Oil and Gas in Montana: Wellhead to Market

Board of Oil and Gas Conservation
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Revenue & Transportation Committee
September 30, 2005

Exhibit #16

Definitions

- "Production facility" means any facility or site constructed or used for the purpose of producing, treating, or separating produced fluid, including but not limited to, oil, gas, injection, or disposal wells, pumping units, flow lines, gas flares, treaters, separators, gun barrels, storage tanks, production pits and ponds, skimmer pits, and evaporation pits or ponds. A transmission pipeline is not a production facility.

- "Transmission pipeline" means a pipeline used to gather and transfer marketable crude oil or natural gas from production treatment, separation, and storage facilities. A flow line is not a transmission pipeline.

Montana Oil Production

- Oil "Traps"
  - Structural (e.g.: Cedar Creek Anticline)
  - Stratigraphic (e.g.: Bell Creek)
- Common Drive Mechanisms
  - Water Influx
  - Solution Gas
  - Fluid Expansion
  - Gravity Drainage
- Reservoir Rocks
  - Limestone/Dolomite (Carbonates)
  - Sandstone (Clastic)

Montana Gas Production

- Gas "Traps"
  - Structural (e.g.: Bowdoin Dome)
  - Stratigraphic (e.g.: Cut Bank Gas Field)
  - Coal Beds
- Common Drive Mechanisms
  - Volumetric Depletion
  - Desorption (CBM)
- Reservoir Rocks
  - Sandstone (Clastic)
  - Carbonates (Blackleaf Canyon)
  - Coal

Montana Production

- Montana has: (as of calendar year 2004)
  - 3750 producing oil wells
  - 24.8 million BBLS oil produced
  - 22.3 BOPD average per well
  - 10.6 Billion FT^3 (BCF) associated gas produced

  - 5200 producing gas wells
  - 87.3 Billion FT^3 (BCF) gas produced
  - 51.1 MCF/Day average per well
  - Includes 450 CBM wells producing 12.2 BCF

Factors Affecting Design of Oil Production Facilities

- Volume of total fluid
- Water/Oil and Gas/Oil ratios
- Water quality/Gas quality
- Availability of electricity
- Product transportation method
- Location (climate, population, etc.)

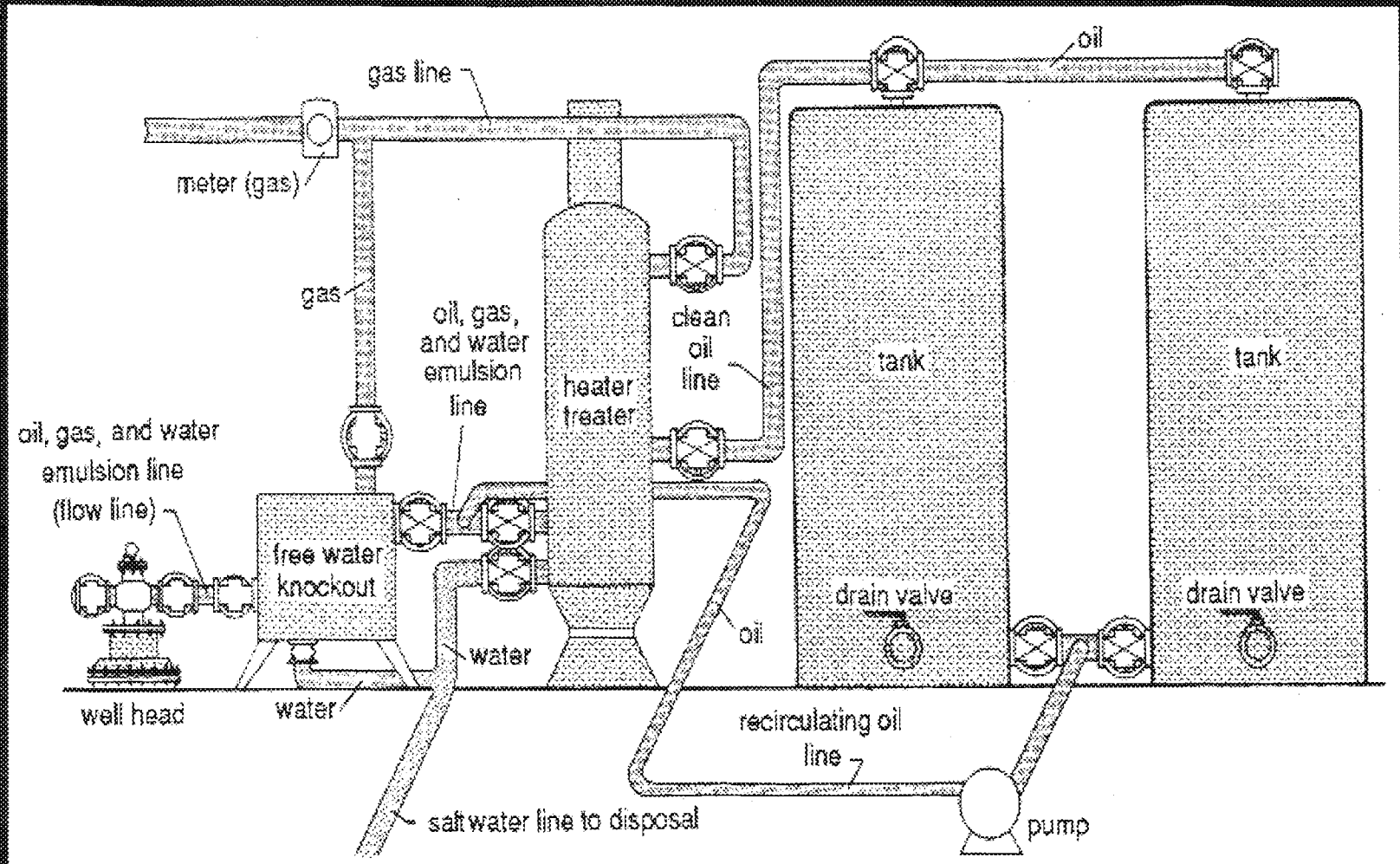
Factors Affecting Design of Gas Production Facilities

