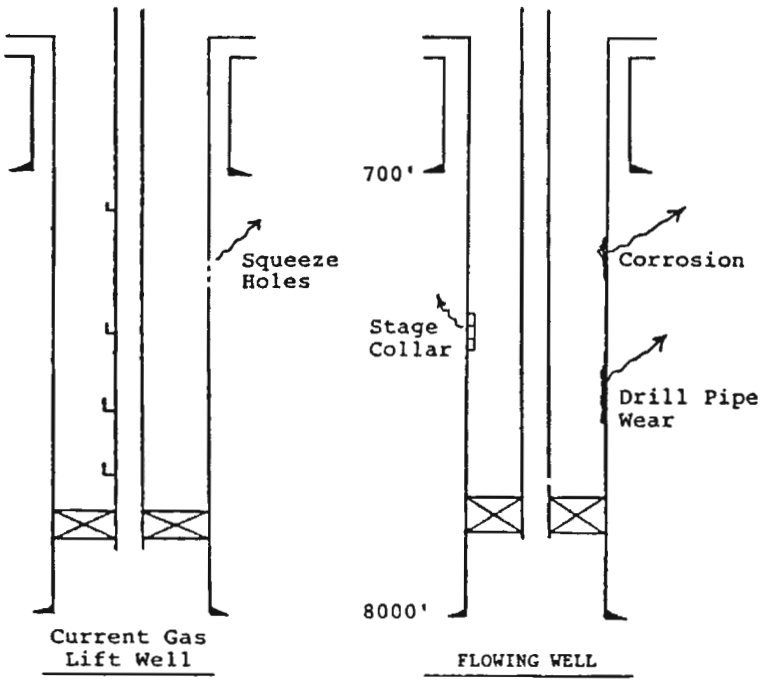
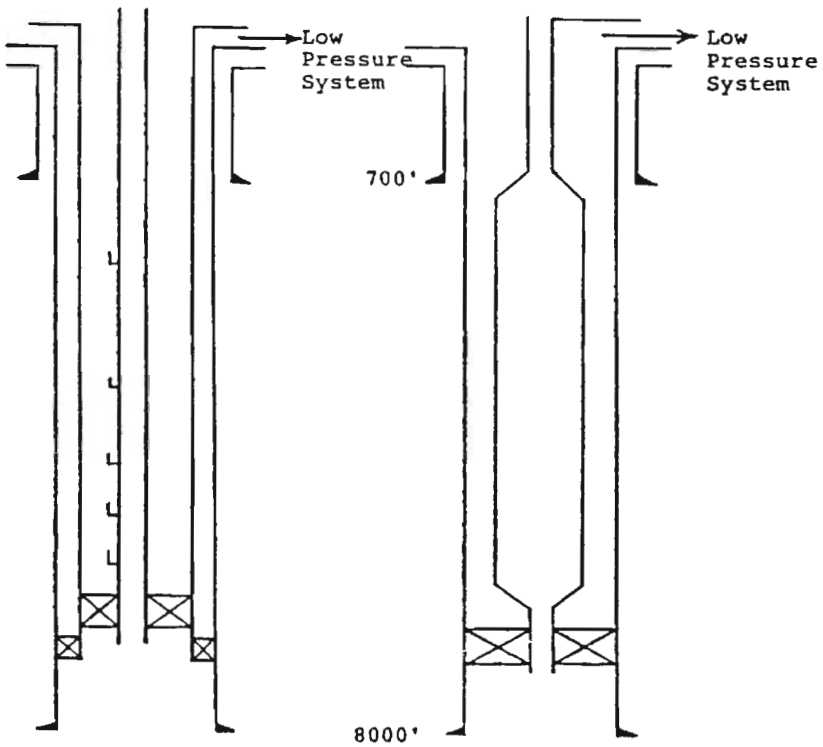
EXHIBIT I

CASING LEAKS: TYPE 1



PROBLEM:

Casing leaks that allow high pressure gas into low pressure, shallow zones.



