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CHAPTER 24

Class VI Injection Wells and Facilities
Underground Injection Control Program

Section 1. **Authority and Purpose.** These regulations are promulgated pursuant to W.S. 35-11-101 through 1904, specifically 313, and no person shall sequester carbon dioxide unless authorized by an Underground Injection Control (UIC) permit issued by the Department of Environmental Quality (DEQ). The injection of carbon dioxide for purposes of a project for enhanced recovery of oil or other minerals approved by the Wyoming Oil and Gas Conservation Commission shall not be subject to the provisions of this regulation unless the operator converts to geologic sequestration upon the cessation of oil and gas recovery operations or as otherwise required by the Commission.

These rules and regulations also provide financial assurance for the purposes specified in 35-11-313.

Section 2. **Definitions.** The following definitions supplement those definitions contained in Section 35-11-103 of the Wyoming Environmental Quality Act.

(a) "Administrator" means the ~~A~~administrator of the ~~w~~Water ~~q~~Quality ~~d~~Division of the ~~d~~Department of ~~e~~Environmental ~~q~~Quality.

(b) "Aquifer" means a zone, stratum or group of strata that can store and transmit water in sufficient quantities for a specific use.

(c) "Area of review" means the subsurface three-dimensional extent of the carbon dioxide plume, associated pressure front, and displaced fluids, as well as the overlying formations and surface area above that delineated region.

(d) "Background" means the constituents or parameters and the concentrations or measurements which describe water quality and water quality variability prior to the subsurface discharge.

(e) "Bore/casing annulus" means the space between the well bore and the well casing.

(f) "Carbon dioxide plume" means the underground extent, in three dimensions, of an injected carbon dioxide stream.

(g) "Carbon dioxide stream" means carbon dioxide, plus associated substances derived from the source materials and any processing, and any substances added to the stream to enable or improve the injection process. This chapter does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR Part 261.

(h) "Casing/tubing annulus" means the space between the well casing and the tubing.

49 (i) "Cementing" means to seal the annular space around the outside of a casing
50 string using a specially formulated mixture to hold the casing in place and prevent any movement
51 of fluid in this annular space. Cementing also includes operations to seal the well at the time of
52 abandonment.

53
54 (j) "Class VI well" means a well injecting a carbon dioxide stream for geologic
55 sequestration, beneath the lowermost formation containing a USDW; or a well used for geologic
56 sequestration of carbon dioxide that has been granted a waiver of the injection depth requirements
57 pursuant to requirements at Section 10 of this chapter; or, a well used for geologic sequestration
58 of carbon dioxide that has received an expansion to the areal extent of an existing Class II
59 enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to Wyoming Oil and
60 Gas Conservation Commission Rules and Regulations, Chapter 4, Section 12 and federal
61 regulation §144.7(d). Class VI wells are regulated under this chapter.

62
63 (k) "Confining zone" means a geological formation, group of formations, or part of a
64 formation ~~that is capable of limiting fluid movement from an injection zone stratigraphically~~
65 overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells
66 operating under an injection depth waiver, confining zone means a geologic formation, group of
67 formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).

68
69 (l) "Corrective action" means the use of ~~A~~administrator-approved methods to ensure
70 that wells within the area of review do not serve as conduits for the movement of fluids into
71 geologic formations other than those to be authorized under the permit.

72
73 (m) "Director" means the director of the ~~d~~Department of ~~e~~Environmental ~~q~~Quality.

74
75 (n) "Draft permit" means a document indicating the tentative decision by the
76 department to issue or deny, modify, revoke and reissue, or terminate a permit. A notice of intent
77 to terminate a permit and a notice of intent to deny a permit are types of draft permits. A denial
78 of a request for modification, revocation and reissuance, or termination is not a draft permit. A
79 draft permit for issuance shall contain all conditions and content, compliance schedules and
80 monitoring requirements required by this chapter.

81
82 (o) "Duly authorized representative" means a specific individual or a position having
83 responsibility for the overall operation of the regulated facility or activity. The authorization
84 shall be made in writing by a responsible corporate officer and shall be submitted to the
85 ~~A~~administrator.

86
87 (p) "Endangerment" means exposure to actions or activities which could pollute an
88 Underground Source of Drinking Water (USDW).

89
90 (q) "Excursion detection" means the detection of migrating carbon dioxide at or
91 beyond the boundary of the geologic sequestration site.

92
93 (r) "Fact sheet" means a document briefly setting forth the principal facts and the
94 significant factual, legal, methodological, and policy questions considered in preparing the draft
95 permit. Fact sheets for Class VI wells are incorporated into the public notice.

96

97 (s) "Fluid" means any material which flows or moves, whether semisolid, liquid,
98 sludge, gas or any other form or state.
99

100 (t) "Geologic sequestration project" means an injection well or wells used to
101 emplace a carbon dioxide stream into an injection zone for geologic sequestration. It includes the
102 subsurface three-dimensional extent of the carbon dioxide plume, associated pressure front, and
103 displaced brine, as well as the surface area above that delineated region. (Reference Section
104 35-11-103(c) of the Wyoming Environmental Quality Act for definitions of *geologic*
105 *sequestration*, *geologic sequestration site*, and *geologic sequestration facilities*.)