- Gas Quantity
- Pressure
- Gas Quality (contaminants, BTU content)
- Water production
- Location

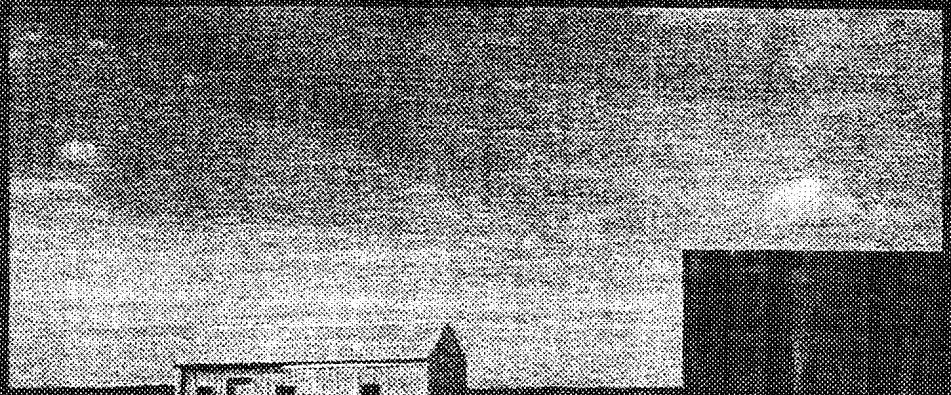
Processing For Market - Oil

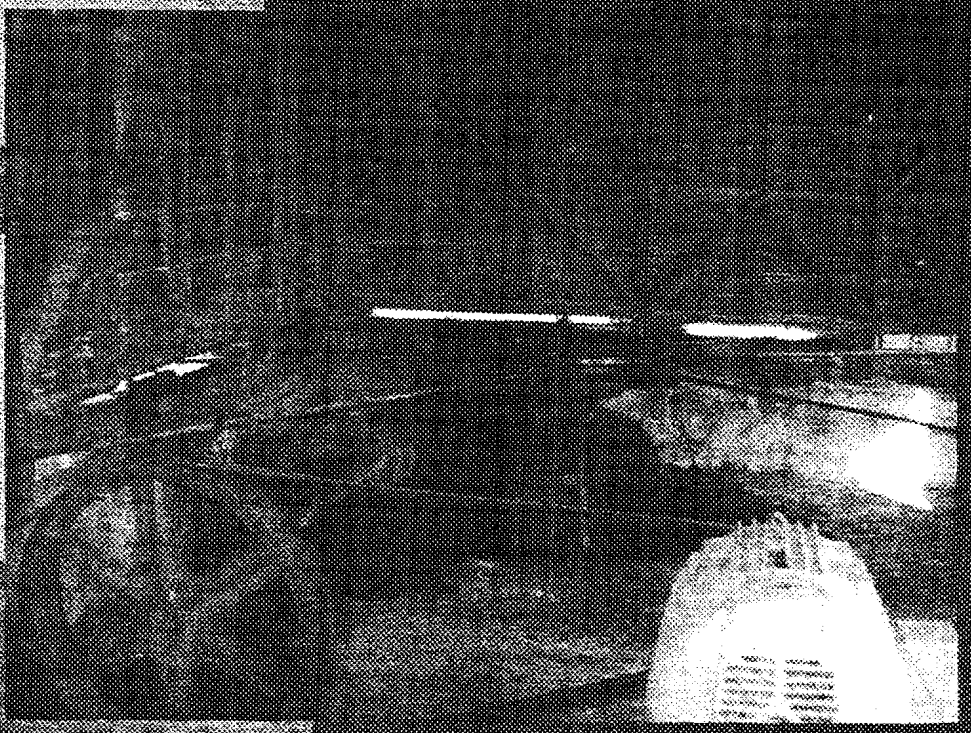
- Commonly done on lease or Unit with producer owned equipment
- Producer must provide "Pipeline Quality" or "Merchantable" oil (Treated to remove free water and sediment)
- Transportation by Truck or Pipeline
- Measurement by Tank Level Difference (gauge) or Meter (Lease Automatic Custody Transfer unit)
- Point of Sale is typically at the lease tanks or at the LACT unit

