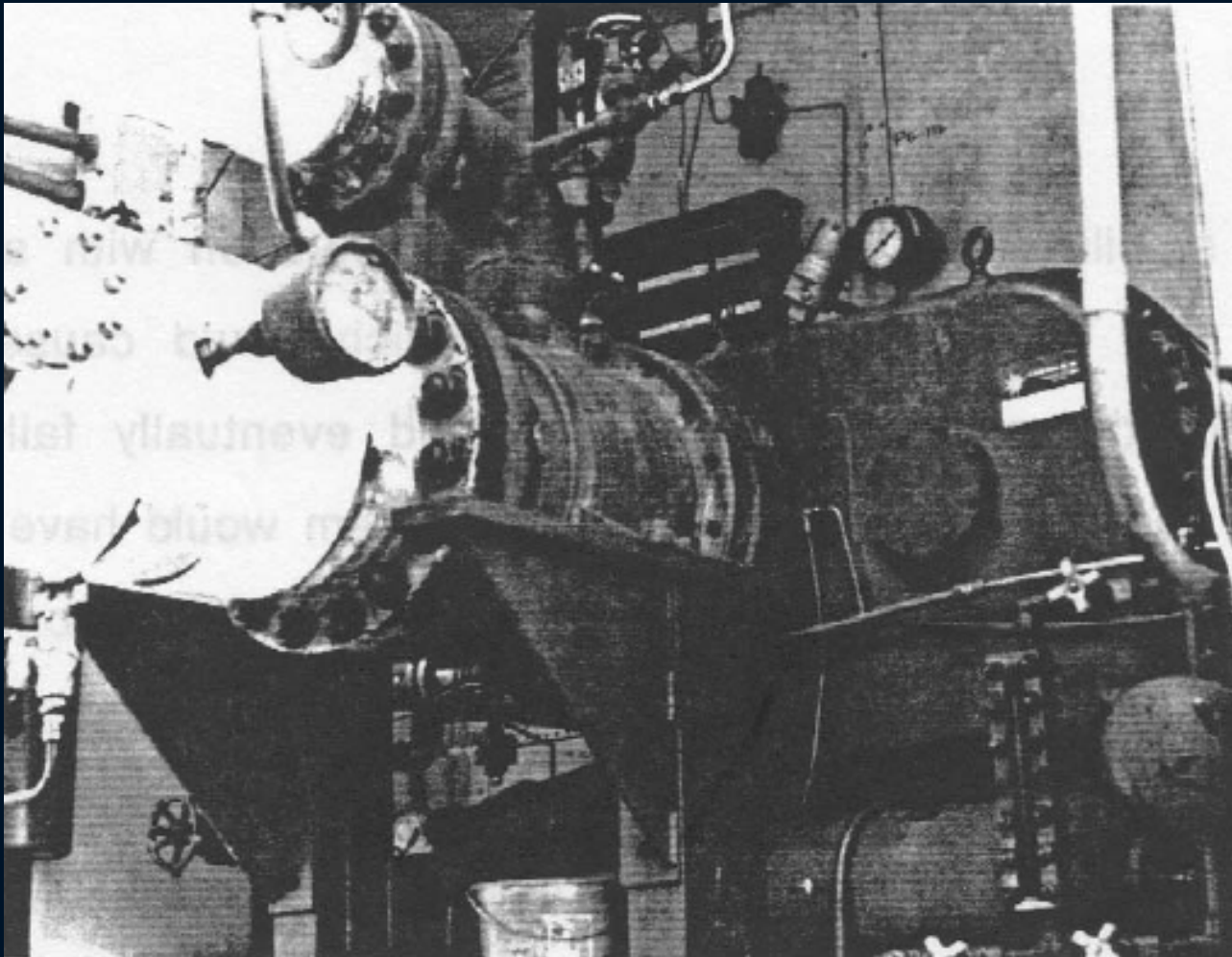


Exhaust Gas-to-Isobutane Boiler, E-3-N

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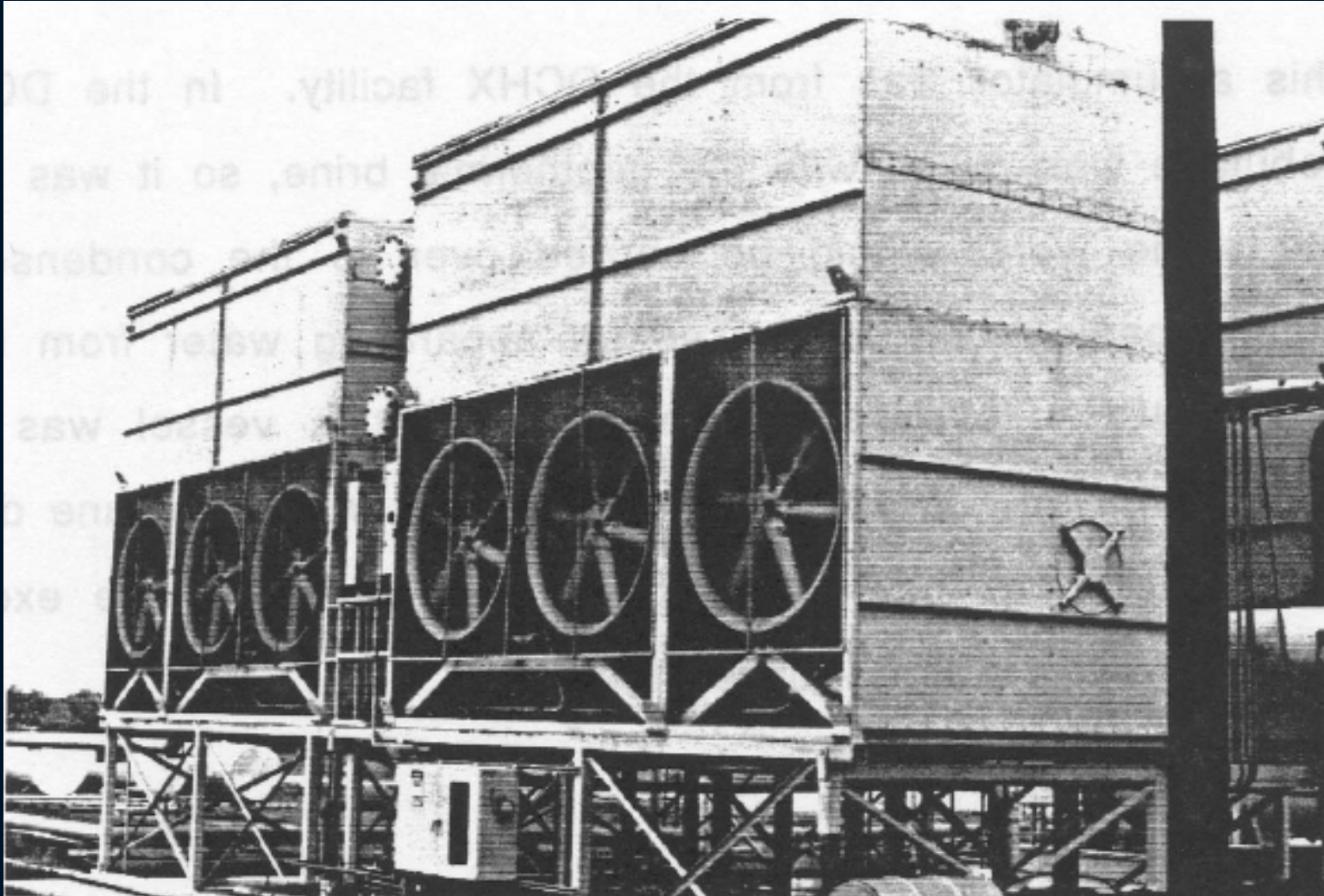


Turbine-Generator

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Condensers

The logo for TIC (Technical Institute of California) is located in the top left corner. It features a stylized 'TIC' in a bold, black font, with a blue and white geometric design behind it. Below the logo, the text 'Qpxfsfe!Cz.Q fgrf' is visible, which appears to be a corrupted or placeholder string.

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Major Technical Concerns at Time of Design:

- * Corrosive brine (1000 mils/yr)
- * Scaling (130,000 ppm TDS)
- * Engine operation on impure gas
- * Turbine reliability (had failures at DCHX)
- * Differential thermal expansion in exhaust gas to isobutane heat exchanger