106
107 (u) "Groundwater" means subsurface water that fills available openings in rock or
108 soil materials such that they may be considered water saturated under hydrostatic pressure.
109

110 (v) "Groundwaters of the state" are all bodies of underground water which are
111 wholly or partially within the boundaries of the state.
112

113 (w) "Hazardous waste" means a hazardous waste as defined in ~~Chapter 2, Section 4~~
114 ~~(e), Wyoming Hazardous Waste Rules and Regulations~~ [40 CFR 261.3](#).
115

116 (x) "Individual permit" means a permit issued for a specific facility operated by an
117 individual operator, company, municipality, or agency. An individual permit may be established
118 as an area permit and include multiple points of discharge that are all operated by the same
119 person.
120

121 (y) "Injectate" means the material being disposed of through any underground
122 injection facility after it has received whatever pretreatment is done.
123

124 (z) "Injection zone" means a geologic formation, group of formations, or part of a
125 formation ~~receiving fluids through a well~~ [that is of sufficient areal extent, thickness, porosity, and](#)
126 [permeability to receive carbon dioxide through a well or wells associated with a geologic](#)
127 [sequestration project](#).
128

129 (aa) "Lithology" means the description of rocks on the basis of their physical and
130 chemical characteristics.
131

132 (bb) "Log" means to make a written record progressively describing the strata and
133 geologic and hydrologic character thereof to include electrical, radioactivity, radioactive tracer,
134 temperature, cement bond and similar surveys, a lithologic description of all cores, and test data.
135

136 (cc) "Long string casing" means a casing ~~which~~ [that](#) is continuous from at least the
137 top of the injection interval to the surface and ~~which~~ [that](#) is cemented in place.
138

139 (dd) "Long-term stewardship" means after release of financial assurance, upon site
140 closure, where the sequestration site may require periodic monitoring, measurement, or
141 verification of plume stabilization over an indefinite period of time.
142

143 ~~(dd)~~(ee) "Mechanical integrity" means the sound and unimpaired condition of all
144 components of the well or facility or system for control of a subsurface discharge and associated
145 activities.

146
147 ~~(ee)~~(ff) "Permit" means a Wyoming Underground Injection Control permit,
148 unless otherwise specified.
149
150 ~~(ff)~~(gg) "Permittee" means the named permit holder.
151
152 ~~(gg)~~(hh) "Plume stabilization" means the carbon dioxide that has been injected
153 subsurface essentially no longer expands vertically or horizontally and poses no threat to
154 USDWs, human health, safety, or the environment, as demonstrated by a minimum of three (3)
155 consecutive years of monitoring data.
156
157 ~~(gg)~~ (ii) "Point of compliance" means a point at which the permittee shall meet all
158 permit and regulatory requirements.
159
160 ~~(hh)~~ (jj) "Point of injection" means the last accessible sampling point prior to a
161 fluid being released into the subsurface environment through a Class VI injection well.
162
163 ~~(ii)~~ (kk) "Post-injection site care" means monitoring, measurement, verification,
164 and other actions (including corrective action) following ~~cessation of injection, closure of~~
165 injection wells until plume stabilization has been achieved and certified by the administrator, as
166 required under Section ~~16-17~~ of this chapter.
167
168 ~~(jj)~~ (ll) "Pressure front" means the zone of elevated pressure that is created by
169 the injection of the carbon dioxide stream into the subsurface. The pressure front of a carbon
170 dioxide plume refers to a zone where there is a pressure differential sufficient to cause movement
171 of injected fluids or formation fluid if a migration pathway or conduit were to exist.
172
173 ~~(kk)~~ (mm) "Public hearing" means a non-adversary hearing held by the
174 ~~A~~ administrator or director of the department. The hearing is conducted pursuant to Chapter 3 of
175 the Wyoming Department of Environmental Quality Rules of Practice and Procedure.
176
177 ~~(ll)~~ (nn) "Radioactive waste" means any waste ~~which that~~ contains radioactive
178 material in concentrations ~~which that~~ exceed those listed in 10 CFR Part 20, Appendix B, Table
179 II, Column 2 as of December 22, 1993.
180
181 ~~(mm)~~ (oo) "Receiver" means any zone, interval, formation or unit in the subsurface
182 into which a carbon dioxide stream is injected.
183
184 ~~(nn)~~ (pp) "Responsible corporate officer" means a president, secretary, treasurer,
185 or vice president of the corporation in charge of a principal business function, or any other person
186 who performs similar policy- or decision-making functions for the corporation.
187
188 ~~(oo)~~ (qq) "Secondarily affected aquifer" means any aquifer affected by migration
189 of fluids from an injection facility, when the aquifer is not directly discharged into.
190
191 ~~(pp)~~ (rr) "Site closure" means the point/time, as ~~determined~~ certified by the ~~director~~
192 administrator following the requirements at Section 17, at which time the owner or operator of a
193 geologic sequestration project is released from post-injection site care responsibilities.
194

195 ~~(qq)~~ (ss) "Subsurface discharge" means a discharge into a receiver.
196
197 ~~(rr)~~ (tt) "Transmissive fault or fracture" means a fault or fracture that has
198 sufficient permeability and vertical extent to allow fluids to move beyond the confining zone.
199
200 ~~(ss)~~ (uu) "USDW" or "Underground source of drinking water" means
201 those aquifers or portions thereof ~~which~~ that have a total dissolved solids content of less than
202 10,000 mg/L, and are classified as either Class I, II, III, IV (a), or Special (A), pursuant to
203 Chapter 8, Quality Standards for Wyoming Groundwaters, Water Quality Rules and Regulations.
204
205 ~~(tt)~~ (vv) "US EPA regional administrator" means the ~~R~~regional ~~A~~administrator of
206 US EPA's Region 8 office in Denver, Colorado.
207
208 ~~(uu)~~ (ww) "Vadose Zone" means the unsaturated zone in the earth, between the
209 land surface and the top of the first saturated aquifer. The vadose zone contains water at less than
210 saturated conditions.
211
212 ~~(vv)~~ (xx) "Water quality management area" means the area delineated for the
213 protection of water quality under a department approved plan developed under Sections 303, 208
214 and/or 201 of the Federal Clean Water Act, as amended.
215
216 ~~(ww)~~ (yy) "Well" means an opening, excavation, shaft or hole in the ground
217 allowing or used for an underground injection, or for monitoring.
218
219 ~~(xx)~~ (zz) "Workover" means to pull the tubing, packer, or any downhole hardware
220 from the well and inspect, replace, or refurbish it prior to placing that hardware back in service, or
221 to enter the hole with any drilling tool.
222
223 ~~(yy)~~ (aaa) "Wellhead protection area" means the area delineated for the protection
224 of a public water supply utilizing a groundwater source under a department approved plan
225 developed pursuant to Section 1528 of the federal Safe Drinking Water Act.
226
227 **Section 3. Applicability.**
228
229 (a) These regulations shall apply to all Class VI wells used to inject carbon dioxide
230 streams for the purpose of geologic sequestration.
231
232 (b) In addition, these regulations shall apply to owners and operators of Class I
233 industrial, Class II, or Class V experimental or demonstration carbon dioxide injection projects
234 who seek to apply for a Class VI geologic sequestration permit for their well or wells.
235
236 (i) Owners and/or operators of permitted Class I or Class V injection well(s)
237 seeking to convert their well(s) to a Class VI well shall apply for a Class VI permit and shall
238 demonstrate to the administrator that the well(s) was/were engineered and constructed to meet the
239 requirements outlined in Section 9 of these regulations and ensure protection of USDWs, in lieu
240 of requirements at Section 9(b) and Section 11(a) of this chapter.
241
242 (A) By December 10, 2011, owners or operators of either Class I
243 wells previously permitted for the purpose of geologic sequestration or Class V experimental