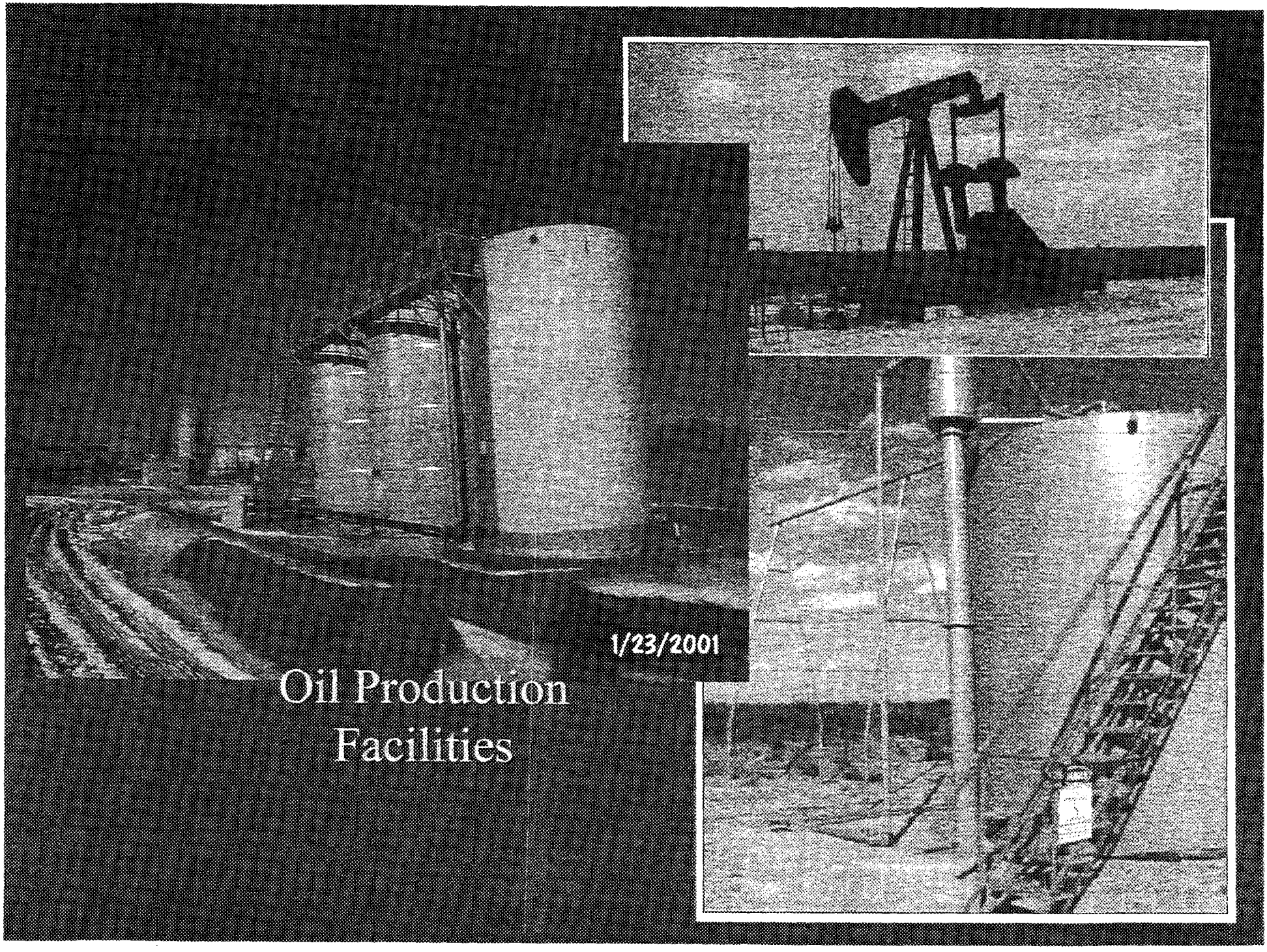
Oil Production Schematic



Oil Production Equipment (Ancient)







