



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

1595 Wynkoop Street  
DENVER, CO 80202-1129  
Phone 800-227-8917  
<http://www.epa.gov/region08>

**PERMIT MODIFICATION – PERMIT NO. CO52154-08524**

Pursuant to Title 40 of the Code of Federal Regulations, section 144.39 and Part III(B) of the above referenced Class V Underground Injection Control (UIC) permit, a modification to this permit is made. Changes made to the modified version of the PART II. SPECIFIC PERMIT CONDITIONS Section A.3.(j)(iii) and Section C.8.(c), and APPENDIX D are as follows:

**Original version (PART II. SPECIFIC PERMIT CONDITIONS Section A.3.(j)(iii))**

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**3. *Sampling and Monitoring Devices***

The Permittee shall install and maintain in good operating condition for the duration period specified in APPENDIX D:

- (j) automatic alarms attached to:
  - (i) T-1P liquid production tubular pair and sound if a temperature at the wellhead of 660 degrees Fahrenheit is reached, and
  - (ii) annulus of the 7" tubing and 3 smaller tubings (psi) and sound if MAIP is reached, and
  - (iii) temperature fiber optic cable housed in conduit cemented into the exterior of the 9 5/8" casing of T-1P well and sound if a temperature of 450 degrees Fahrenheit is reached, and
  - (iv) temperature fiber optic cable measuring 100 feet averaged temperatures from surface to at least the top of injection zone, within the 7" tubing measuring the retort temperature of T-1P well, and sound if a temperature of 750 degrees Fahrenheit is reached; reasonable efforts must be made to keep cable operational, and
  - (v) temperature fiber optic cable measuring 10 feet averaged temperatures from surface to at least the top of injection zone in at least two tomography wells, during operational period, and sound if a temperature of 400 degrees Fahrenheit is detected at or above the top of the injection zone.

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**is modified to read:**

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### **3. Sampling and Monitoring Devices**

The Permittee shall install and maintain in good operating condition for the duration period specified in APPENDIX D:

- (j) automatic alarms attached to:
  - (i) T-1P liquid production tubular pair and sound if a temperature at the wellhead of 660 degrees Fahrenheit is reached, and
  - (ii) annulus of the 7" tubing and 3 smaller tubings (psi) and sound if MAIP is reached, and
  - (iii) temperature fiber optic cable, housed in conduit cemented into the exterior of the 9 5/8" casing of T-1P well, measuring 10 feet averaged temperatures from surface to at least the top of injection zone and sound;
    - I. if a temperature of 450 degrees Fahrenheit is reached between the interval from 350 feet below ground surface to, at minimum, top of injection zone, or
    - II. if a temperature of 500 degrees Fahrenheit is reached between the interval of 230 to 270 feet; and
  - (iv) temperature fiber optic cable measuring 100 feet averaged temperatures from surface to at least the top of injection zone, within the 7" tubing measuring the retort temperature of T-1P well, and sound if a temperature of 750 degrees Fahrenheit is reached; reasonable efforts must be made to keep cable operational, and
  - (v) temperature fiber optic cable measuring 10 feet averaged temperatures from surface to at least the top of injection zone in at least two tomography wells, during operational period, and sound if a temperature of 400 degrees Fahrenheit is detected at or above the top of the injection zone.

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**and original version (PART II. SPECIFIC PERMIT CONDITIONS Section C.8.(c))**

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### **8. Maximum Operating Temperature Requirements for T-1P**

- (c) The maximum allowable temperature, measured by the temperature fiber optic cable outside of the 9 5/8" casing, at any time is 450 degrees Fahrenheit. In addition to a maximum allowable temperature, the maximum allowable number of days for a given temperature range, reached at the exterior of the 9 5/8" casing, as measured at any point

along the fiber optic cable, are:

Temperature deg F	Number of Days
350 – 400	633
401 – 410	341
411 – 420	186
421 – 430	103
431 – 440	58
441 – 450	33

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is modified to read:

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## 8. Temperature Monitoring Requirements and Limits for T-1P

- (c) The maximum temperature limits measured by the temperature fiber optic cable outside of the 9 5/8" casing varies based upon depth. The temperature monitoring requirement at various depths is described below.

<u>Depth (feet)</u>	<u>Maximum Temperature</u>	<u>Temperature Days</u>
0-230	Not Applicable	Not Applicable
230-270	500 deg F	Table 1
270-350	Not Applicable	Not Applicable
> 350	450 deg F	Table 2

In addition to a maximum allowable temperature that may be reached at the exterior of the production casing as measured by the temperature fiber optic cable outside of the 9 5/8" casing, the maximum allowable number of days for a given temperature range or Temperature Days, reached at the exterior of the 9 5/8" casing for the corresponding depth are:

Table 1

Temperature (deg F)	Number of Days
400 – 450	633
451 – 460	341
461 – 470	186
471 – 480	103
481 – 490	58
491 – 500	33

Table 2

Temperature (deg F)	Number of Days
350 – 400	633
401 – 410	341
411 – 420	186
421 – 430	103
431 – 440	58
441 – 450	33

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and original version (Appendix D):

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Temperature of cement outside of 9 5/8" casing (degrees F): 10' averaged temperature from surface to at least the top of injection zone	Fiber optic cable	At or below 450 deg F	Auto Alarm	Continuously	Monthly minimum, average and maximum temperatures	During operation
		Temp # of (deg F) Days		Quarterly	Quarterly recorded temperature data	Year 1 post-operation
		<u>350 - 400 633</u>				
		<u>401 - 410 341</u>				
		<u>411 - 420 186</u>				
		<u>421 - 430 103</u>		Annually	Temperature data, if recorded in the quarter	Year 2 & 3 post-operation
		<u>431 - 440 58</u>				
		<u>441 - 450 33</u>				

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**is modified to read:**

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Temperature of cement outside of 9 5/8" casing (deg F): 10' averaged temperature from 350 feet below ground surface (bgs) to at least the top of injection zone	Fiber optic cable	At or below 450 deg F	Auto Alarm	Continuously	Monthly minimum, average and maximum temperatures	During operation
		Temp # of (deg F) Days		Quarterly	Quarterly recorded temperature data	Year 1 post-operation
		<u>350 - 400 633</u>				
		<u>401 - 410 341</u>				
		<u>411 - 420 186</u>				
		<u>421 - 430 103</u>		Annually	Temperature data, if recorded in the quarter	Year 2 & 3 post-operation
		<u>431 - 440 58</u>				
		<u>441 - 450 33</u>				

Temperature of cement outside of 9 5/8" casing (deg F): 10' averaged temperature from 230 to 270 feet bgs	Fiber optic cable	At or below 500 deg F	Auto Alarm	Continuously	Monthly minimum, average and maximum temperatures	During operation
		Temp # of (deg F) Days		Quarterly	Quarterly recorded temperature data	Year 1 post-operation
		<u>400 - 450 633</u>				
		<u>451 - 460 341</u>				
		<u>461 - 470 186</u>				
		<u>471 - 480 103</u>		Annually	Temperature data, if recorded in the quarter	Year 2 & 3 post-operation
		<u>481 - 490 58</u>				
		<u>491 - 500 33</u>				

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