244 technology wells no longer being used for experimental purposes that will continue injection of
245 carbon dioxide for the purpose of geologic sequestration must apply for a Class VI permit.

246 ~~Formerly 3(a)(i)(ii)~~ If the Administrator determines that USDWs will not
247 be endangered, such wells are exempt, at the Administrator's discretion, from the casing and
248 cementing requirements at Section 9(b)(i) through (vii) and Section ~~4011~~(a)(i)(A) through (C).
249

250
251 (c) For owners and/or operators of permitted Class II injection well(s) seeking to
252 convert their well(s) to a Class VI well, the following shall apply:
253

254 (i) After consultation with the Oil and Gas Conservation Commission
255 Supervisor, the administrator may, in his/her best estimate, require a Class VI permit in
256 consideration of the following:

257 _____ (A) Increase in reservoir pressure within the injection zone(s).

258 _____
259 _____ (B) Increase in carbon dioxide injection rates.

260 _____
261 _____ (C) Decrease in reservoir production rates.

262 _____
263 _____ (D) Distance between the injection zone(s) and USDWs.

264 _____
265 _____ (E) Suitability of the Class II area of review delineation.

266 _____
267 _____ (F) Quality of abandoned well plugs within the area of review.

268 _____
269 _____ (G) The owner's and/or operator's plan for recovery of carbon
270 dioxide at the cessation of injection.

271 _____
272 _____ (H) The source and properties of the injected carbon dioxide.

273 _____
274 _____ (I) Any additional site-specific factors as determined by the
275 administrator.

276
277 _____ (ii) The owner and/or operator of a Class II well shall apply for a Class VI
278 permit when there is an increased risk to USDWs compared to their Class II operation.

279
280 _____ (iii) The owner and/or operator of a Class II well may continue operation as a
281 Class II well when there is no increased risk to USDWs compared to their Class II operation.
282 When enhanced oil recovery operations have ceased, the owner and/or operator may apply for a
283 Class VI permit.

284
285 ~~Formerly 3(e) (d)~~ These regulations do not apply to the injection of any carbon
286 dioxide stream that meets the definition of a hazardous waste.
287

288 **Section 4. Permits required; processing of permits; and requirements**
289 **applicable to all permits.**

290
291 (a) Permits required.
292

- 293 (i) Owners or operators of Class VI wells must obtain a permit in
294 accordance with these regulations. Class VI wells are not authorized by rule to inject.
295
- 296 (ii) Construction, installation, operation, monitoring, testing, plugging, post-
297 injection site care, and modification to, or of, any Class VI well shall be allowed only in
298 accordance with these regulations.
299
- 300 (iii) Injections from Class VI wells shall be restricted to those receivers
301 defined as Class V (Hydrocarbon Commercial) or Class VI groundwaters by the department
302 pursuant to Chapter ~~VIII~~ 8, Quality Standards for Wyoming Groundwaters, Water Quality Rules
303 and Regulations.
304
- 305 (iv) A separate permit to construct is not required under Chapter 3, Water
306 Quality Rules and Regulations for any Class VI facility.
307
- 308 (v) Permits for Class VI wells shall be issued for the operating life of the
309 facility and extend through the post-injection site care period until the geologic sequestration
310 project is closed in accordance with department rules and regulations.
311
- 312 (vi) Permits may be issued for individual Class VI wells ~~or they may be~~
313 ~~issued on an area basis for multiple points of discharge operated by the same person.~~
314
- 315 (vii) Each permit shall be reviewed by the department at least once every five
316 (5) years for continued validity of all permit conditions and contents. Permits that do not satisfy
317 the requirements of these regulations are subject to modification, revocation and reissuance, or
318 termination pursuant to this chapter.
319
- 320 (viii) Sections of permit applications filed under this chapter ~~which that~~
321 represent engineering work shall be sealed, signed, and dated by a licensed professional engineer
322 as required by Wyoming Statutes, Title 33, Chapter 29.
323
- 324 (ix) Sections of permit applications filed under this chapter ~~which that~~
325 represent geologic work shall be sealed, signed, and dated by a licensed professional geologist as
326 required by Wyoming Statutes, Title 33, Chapter 41.
327
- 328 (b) Permit processing procedures applicable to all Class VI facilities, individual and
329 general permits:
- 330
- 331 (i) The applicant shall submit five (5) copies of the permit application to the
332 division.
333
- 334 (ii) Within 60 days of submission of the application, the ~~A~~administrator shall
335 make an initial determination of completeness. An application shall be determined complete
336 when the ~~A~~administrator receives an application and any supplemental information necessary to
337 determine compliance with these regulations.
338
- 339 (iii) Re-submittal of information by an applicant for an incomplete
340 application will begin the process described in paragraph (b) of this section.
341

342 (iv) During any 60 day review period where an application is determined
343 complete, the ~~A~~administrator shall prepare a draft permit for issuance or denial, prepare a fact
344 sheet on the proposed operation, and provide public notice pursuant to Section ~~19~~ 20.