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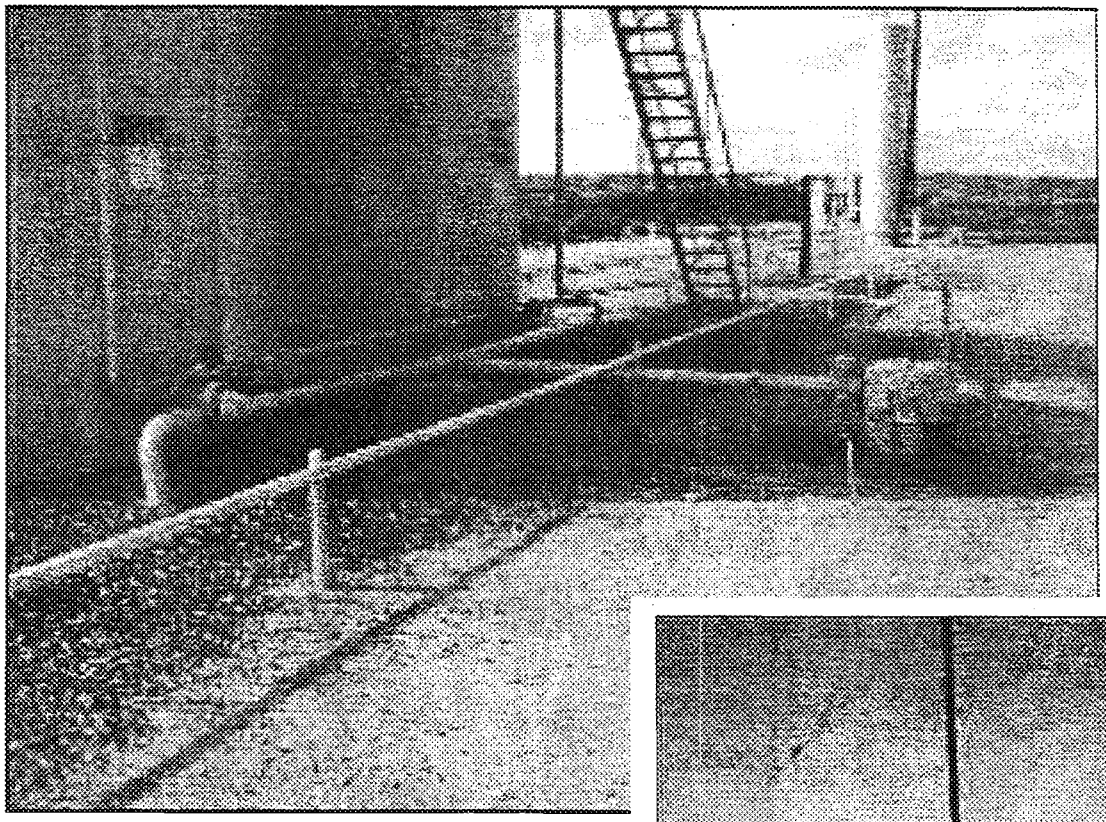
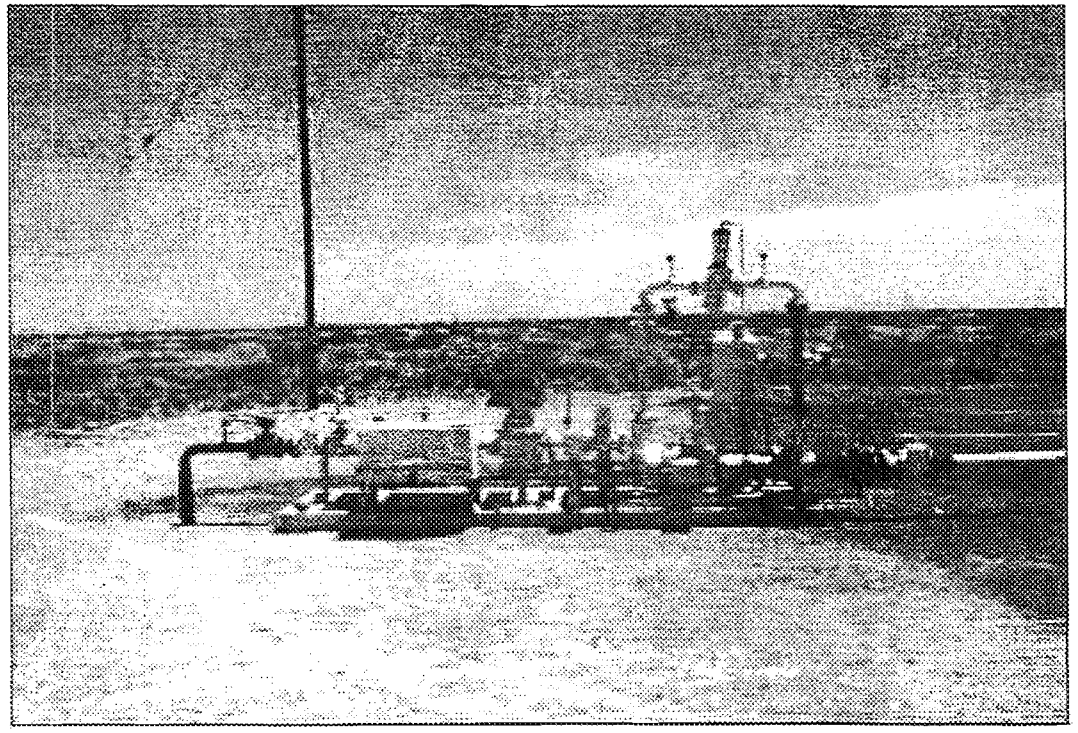
Oil Production Facilities





