Biostimulation in Groundwater at Hanford 100H Using HRC Injection

- 40 lbs of ^{13}C-labeled HRC were injected, followed by Br-tracer injection, into Well 699-96-45 within the Hanford formation over the depth interval from 44 ft to 50 ft on August 3, 2004 (time 0).

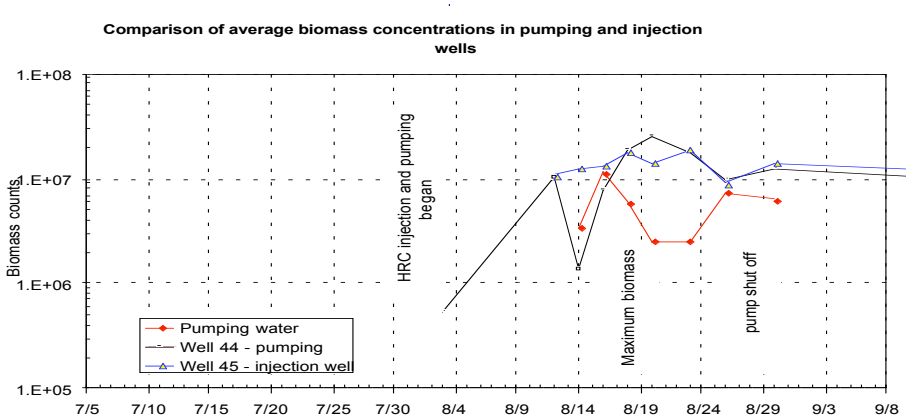
- 2.5 gal of water were used a primer to fill the injection hose before the injection, 4 gal of water were used to dilute HRC, and 4.5 gal of water were used as a chaser after the HRC injection.

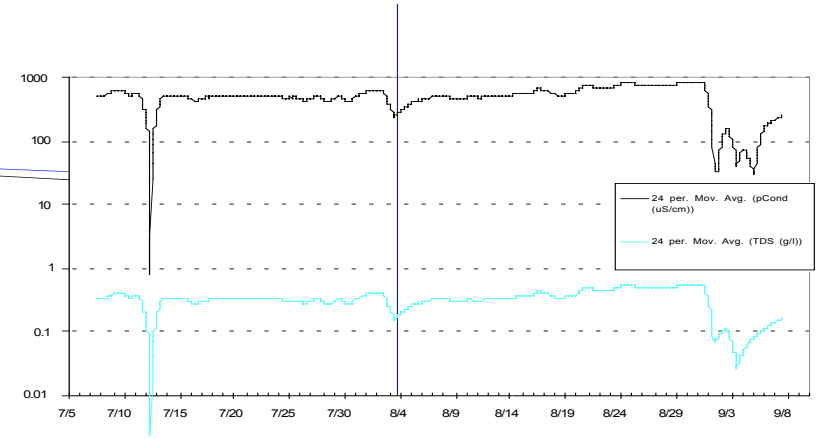
- Pumping from the monitoring well 699-96-44 (15 ft from the injection well) started immediately after the injection and continued for 27 days.

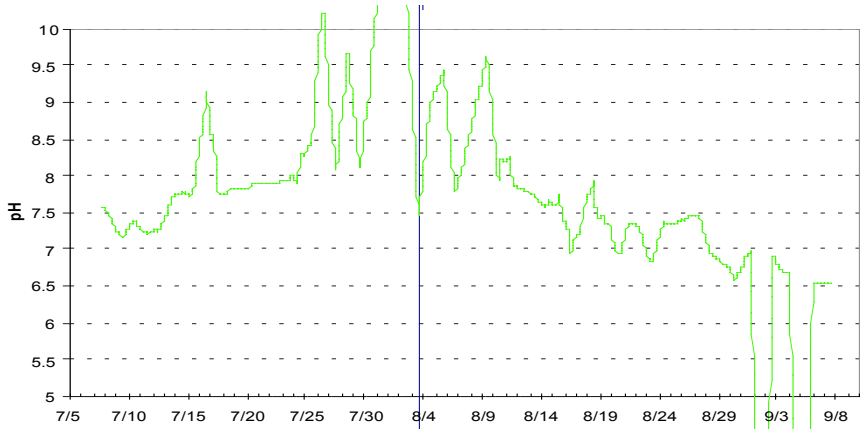
- Br breakthrough occurred 7 days after the injection, and the maximum was reached 11 days after the injection.