345
346 (v) The ~~Director~~ administrator may deny an individual permit for any of the
347 following reasons:

348 (A) The application is incomplete;

349
350 (B) The project, if constructed and/or operated, will cause violation
351 of applicable state surface or groundwater standards;

352
353 (C) The application contains a proposed construction or operation
354 ~~which~~ that does not meet the requirements of this chapter;

355
356 (D) The permitted facility would be in conflict with or is in conflict
357 with a state approved local wellhead protection plan, state approved local source water protection
358 plan, or state approved water quality management plan; or

359
360 (E) Other justifiable reasons necessary to carry out the provisions of
361 the Wyoming Environmental Quality Act.

362
363 (vi) If the ~~Director~~ administrator intends to deny an individual permit for any
364 reason other than an incomplete or deficient application, a draft permit shall be prepared and
365 public notice issued pursuant to Section ~~19~~ 20 of this chapter.

366
367 (vii) A denial of a permit by the department is appealable by the applicant to
368 the Environmental Quality Council in accordance with the Rules of Practice and Procedure.
369 Requests for appeal must be in writing, state the reasons for appeal, and be made to both the
370 ~~D~~irector and the chairman of the Environmental Quality Council.

371
372 (viii) Permits may be modified, revoked and reissued, or terminated either in
373 response to a petition from any interested person (including the permittee) or upon the
374 ~~A~~administrator's initiative. However, permits may only be modified, revoked and reissued, or
375 terminated for the reasons specified in Section 4(b) of this chapter. All requests shall be in
376 writing and shall contain facts or reasons supporting the request.

377
378 If the administrator decides the petition is not justified, the petitioner shall be sent a brief
379 written response giving the reason for the decision. A request for modification, revocation and
380 reissuance, or termination shall be considered denied if the administrator takes no action within
381 60 days after receiving the written request. Denials of requests for modification, revocation and
382 reissuance, or termination are not subject to public notice and comment. Denials by the
383 administrator may be appealed for hearing to the Environmental Quality Council by a letter
384 briefly setting forth the relevant facts.

385
386 (ix) The ~~A~~administrator may modify a permit when:

387
388 (A) Any material or substantial alterations or additions to the facility
389 occur after permitting or licensing, ~~which~~ that justify the application of permit conditions that are
390 different or absent in the existing permit;

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(B) Any modification in the operation of the facility is capable of causing or increasing pollution in excess of applicable standards or permit conditions;

(C) Information warranting modification is discovered after the operation has begun that would have justified the application of different permit conditions at the time of permit issuance;

(D) Regulations or standards upon which the permit was based have changed by promulgation of amended standards or regulations, or by judicial decision after the permit was issued;

(E) Cause exists for termination, as described in this section, but the department determines that modification is appropriate; or

(F) Modification is necessary to comply with applicable statutes, standards or regulations.

(x) Additionally whenever the administrator determines that permit changes are necessary based on:

(A) Area of review reevaluations under Section 8(e) of this chapter;
or

(B) Any amendments to the testing and monitoring plan under Section 14(b)(xii) of this chapter; or

(C) Any amendments to the injection well plugging plan under Section 16(c) of this chapter; or

(D) Any amendments to the post-injection site care and site closure plan under Section 17(a)(iii) of this chapter; or

(E) Any amendments to the emergency and remedial response plan under Section 18(d) of this chapter; or

(F) A review of monitoring and/or testing results conducted in accordance with permit requirements.

~~(x)~~(xi) Minor modifications of permits may occur with the consent of the permittee without following the public notice requirements. Minor modifications will become final 20 days from the date of receipt of such notice. For the purposes of this chapter, minor modifications may only:

(A) Correct typographical errors;

(B) Require more frequent monitoring or reporting by the permittee;

439 (C) Change an interim compliance date in a schedule of compliance,
440 provided the new date is not more than 120 days after the date specified in the existing permit and
441 does not interfere with attainment of the final compliance date requirement;

442
443 (D) Allow for a change in ownership or operational control of a
444 facility where the Administrator determines that no other change in the permit is necessary,
445 provided that a written agreement containing a specific date for transfer of permit responsibility,
446 coverage, and liability between the current and new permittees have been submitted to the
447 Administrator;

448
449 (E) Change quantities or types of fluids injected which are within the
450 capacity of the facility as permitted and, in the judgment of the Administrator, would not
451 interfere with the operation of the facility or its ability to meet conditions described in the permit
452 and would not change its classification; or

453
454 (F) Change construction requirements approved by the
455 Administrator pursuant to department rules and regulations provided that any such alteration
456 shall comply with the requirements of this chapter.

457
458 (G) Amend a plugging and abandonment plan which has been
459 updated under Section 16 of this chapter.

460
461 (H) Amend a Class VI injection well testing and monitoring plan,
462 plugging plan, post-injection site care and site closure plan, or emergency and remedial response
463 plan where the modifications merely clarify or correct the plan, as determined by the
464 administrator.

465
466 (xi) The Administrator may revoke and reissue or terminate a permit for any
467 of the following reasons:

468
469 (A) Noncompliance with terms and conditions of the permit;

470
471 (B) Failure in the application or during the issuance process to
472 disclose fully all relevant facts, or misrepresenting any relevant facts at any time; or

473
474 (C) A determination that the activity endangers human health or the
475 environment and can only be regulated to acceptable levels by a permit modification or
476 termination.

477
478 (xii) The Administrator may modify a permit to resolve issues that could
479 lead to the revocation of the permit under Section 5(b) of this chapter. The Administrator, as
480 part of any notification of intent to terminate a permit, shall order the permittee to proceed with
481 reclamation on a reasonable time period.

482
483 If the Administrator tentatively decides to modify or revoke and reissue a permit, a draft
484 permit incorporating the proposed changes shall be prepared. The Administrator may request
485 additional information and, in the case of a modified permit, may require the submission of an
486 updated application. In the case of revoked and reissued permits, the Administrator shall require
487 the submission of a new application.

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(xiii) In a permit modification under Section 4(b) of this chapter, only those conditions to be modified shall be reopened when a new draft permit is prepared. All other aspects of the existing permit shall remain in effect for the duration of the unmodified permit and the modified permit shall expire on the date when the original permit would have expired. When a permit is revoked and reissued under this section, the entire permit is reopened as if the permit has expired and is being reissued. During any revocation and reissuance proceeding, the permittee shall comply with all conditions of the existing permit until a new final permit is issued.

