

EXHIBIT "A"

INJECTION WELL MONITORING GUIDANCE

(Revised 5/7/97)

INJECTION PROFILES

- 1) All injection profiles shall be a combination of temperature and radioactive tracer logs. A representative of the Division will always witness the injection profiles.
- 2) All log curves shall be started (or finished) at a minimum of 200 feet above the top perforation. Temperature curves shall be run: a) while injecting, and, *if the well is on vacuum or goes on vacuum within 30 minutes of shutting in the well* at the conclusion of the tracer studies; b) 30 minutes after shut-in, c) 1 hour after shut-in, and d) 2 hours after shut-in. *If the well is holding surface pressure* at the conclusion of the tracer studies, shut-in temperature curves will be run: b) 1 hour after shut-in, c) 2 hours after shut-in, and d) 24 hours after shut-in.
- 3) Radioactive tracer runs shall start at a minimum of 150 feet above the top perforation and consist primarily of an "intensity" type survey. The initial recorded runs through the radioactive material should have a minimum of 6 inches chart deflection immediately above any anticipated loss interval. The tracer intensity shall be recorded until the R/A residual falls below 1 chart division deflection over background.
- 4) The "velocity" type and "drop shot" type surveys are not required but may be run at the discretion of the operator of the well. The determination should however, take into consideration the injection rate. It may be desirable to run velocities if the rate is such that drag runs cannot easily be made. As a rule of thumb, it is difficult to keep up with a slug with an injection rate over about 1500 bpd in 5-1/2 inch casing.
- 5) A "no flow" interval should be established immediately below the bottom perforation or, if flow exists, a percentage or rate of movement below the perforated interval should be calculated.
- 6) Channel (leak) checks should be made first at the bottom perforation and finally at the top perforation with the detector tool positioned approximately 10 feet below (for a downward check) or above (for upward) the subject perforations. Possible casing leak situations should be investigated by breaking down the entire blank pipe interval (unless the probable interval is identified by temperature or previous tracer studies), from the top perforation to the packer in 10 foot intervals. Any suspect casing collars