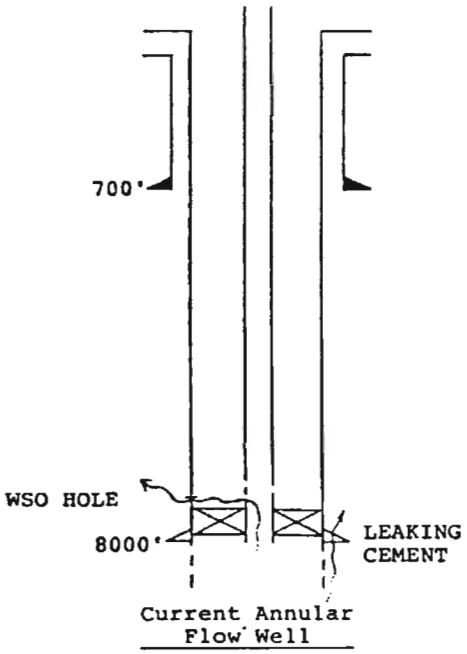
SOLUTION:

Use innerstrings and/or tubing to confine all high gas pressure. Keep innerstring or tubing annulus pressure lower than that required to force gas into acquifer sand at shoe of surface casing by venting gas to atmosphere or to low pressure system. Withdrawal wells' deliverability can be kept high by using large tubing.

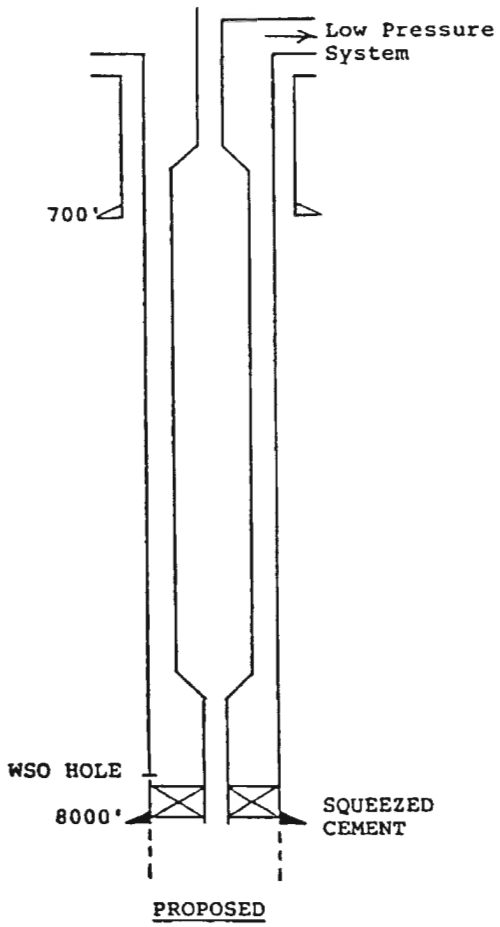
JWT:hs
2/9/84

EXHIBIT I

CASING SHOE LEAKS: TYPE 2



PROBLEM:
Casing shoe leaks due to poor, deteriorated cement or to leakage through WSO holes in active or abandoned wells.



SOLUTION, ACTIVE WELLS:
Squeeze cement into shoe area. Place tubing packer below WSO holes where possible.

ALTERNATE SOLUTION, ACTIVE WELLS:
Do not repair if leak is into 7th zone but no higher. Collect all free gas from the 7th zone by activating more collection wells.

SOLUTION, ABANDONED WELLS:
Collect all free gas from overlying zones. Repair work not possible.