(xiv) Permit modifications, revocations or terminations shall be developed as a draft permit and are subject to the public notice and hearing requirements outlined in Section ~~19~~ 20.

(xv) Transfer of a permit is allowed only upon approval by the Administrator. When a permit transfer occurs pursuant to this section, the permit rights of the previous permittee will automatically terminate.

(A) The proposed permit holder shall apply in writing as though that person was the original applicant for the permit and shall further agree to be bound by all of the terms and conditions of the permit; and

(B) Transfer will not be allowed if the permittee is in noncompliance with any term and conditions of the permit, unless the transferee agrees to bring the facility back into compliance with the permit.

(C) When a permit transfer occurs, the Administrator may modify a permit pursuant to this section. The Administrator shall provide public notice pursuant to Section ~~19~~ 20 for any modification other than a minor modification defined by this section.

(c) Permit conditions.

(i) All individual permits issued under this chapter shall contain the following conditions:

(A) A requirement that the permittee comply with all conditions of the permit, and any permit noncompliance constitutes a violation of these regulations and is grounds for enforcement action, permit termination, revocation, or modification;

(B) A requirement that if the permittee wishes to continue injection activity after the expiration date of the permit, the permittee must apply to the Administrator for, and obtain, a new permit prior to expiration of the existing permit;

(C) A stipulation that it shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit;

(D) A requirement that the permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit;

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(E) A requirement that the permittee properly operate and maintain all facilities and systems of treatment and control ~~which~~ that are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding and operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit;

(F) A stipulation that the filing of a request by the permittee, or at the instigation of the ~~A~~a administrator, for a permit modification, revocation, termination, or notification of planned changes or anticipated non-compliance, shall not stay any permit condition;

(G) A stipulation that this permit does not convey any property rights of any sort, or any exclusive privilege;

(H) A stipulation that the permittee shall furnish to the ~~A~~a administrator, within a specified time, any information which the ~~A~~a administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. The permittee shall also furnish to the ~~A~~a administrator, upon request, copies of records required to be kept by the permit;

(I) A requirement that the permittee shall allow the ~~A~~a administrator, or an authorized representative of the ~~A~~a administrator, upon the presentation of credentials, during normal working hours, to enter the premises where a regulated facility is located, or where records are kept under the conditions of this permit, and inspect the discharge and related facilities, review and copy reports and records required by the permit, collect fluid samples for analysis, measure and record water levels, and perform any other function authorized by law or regulation;

(J) A requirement that the permittee furnish any information necessary to establish a monitoring program pursuant to Section ~~13~~ 14 of this chapter;

(K) A requirement that all samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity, and records of all monitoring information be retained by the permittee. The monitoring information to be retained shall be that information stipulated in the monitoring program established pursuant to the criteria in Section ~~13~~ 14 of this chapter;

(L) A requirement that all applications, reports, and other information submitted to the ~~A~~a administrator contain certifications as required in Section 5(d) of this chapter, and be signed by a person who meets the requirements to sign permit applications found in Section 5(c), or for routine reports, a duly authorized representative;

(M) A requirement that the permittee give advance notice to the ~~A~~a administrator as soon as possible of any planned physical alteration or additions, other than authorized operation and maintenance, to the permitted facility and receive authorization prior to implementing the proposed alteration or addition;

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(N) A requirement that any modification ~~which~~ that may result in a violation of a permit condition shall be reported to the Aadministrator, and any modification that will result in a violation of a permit condition shall be reported to the Aadministrator through the submission of a new or amended permit application;

(O) A requirement that any transfer of a permit must first be approved by the Aadministrator, and that no transfer will be approved if the facility is not in compliance with the existing permit unless the proposed permittee agrees to bring the facility into compliance;

(P) A requirement that monitoring results shall be reported at the intervals specified elsewhere in the permit;

(Q) A requirement that reports of compliance or non-compliance with, or any progress reports on interim and final requirements contained in any compliance schedule, if one is required by the Aadministrator, shall be submitted no later than 30 days following each schedule date;

(R) ~~A requirement that confirmed noncompliance resulting in the migration of injected fluid into any zone outside of the permitted receiver~~ Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between USDWs must be orally reported to the Aadministrator within 24 hours, and a written submission shall be provided within five (5) days of the time the permittee becomes aware of the excursion. The written submission shall contain:

(I) A description of the noncompliance and its cause;

(II) The period of noncompliance, including exact dates and times, and, if the noncompliance has not been controlled, the anticipated time it is expected to continue; and

(III) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(S) A requirement that the permittee report all instances of noncompliance not already required to be reported under paragraphs (c)(i)(Q) through (R) of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (c)(i)(R) of this section;

(T) A requirement that in the situation where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Aadministrator, the permittee shall promptly submit such facts or information;

(U) A requirement that the injection facility meet construction requirements outlined in Section 9 of this chapter, and that the permittee submit notice of completion of construction to the Aadministrator and allow for inspection of the facility upon completion of construction, prior to commencing any injection activity;

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(V) A requirement that the permittee notify the Administrator at such times as the permit requires before conversion or abandonment of the facility; and

(W) A requirement that injection may not commence until construction is complete.

(X) A requirement that the owner or operator of a Class VI well permitted under this part shall establish mechanical integrity prior to commencing injection or on a schedule determined by the Administrator. Thereafter, the owner or operator of Class VI wells must maintain mechanical integrity as defined in Section ~~12~~ 13 of this chapter.

(Y) A requirement that when the Administrator determines that a Class VI well lacks mechanical integrity pursuant to Section ~~12~~ 13 of this chapter, he/she shall give written notice of his/her determination to the owner or operator.

(Z) A requirement that, for any Class VI well ~~which that~~ lacks mechanical integrity, injection operations are prohibited until the permittee shows to the satisfaction of the Administrator under Section ~~12~~ 13 that the well has mechanical integrity.