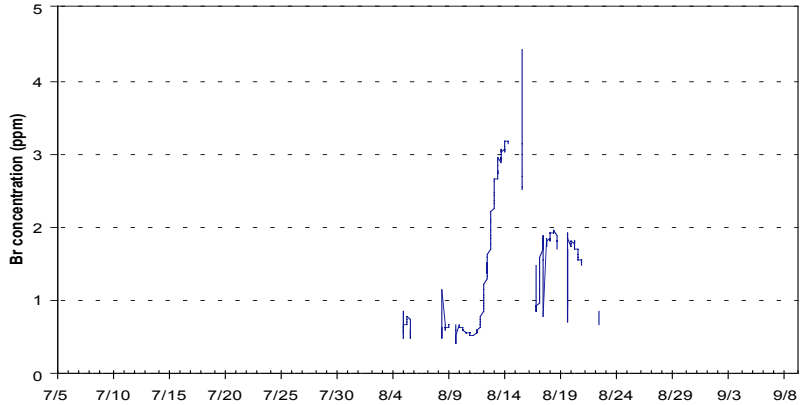
- Microbial cell counts reached the maximum 13-17 days after the injection

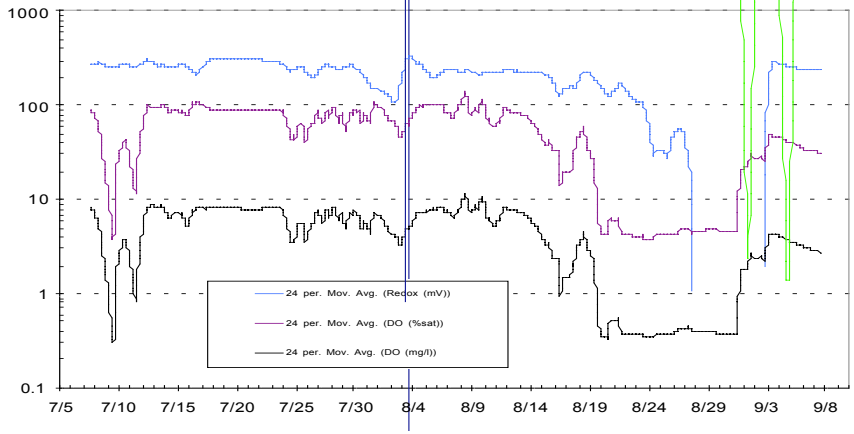
- Pumping stopped on August 30.









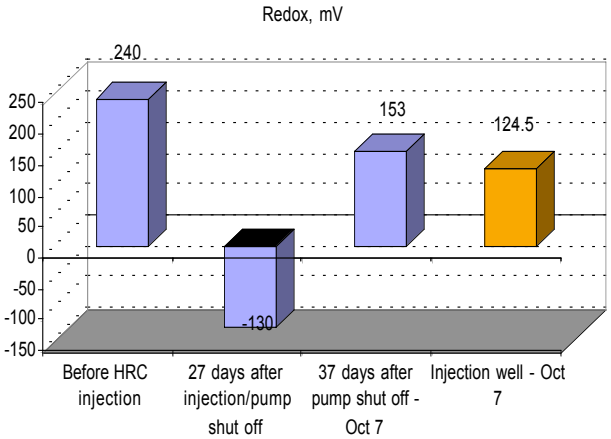


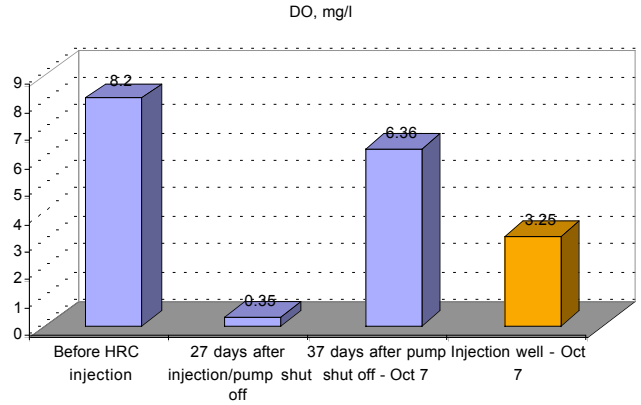
pH and DO began to drop on ~August 8.

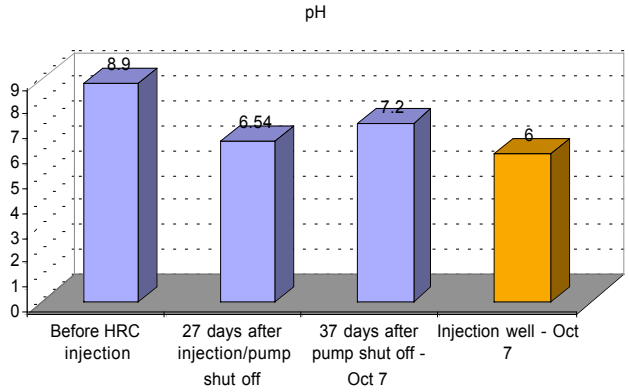
The minimum of the DO concentration corresponds to the maximum of biomass on August 19-20. At this time, the Redox potential started to drop.