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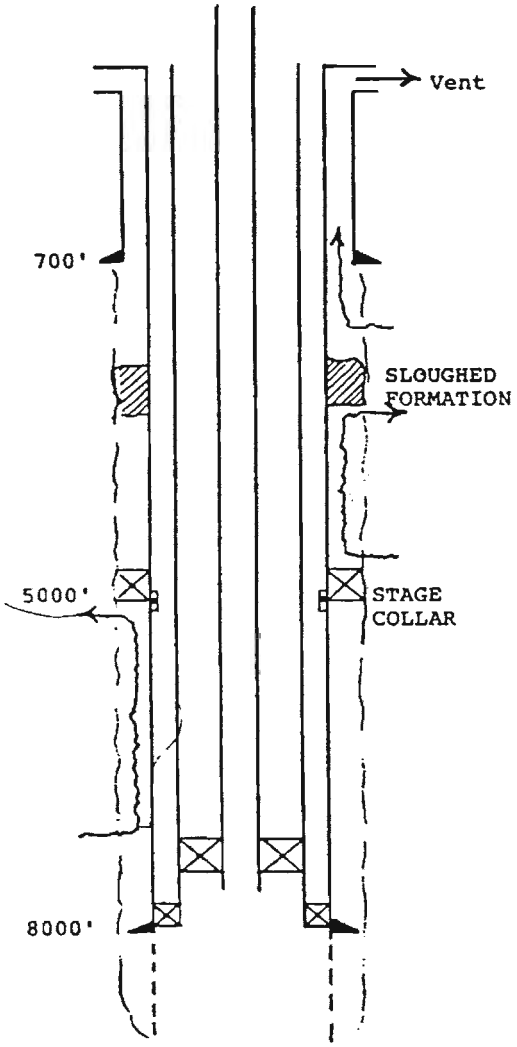
EXHIBIT I

UNCEMENTED WELLBORE LEAKS: TYPE 3



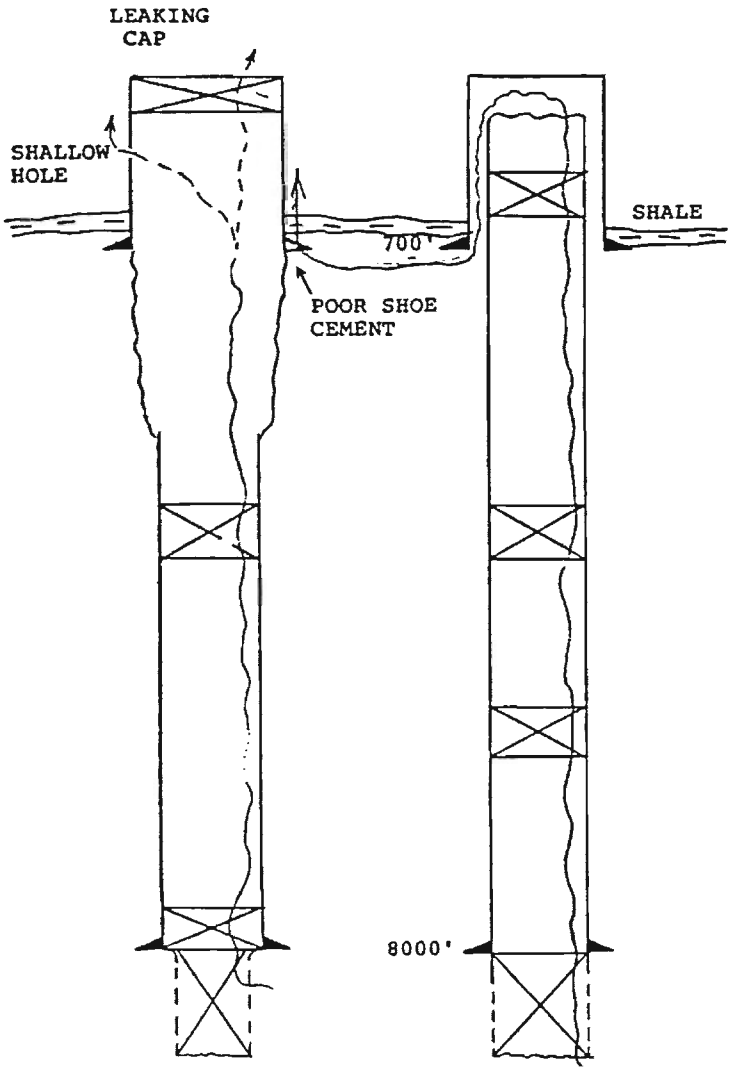
CURRENT AND FUTURE WELL

PROBLEM:
All wells have some uncemented segments. Few wells have any cement above 2000'. Formation sloughing may have filled in some of these wellbores but most remain the most permeable upward path for gas migration.