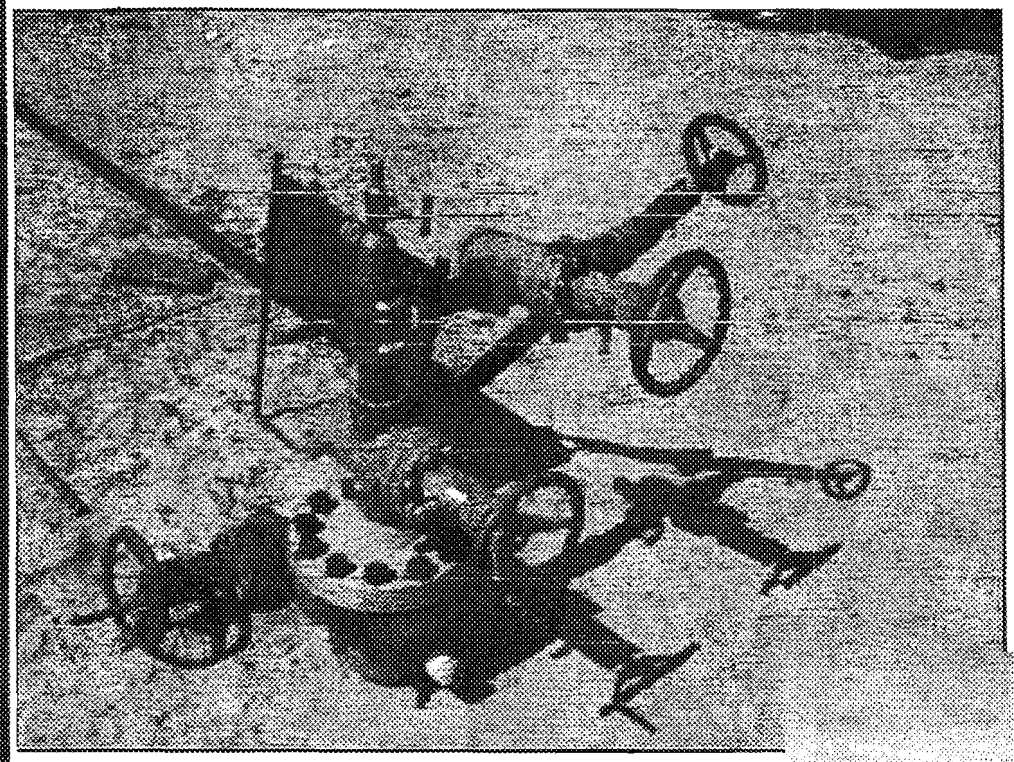
Oil Point of Sale

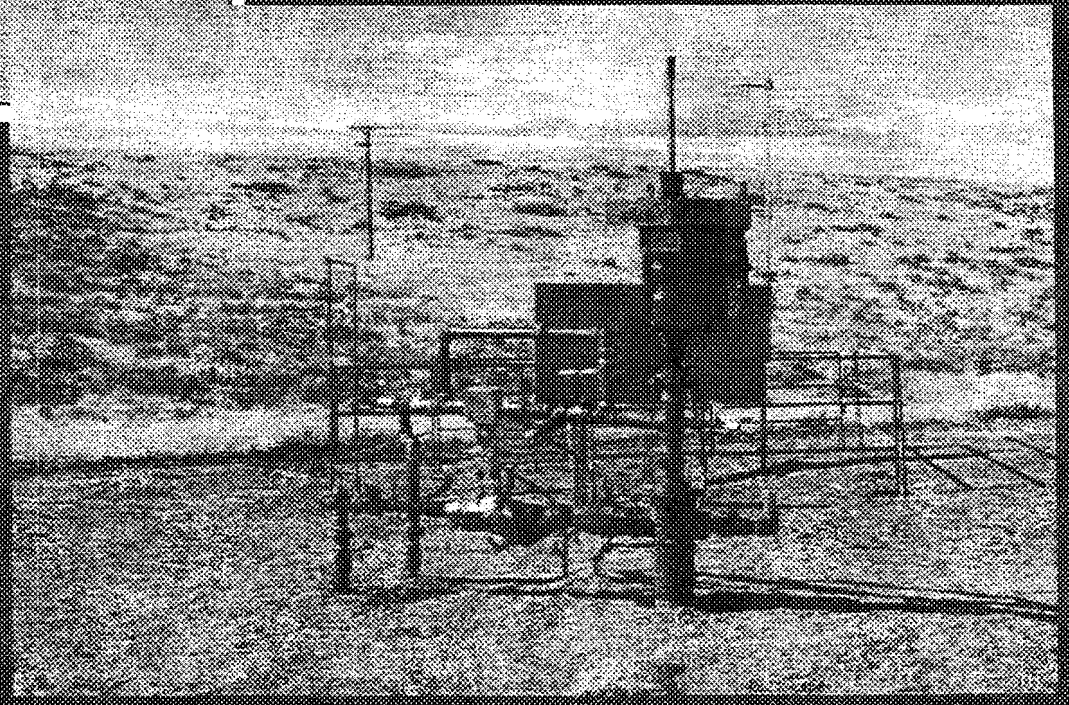
Processing for Market- Wet Gas

- Casing head or Associated gas
  - » Low Pressure, may contain high liquids content
  - » May contain H_2S
  - » Typically gathered as "wet" gas and piped to an off-lease "Gas Plant"