(AA) A Class VI permit shall include conditions which meet the requirements set forth in Section 16 of this chapter. Where the plan meets the requirements of Section 16 of this chapter, the administrator shall incorporate it into the permit as a permit condition.

(I) For purposes of the above subparagraph, temporary or intermittent cessation of injection operations is not abandonment.

(ii) In addition to the conditions required of all permits, the Administrator ~~may shall~~ establish, on a case-by-case basis, conditions as required for monitoring, schedules of compliance, and such additional conditions as are necessary to prevent the migration of fluids into underground sources of drinking water.

Section 5. Permit application.

(a) It is the operator's responsibility to make application for and obtain a permit in accordance with these regulations. Each application must be submitted with all supporting data.

(b) A complete application for a Class VI well shall include:

(i) A brief description of the nature of the business and the activities to be conducted that require the applicant to obtain a permit under this chapter.

(ii) The name, address and telephone number of the operator, and the operator's ownership status and status as a Federal, State, private, public or other entity.

(iii) Up to four SIC (Standard Industrial Classification) codes ~~which that~~ best reflect the principal products or services provided by the facility.

683 (iv) The name, address, and telephone number of the facility. Additionally,
684 the location of the geologic sequestration project shall be identified by section, township, range
685 and county, noting which, if any, sections include Indian lands.

686
687 (v) Within the area of review, a listing and status of all permits or
688 construction approvals associated with the geologic sequestration project received or applied for
689 by the applicant under any of the following programs:

690
691 (A) Hazardous Waste Management under the Resource Conservation
692 and Recovery Act (RCRA).

693
694 (B) UIC Program under the Safe Drinking Water Act.

695
696 (C) [National Pollutant Discharge Elimination System \(NPDES\)](#)
697 under the Clean Water Act.

698
699 (D) Prevention of Significant Deterioration (PSD) program under the
700 Clean Air Act.

701
702 (E) National Emissions Standards for Hazardous Air Pollutants
703 (NESHAPs) pre-construction approval under the Clean Air Act.

704
705 (F) Dredge and fill permits under section 404 of the Clean Water
706 Act.

707
708 (G) Within the area of review, a list of other relevant permits,
709 whether federal or state, associated with the geologic sequestration project that the applicant has
710 been required to obtain, such as construction permits. This includes a statement as to whether or
711 not the facility is within a state approved water quality management plan area, a state approved
712 wellhead protection area or a state approved source water protection area.

713
714 (vi) A map showing the injection well(s) for which a permit is sought and the
715 applicable area of review, [consistent with Section 8 of this chapter](#).

716
717 (A) Within the area of review, the map must show the number, or
718 name and location of all known injection wells, producing wells, abandoned wells, plugged wells
719 or dry holes, deep stratigraphic boreholes, state or EPA approved subsurface cleanup sites, public
720 drinking water supply wellhead or source water protection areas, surface bodies of water, springs,
721 mines (surface and subsurface), quarries, water wells and other pertinent surface features
722 including structures intended for human occupancy, [state, tribal, and territory boundaries](#), and
723 roads.

724
725 (B) Only information of public record is required to be included on
726 this map.

727
728 (vii) A map delineating the area of review based upon modeling, using all
729 available data including data available from any logging and testing of wells within and adjacent
730 to the area of review;

731

732 (A) A Class VI area of review shall never be less than the area of
733 potentially affected groundwater.

734
735 (B) All areas of review shall be legally described by township, range
736 and section to the nearest ten (10) acres as described under the general land survey system.

737
738 (viii) A description of the general geology of the area to be affected by the
739 injection of carbon dioxide including geochemistry, structure and faulting, fracturing and seals,
740 and stratigraphy and lithology including petrophysical attributes. The description shall also
741 include sufficient information on the geologic structure and reservoir properties of the proposed
742 storage site and overlying formations, including:

743
744 (A) Isopach maps of the proposed injection and confining zone(s), a
745 structural contour map aligned with the top of the proposed injection zone, and at least two
746 geologic cross sections of the area of review reasonably perpendicular to each other and showing
747 the geologic formations from the surface to total depth;

748
749 (B) Location, orientation, and properties of known or suspected
750 faults and fractures that may transect the confining zone(s) in the area of review and a
751 determination that they would not interfere with containment;

752
753 (C) Information on seismic history that have affected the proposed
754 area of review including knowledge of previous seismic events and history of these events, the
755 presence and depth of seismic sources, and a determination that the seismicity would not
756 compromise containment;

757
758 (D) Data sufficient to demonstrate the effectiveness of the injection
759 and confining zone(s), including data on the depth, areal extent, thickness, mineralogy, porosity,
760 vertical permeability and reservoir pressure of the injection and confining zone(s) within the area
761 of review, and geologic changes based on field data which may include geologic cores, outcrop
762 data, seismic surveys, well logs, capillary pressure tests and names and lithologic descriptions;

763
764 (E) Geomechanical information on fractures, stress, ductility, rock
765 strength, and in situ fluid pressures within the confining zone; and

766
767 (F) Geologic and topographic maps and cross sections illustrating
768 regional geology, hydrogeology, and the geologic structure of the local area.

769
770 (ix) A compilation of all wells and other drill holes within, and adjacent
771 (within 1 mile) to the area of review. Such data must include a description of each well and drill
772 hole type, construction, date drilled, location, depth, record of plugging and/or completion, and
773 any additional information the Administrator may require.

774
775 (A) Applicants shall also identify the location of all known wells
776 within, and adjacent (within 1 mile) to the area of review ~~which~~ that penetrate the confining or
777 injection zone.