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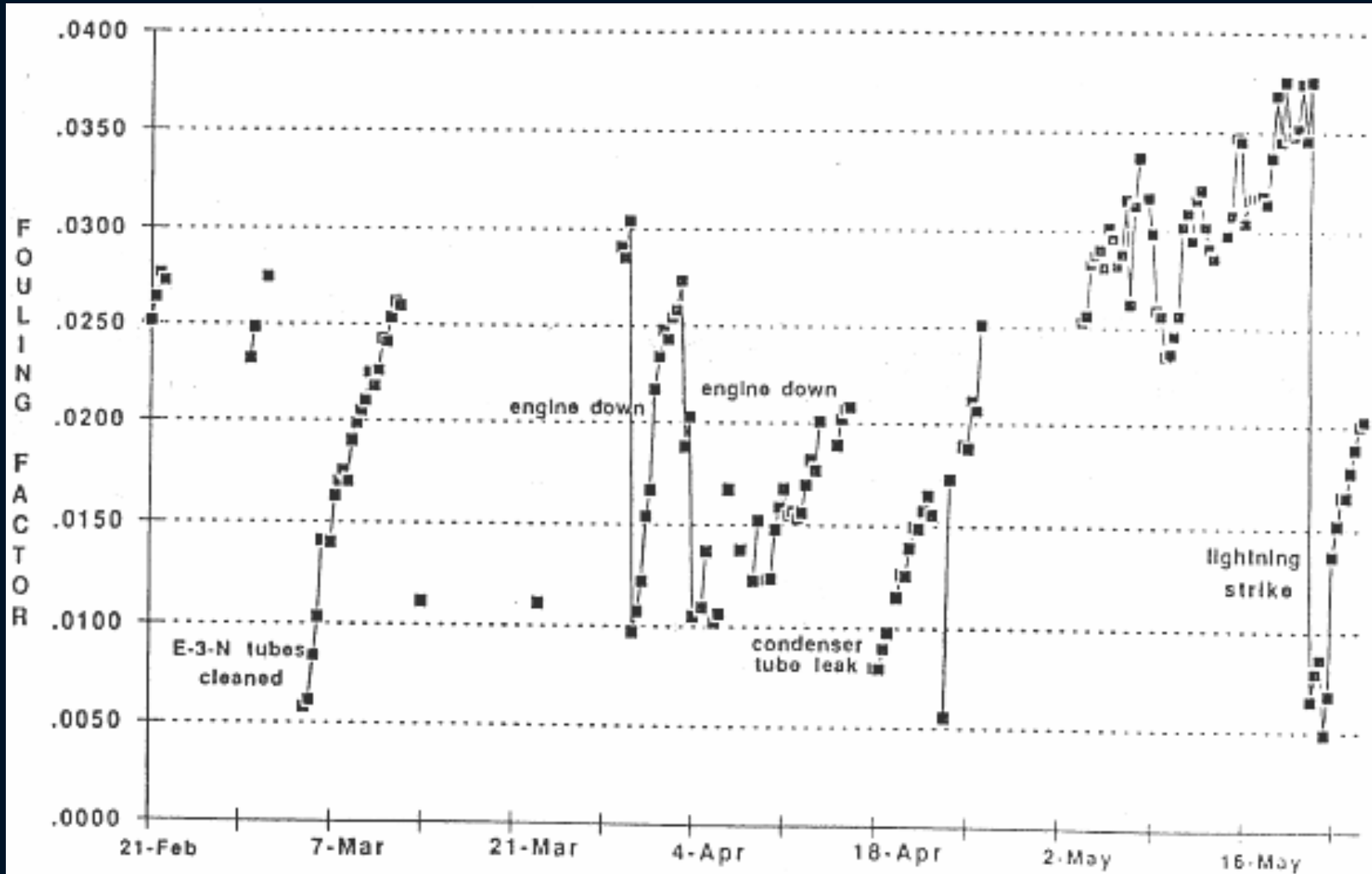
Discussion of Major Technical Concerns:

- * Corrosion inhibitors worked: no failures in 16 Ga. carbon steel tubes.
- * Scaling inhibitors worked well
- * Engines operated well, next slide shows fouling due to carbon deposits
- * Binary cycle turbine had no wheel failures (used Finite Element Analysis)
- * Split channel in E-3-N solved differential thermal expansion problem

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E-3-N Fouling vs. Time (hr-sq ft-deg F/Btu)

The logo for TIC (Total Inlet Control) is located in the top left corner. It features the letters 'TIC' in a bold, black, sans-serif font, set against a white background that is part of a larger, stylized graphic element. Below the 'TIC' text, the words 'Optimize! Control! Profit!' are written in a smaller, black, sans-serif font. The entire logo is contained within a dark blue, triangular shape that points downwards.

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Optimize! Control! Profit!

Pleasant Bayou Power Plant

Overall Results:

- * 97.5% Availability
- * Effective demonstration of hybrid cycle
- * Effective demonstration of power generation on geopressured resource
- * No major technical problems
- * Only significant operating problem was carbon deposit in exhaust gas heat exchanger—easily removed

The logo for TIC (Texas Instruments Company) is located in the top left corner. It features the letters 'TIC' in a bold, black, sans-serif font, set against a white background that is part of a larger, stylized graphic element. Below the 'TIC' text, there is a small, light blue banner with the text 'Qpxfsfe!Cz.Q fgrf' in a very small, white, sans-serif font. The entire logo is set against a dark blue background.

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DOE Program Discussion:

- * Currently talk of DOE geothermal program being eliminated in 2007
- * This power plant shows the value of DOE program because it demonstrated that a power plant could be successfully operated on a resource with unknowns such as scaling and corrosion

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DOE Program Discussion (cont.):

- * Private contractors, banks, and developers are reluctant to take such risks, but with DOE's involvement the risks were shown to be small
- * This is a major contribution DOE has made and can continue to make
- * It would be a **BIG** mistake for the DOE geothermal program to be eliminated

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Overall View from Fire Water Pond



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THE END