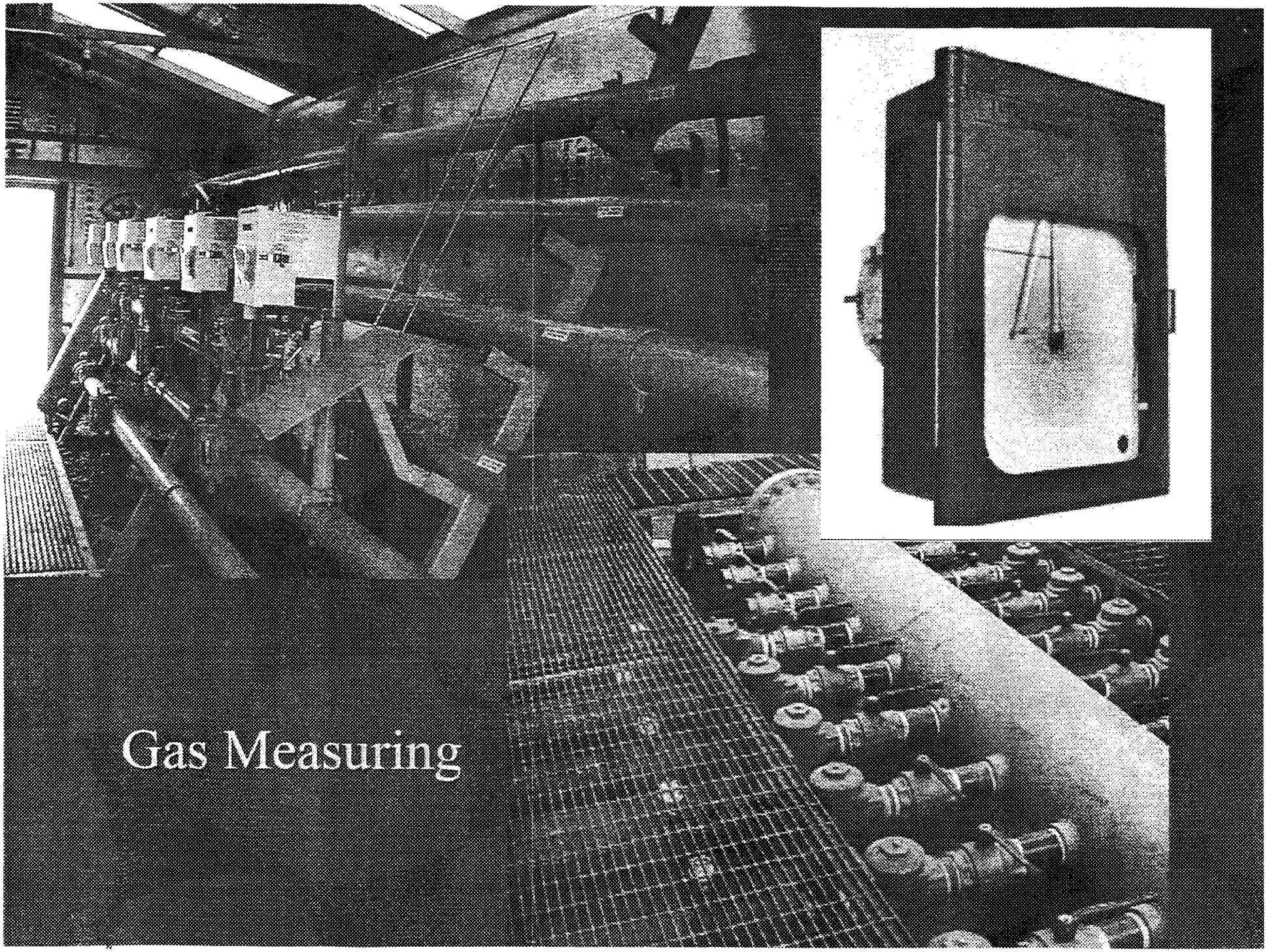
Processing for Market- Dry Gas

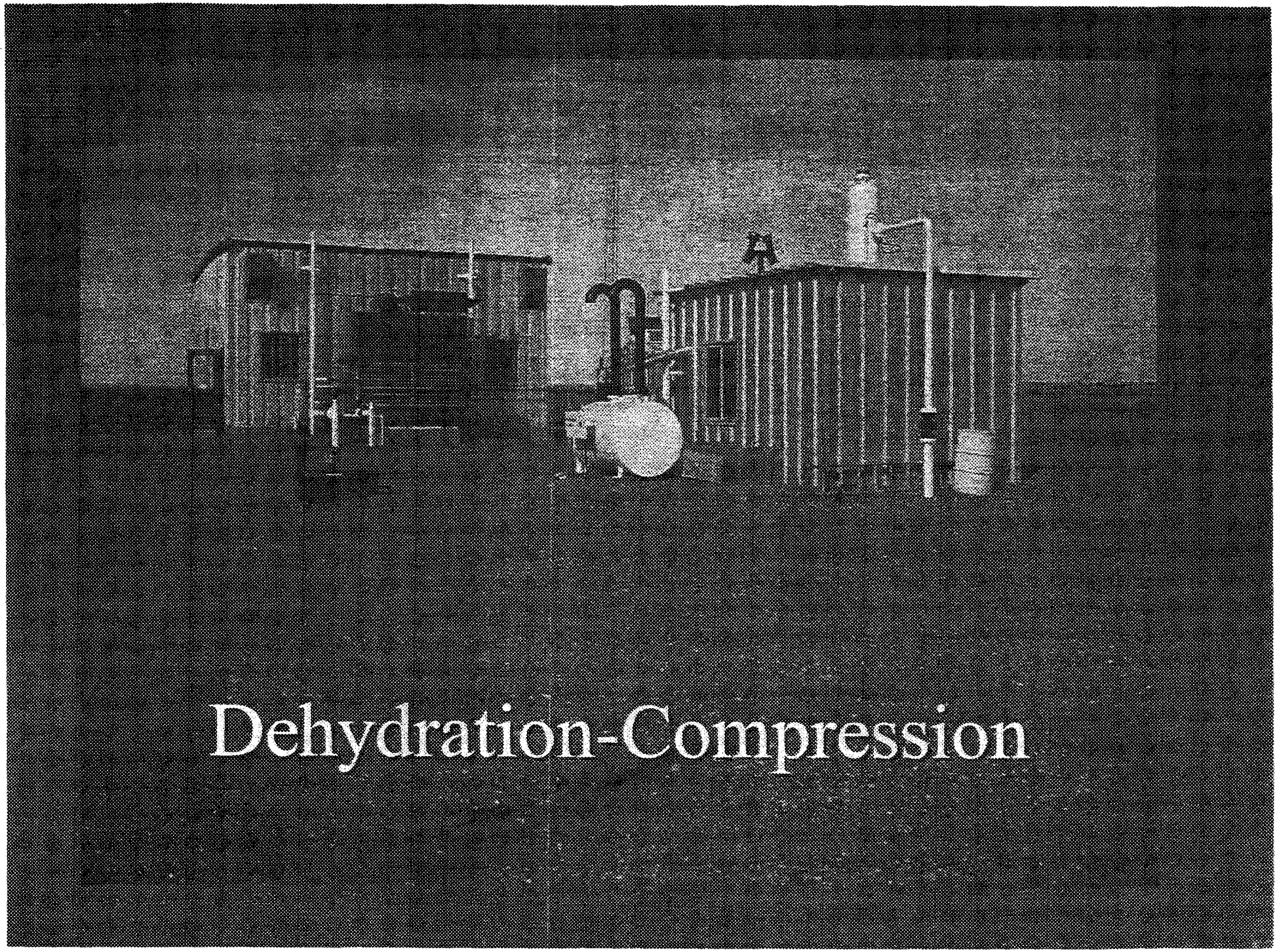
- May flow above pipeline pressure but usually requires compression
- Often requires on-lease processing for water removal
- May require processing for contaminate removal or NGL removal
- Water production may dictate use of well pumping equipment