778

- 779 (B) Applicants shall perform mapping with sufficient resolution as to
780 make a comprehensive effort to identify wells that are not in the public record using aerial
781 photography, aerial survey, physical traverse, or other methods acceptable to the ~~A~~administrator.
782
- 783 (C) Applicants shall perform corrective action as specified in Section
784 8.
785
- 786 (x) Maps and stratigraphic cross sections indicating the general vertical and
787 lateral limits of all USDWs, the location of water wells and springs within the area of review,
788 their positions relative to the injection zone(s), and the direction of water movement, where
789 known;
790
- 791 (xi) A characterization of the injection zone and aquifers above and below
792 the injection zone which may be affected, including applicable pressure and fluid chemistry data
793 to describe the projected effects of injection activities, and background water quality data which
794 will facilitate the classification of any groundwaters which may be affected by the proposed
795 discharge. This must include information necessary for the division to classify the receiver and
796 any secondarily affected aquifers under Chapter 8, Wyoming Water Quality Rules and
797 Regulations;
798
- 799 (xii) Baseline geochemical data on subsurface formations, including all
800 USDWs in the area of review.
801
- 802 (xiii) Proposed operating data:
803
- 804 (A) Average and maximum daily rate and volume and/or mass and
805 total anticipated volume and/or mass of the carbon dioxide stream;
806
- 807 (B) Average and maximum surface injection pressure;
808
- 809 (C) The source of the carbon dioxide stream; and
810
- 811 (D) An analysis of the chemical and physical characteristics of the
812 carbon dioxide stream and any other substance(s) proposed for inclusion in the injectate stream;
813 and
814
- 815 (E) Anticipated duration of the proposed injection period(s).
816
- 817 (xiv) The compatibility of the carbon dioxide stream with fluids in the
818 injection zone and minerals in both the injection and the confining zone(s), based on the results of
819 the formation testing program, and with the materials used to construct the well;
820
- 821 (xv) An assessment of the impact to fluid resources, on subsurface structures
822 and the surface of lands that may reasonably be expected to be impacted, and the measures
823 required to mitigate such impacts;
824
- 825 (xvi) Proposed formation testing program to obtain an analysis of the chemical
826 and physical characteristics of the injection zone and confining zone and that meets the
827 requirements at Section 11 of this chapter;

- 828 (xvii) Proposed stimulation program, a description of stimulation fluids to be
829 used and a determination that stimulation will not compromise containment;
830
831 (A) All stimulation programs must be approved by the administrator
832 as part of the permit application and incorporated into the permit.
833
834 (xviii) ~~The results of the formation testing program as required in paragraph~~
835 ~~(xvi) of this section; formerly (xix)~~ Proposed procedure to outline steps necessary to conduct
836 injection operation;
837
838 (xix) ~~formerly (xx)~~ A wellbore schematic of the subsurface construction
839 details and surface wellhead construction of the injection and monitoring wells;
840
841 (xx) ~~formerly (xxi)~~ Injection well design and construction procedures that
842 meet the requirements of Section 9;
843
844 (xxi) ~~formerly (xxii)~~ Proposed area of review and corrective action plan that
845 meets the requirements under Section 8;
846
847 (xxii) ~~formerly (xxiii)~~ The status of corrective action on wells in the area of
848 review;
849
850 (xxiii) ~~formerly (xxiv)~~ All available logging and testing program data on the
851 well(s) required by Section ~~10~~ 11;
852
853 (xxiv) ~~formerly (xxv)~~ A demonstration of mechanical integrity pursuant to
854 Section ~~12~~ 13;
855
856 (xxv) ~~formerly (xxvi)~~ A demonstration, satisfactory to the ~~A~~ administrator, that
857 the applicant has met the financial responsibility requirements under Section ~~18~~ 19;
858
859 (xxvi) ~~formerly (xxvii)~~ Proposed testing and monitoring plan required by
860 Section ~~13~~ 14;
861
862 (xxvii) ~~formerly (xxviii)~~ Proposed injection and monitoring well(s) plugging plan
863 required by Section ~~15~~ 16(b);
864
865 (A) Where the plan meets the requirements of Section 16(b) of this
866 chapter, the administrator shall incorporate it into the permit as a permit condition.
867
868 (I) For purposes of this subparagraph, temporary or
869 intermittent cessation of injection operations is not abandonment.
870
871 (xxviii) ~~formerly (xxix)~~ Proposed post-injection site care plan required by
872 Section ~~16~~ 17(a);
873
874 (xxix) At the administrator's discretion, a demonstration of an alternative post-
875 injection site care timeframe required by Section 17 of this chapter;
876

877 (xxx) Proposed emergency and remedial response plan required by Section ~~17~~
878 18;

879
880 (xxxii) A site and facilities description, including a description of the proposed
881 geologic sequestration facilities;

882
883 (xxxiii) Documentation sufficient to demonstrate that the applicant has all legal
884 rights, including but not limited to the right to surface use, necessary to sequester carbon dioxide
885 and associated constituents;

886
887 (xxxiii) Proof of notice to surface owners, mineral claimants, mineral owners,
888 lessees and other owners of record of subsurface interests as to the contents of such notice.
889 Notice requirements shall at a minimum require:

890
891 (A) The publishing of notice of the application in a newspaper of
892 general circulation in each county of the proposed operation at weekly intervals for four (4)
893 consecutive weeks; and

894
895 (B) A copy of the notice shall also be mailed to all surface owners,
896 mineral claimants, mineral owners, lessees and other owners of record of subsurface interests
897 ~~which that~~ are located within one (1) mile of the proposed boundary of the geologic sequestration
898 site as defined by W.S. 35-11-103(c)(xxi).

899
900 (xxxiv) A list of contacts, submitted to the administrator, for those Tribes
901 identified to be within the area of review of the Class VI project based on information provided in
902 subparagraphs (b)(vi), (b)(vi)(A), and (b)(vi)(B) of this section; and

903
904 ~~(xxxiv)~~(xxxv) Any other information requested by the ~~A~~administrator.

905
906 (c) The administrator shall notify, in writing, any Tribes within the area of review of
907 the Class VI project based on information provided in subparagraphs (b)(vi), (b)(vi)(A),
908 (b)(vi)(B), and (b)(xxxv) of this section.