SOLUTION:
Noise and TDT monitor active wells to find areas of increasing activity. Continually produce shallow zones. Vent to atmosphere all gas coming from surface casing shoe aquifer.

EXHIBIT I

ABANDONMENT PLUG LEAKS: TYPE 4



EXISTING ABANDONED WELL TYPES

PROBLEM, TYPE A ABANDONMENT:
Cement plugs inside casing allow some gas to migrate upwards. Because its casing was cut off below the surface string, water will continue to fill casing as gas leaks out. Leak will therefore be sporadic and low rate.

PROBLEM, TYPE B ABANDONMENT:
Cement plugs inside casing allow some gas to migrate upwards. Because the casing stub is cut off within 100' of surface, the entire surface casing fills with gas. No liquid enters the well. The gas leak unloads fluid from the well and the rate increases with time. Eventually all of the fluid unloads and the leak rate stabilizes at a near constant daily rate.

PROBLEMS, BOTH TYPE ABANDONMENTS:

1. Casing cap, surface casing and casing shoe cement competent. Gas will build up inside surface casing and force its way into shallow aquifer sand. Gas will surface at a non-leaking well that has the following problems.
2. Casing cap not competent. Gas will surface near well.
3. Surface casing or shoe cement not competent. Gas will spread over large area as it rises to surface lethargically.

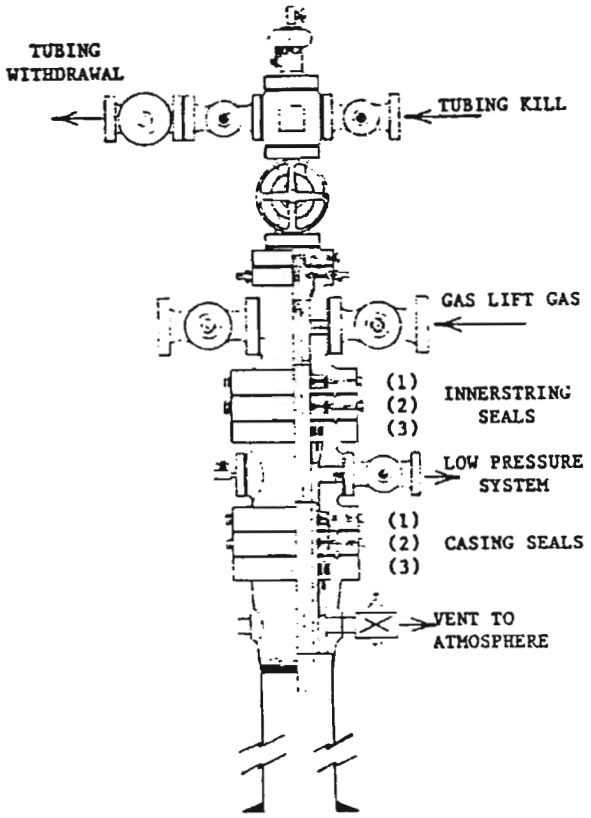
SOLUTION, PROBLEM 1:
Direct repair of leaking well not possible because source well is unknown. Other wells where gas appears are continually vented to surface.

SOLUTION, PROBLEM 2:
Unearth well and recap or place collection funnel over it. Rig work not required. Vent all gas to atmosphere.

SOLUTION, PROBLEM 3:
Unearth well, move in rig, attempt to enter and repair old casing. Produce gas through casing into low pressure system. Vent surface annulus to atmosphere.

EXHIBIT I

WELLHEAD LEAKS: TYPE 5



CURRENT AND PROPOSED WELLHEAD FOR WELLS WITH INNERSTRINGS

PROBLEM:
Wellhead seal leaks allow high pressure gas to leak into the innerstring, tubing or surface casing annulus. Gas then enters shallow zones at the surface casing shoe or through casing holes.

SOLUTION:
Keep all annular pressures below that required to force gas into shallow zones either by connecting them to low pressure system or venting them to atmosphere. Install new wellheads with triple seals (as illustrated) on wells with obsolete equipment when other well work is performing or when wellhead is leaking badly.

(1) Inject sealant to energize seal in head

(2) Inject sealant to energize seal in sealing flange

(3) Set down weight on slips to energize seal

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