

TIME DRIVE SURVEY GUIDELINES

A Time Drive Survey is to be run after each Radioactive Tracer Survey.

1. Flush the well sufficiently to purge all radioactive tracer material from the previously run radioactive tracer survey.
2. Place the gamma ray detector 25 to 60 feet above the depth the tracer material exited the well bore during the previous radioactive tracer survey; but, **in no case** should the detector be above the confining shale immediately above the Top of Zone (TOZ).

Example: If the tracer material exited the well bore at 2000 feet, placing the detector 25 feet above the exit point is acceptable.

3. To determine if upward migration occurs, the time drive should be run replicating normal operating pressures and conditions. Prior to releasing the tracer material, start injecting, increasing the injection pressure to the normal operating pressure, **not to exceed the MASIP**. The injection pressure must remain constant for the duration of the test after releasing the tracer material.
4. With the tracer detector stationary, begin recording in time-drive mode. Release the tracer material above the stationary detector. As the tracer material is detected moving downward past the stationary detector, continue recording for a minimum of five minutes plus an additional one-half (1/2) minute times the number of feet the detector is positioned above the depth that the tracer material previously exited the well.

Example: If the tracer detector is placed 30 feet above the depth that the tracer material previously exited the well bore, the time drive must last at least 20 minutes past the time when the tracer material passed the detector.
Minutes to pump = $(5 + (1/2 \times 30)) = 20$

5. If the tracer material is detected coming back past the detector, pull the detector up some distance, e.g. 10 feet higher, and repeat the process with a new radioactive slug. If you have reason to believe the tracer material will migrate upward to a certain depth, e.g. TOZ, you may begin Step 2 just below this depth to see if the tracer material passes by. If the tracer material is detected passing, then pull the detector up above the TOZ and run another log at that point to see if the tracer material gets that high, i.e. out of zone.
6. Write the following information on the log alongside the time-drive run:
 - A. Injection pressure (psi). Also indicate any variation in pressure during the time drive.
 - B. Injection Rate (bpm).
 - C. Length of time-drive in minutes, beginning and ending clock times, or 1-minute intervals indicated on the log.