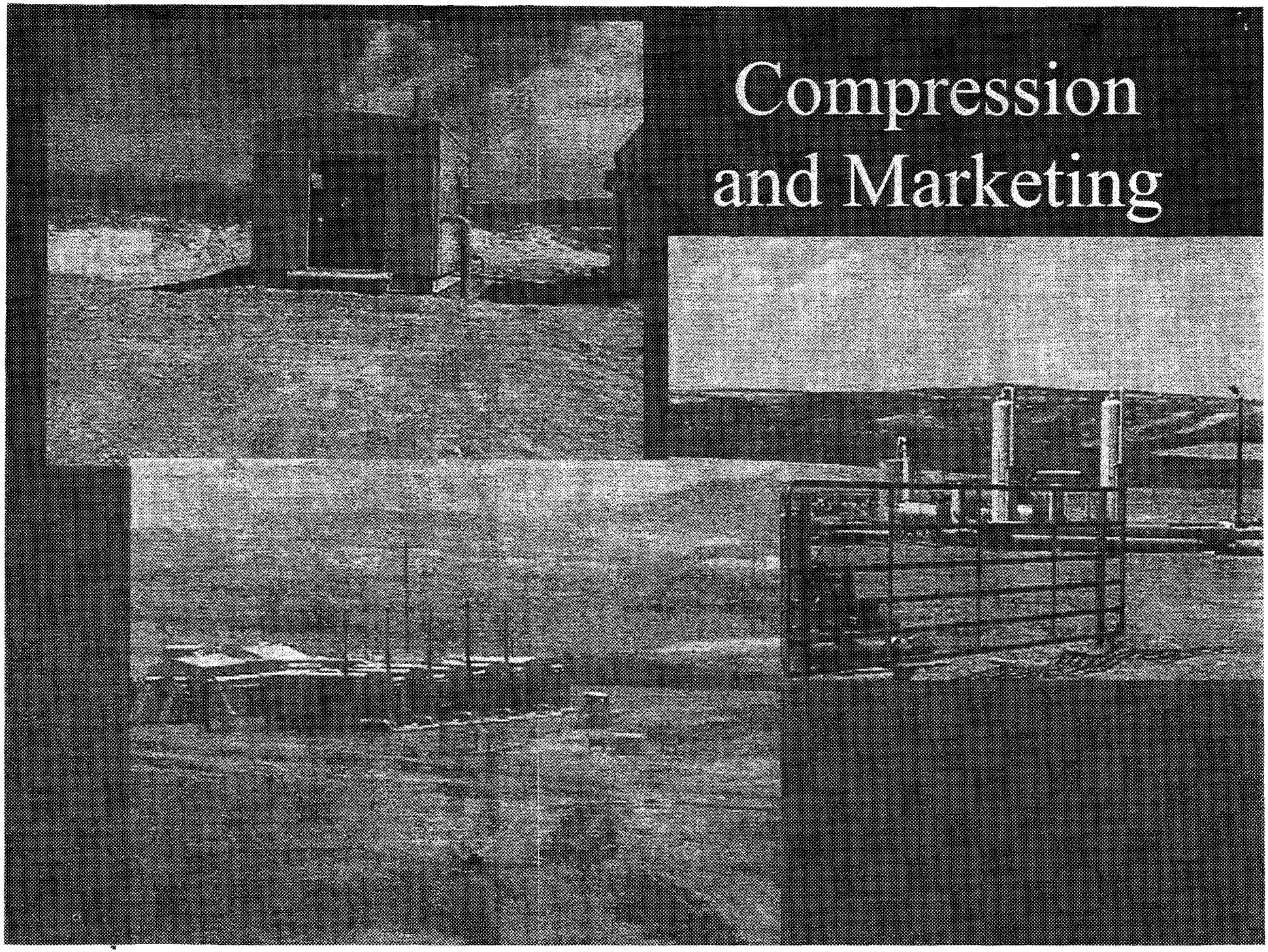


Gas Wells


Gas Measuring



Dehydration-Compression


Compression
and Marketing