When the pump was shut off on August 30:

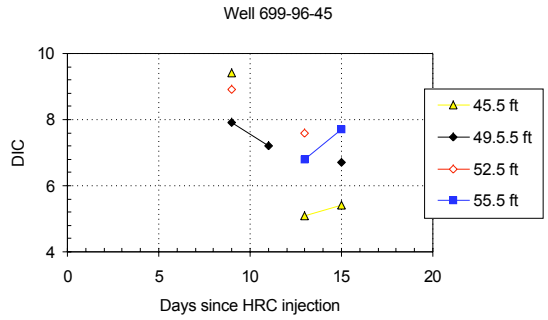
- DO and redox increased, and then decreased again;
- TDS dropped and then increased again.

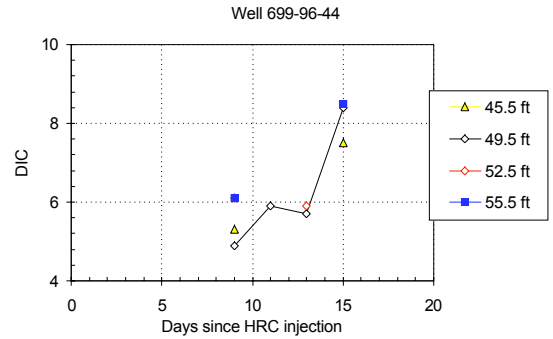


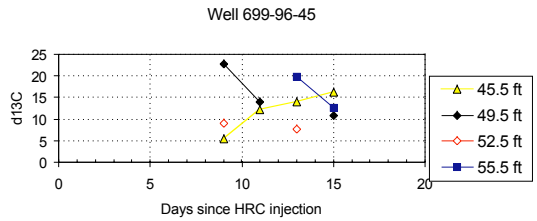


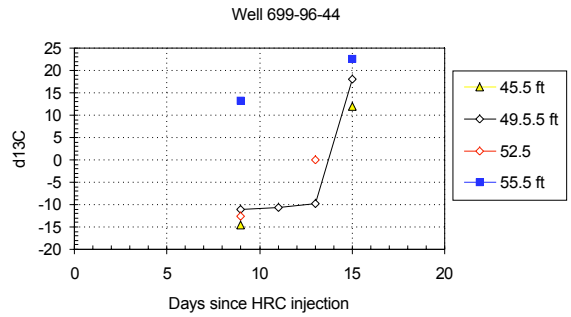


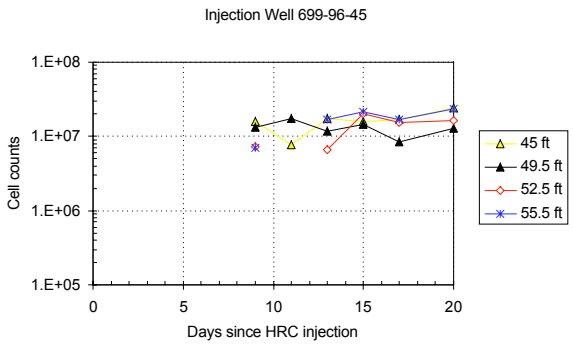
Comparison of the results of measurements of the Redox potential, DO, and pH in the monitoring Well 699-96-44 (blue color) before the HRC injection, after 27 days after the HRC injection (August 30, 2004, when the pump was shut off), and October 7 (37 days after the pump was shut off, characterizing natural gradient flow), and the October 7, 2004 data from the injection well 699-96-45. The October 7 measurements show the recovery of geochemical conditions over time.

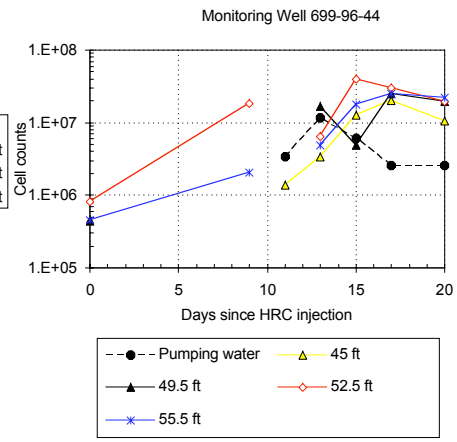

Well 699-96-45
DIC
Days since HRC injection
45.5 ft
49.5.5 ft
52.5 ft
55.5 ft


Well 699-96-44
DIC
Days since HRC injection
45.5 ft
49.5 ft
52.5 ft
55.5 ft


Well 699-96-45
d13C
Days since HRC injection
45.5 ft
49.5 ft
52.5 ft
55.5 ft


Well 699-96-44
d13C
Days since HRC injection
45.5 ft
49.5.5 ft
52.5
55.5 ft


Injection Well 699-96-45
Cell counts
Days since HRC injection
45 ft
49.5 ft
52.5 ft
55.5 ft


Monitoring Well 699-96-44
Cell counts
Days since HRC injection
Pumping water
45 ft
49.5 ft
52.5 ft
55.5 ft