909
910 (d) Prior to granting approval for the operation of a Class VI well, the administrator
911 shall consider the following information:

912
913 (i) The final area of review based on modeling, using data obtained during
914 logging and testing of the well and the formation as required by subparagraphs (b)(xiv), (b)(xvii),
915 (b)(xxiii), and (b)(xxiv) of this section;

916
917 (ii) Any relevant updates, based on data obtained during logging and testing
918 of the well and the formation as required by subparagraphs (b)(xiv), (b)(xvii), (b)(xxiii), and
919 (b)(xxiv) of this section, to the information on the geologic structure and hydrogeologic
920 properties of the proposed storage site and overlying formations, submitted to satisfy the
921 requirements of subparagraph (b)(viii) of this section;

922
923 (formerly 5(b)(xviii) (iii) The results of the formation testing program as
924 required in paragraph (b)(xvi) of this section;

925

926 (iv) Final injection well construction procedures that meet the requirements
927 of Section 9 of this chapter;

928
929 (v) Any updates to the proposed area of review and corrective action plan,
930 testing and monitoring plan, injection well plugging plan, post-injection site care and site closure
931 plan, or the emergency and remedial response plan submitted under paragraph (a) of this section,
932 which are necessary to address new information collected during logging and testing of the well
933 and the formation as required by all paragraphs of this section, and any updates to the alternative
934 post-injection site care timeframe demonstration submitted under paragraph (a) of this section,
935 which are necessary to address new information collected during the logging and testing of the
936 well and the formation as required by all paragraphs of this section; and

937
938 (vi) Owners or operators seeking a waiver of the requirement to inject below
939 the lowermost USDW must also refer to Section 10 of this chapter and submit a supplemental
940 report, as required at Section 10(a). The supplemental report is not part of the permit application.

941
942 (e) An applicant applying for a Class VI well permit must obtain public liability
943 insurance to cover the geologic sequestration activities for which a permit is sought.

944
945 (i) The public liability insurance shall be in addition to the financial
946 assurance required in Section 19 of this chapter.

947
948 (ii) The insurance policy shall provide for personal injury and property
949 damage protection and shall be in place until a completion and release certificate has been
950 obtained from the administrator certifying that plume stabilization has been achieved.

951
952 (iii) The minimum insurance coverage for public liability insurance as
953 required by W.S. §35-11-313(f)(ii)(O) shall be five hundred thousand dollars (\$500,000) for each
954 occurrence of bodily injury or property damage, and one million dollars (\$1,000,000) aggregate.

955
956 (iv) The public liability insurance shall include a rider requiring that the
957 insurer notify the administrator whenever substantive changes are made to the policy, including
958 any termination or failure to renew.

959
960 (v) Self-insurance in lieu of public liability insurance must meet state or
961 federal requirements and be approved by the administrator.

962
963 ~~(e)~~(f) All applications for permits, reports, or information to be submitted to the
964 Administrator shall be signed by a responsible officer as follows:

965
966 (i) For a corporation - a responsible corporate officer means:

967
968 (A) A president, secretary, treasurer, or vice president of the
969 corporation in charge of a principal business function, or any other person who performs similar
970 policy or decision making functions for the corporation; or

971
972 (B) The manager of one or more manufacturing, production, or
973 operating facilities employing more than 250 persons or having gross annual sales or expendi-

974 tures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has
975 been assigned or delegated to the manager in accordance with corporate procedures.

976
977 (ii) For a partnership or sole proprietorship -- by a general partner or the
978 proprietor, respectively;

979
980 (iii) For a municipality, state, federal or other public agency -- by either the
981 principal executive officer or ranking elected official.

982
983 ~~(d)~~(g) The application shall contain the following certification by the person signing the
984 application:

985
986 "I certify under penalty of law that this document and all attachments were prepared
987 under my direction or supervision in accordance with a system designed to ensure that qualified
988 personnel properly gather and evaluate the information submitted. Based on my inquiry of the
989 person or persons who manage the system, or those persons directly responsible for gathering the
990 information, the information submitted is, to the best of my knowledge and belief, true, accurate,
991 and complete. I am aware that there are significant penalties for submitting false information,
992 including the possibility of fine and imprisonment for knowing violations."

993
994 ~~(e)~~(h) All data used to complete permit applications shall be kept by the applicant ~~for a~~
995 ~~minimum of three (3) years from the date of signing~~ for the life of the geologic sequestration
996 project and for 10 years following site closure.

997
998 Section 6. **Prohibitions.**

999
1000 (a) In addition to the requirements in W.S. 35-11-301(a), no person shall:

1001
1002 (i) Discharge into, construct, operate, or modify any Class VI well unless
1003 permitted pursuant to this chapter;

1004
1005 (ii) Discharge to any zone except the authorized discharge zone as described
1006 in the permit;

1007 (iii) Conduct any authorized injection activity in a manner that results in a
1008 violation of any permit condition or representations made in the application, or the request for
1009 coverage under the individual permit. A permit condition supersedes any application content.

1010
1011 (b) No person shall inject any hazardous waste ~~which that~~ has been banned from
1012 land disposal pursuant to Chapter ~~13~~ 1, Wyoming Hazardous Waste Rules.

1013
1014 (c) The construction of new, or operation or maintenance of any existing Class V
1015 wells for non-experimental geologic sequestration is prohibited.

1016
1017 (d) Other than EPA approved aquifer exemption expansions that meet the criteria set
1018 forth in Wyoming Oil and Gas Conservation Commission Rules and Regulations, Chapter 4,
1019 Section 12, new aquifer exemptions shall not be issued for Class VI injection wells. Even if an
1020 aquifer has not been specifically identified by the administrator, it is an underground source of
1021 drinking water if it meets the definition in Section 2 of this chapter.

1022

1023 Section 7. **Minimum criteria for siting Class VI wells.**

1024
1025 (a) Owners or operators of Class VI wells must demonstrate to the satisfaction of the
1026 Aadministrator that the wells will be sited in areas with a suitable geologic system. The geologic
1027 system must be comprised of:

1028
1029 (i) An injection zone of sufficient areal extent, thickness, porosity, and
1030 permeability to receive the total anticipated volume of the carbon dioxide stream; and

1031
1032 (ii) A confining zone(s) that is free of transmissive faults or fractures and of
1033 sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced
1034 formation fluids and allow injection at proposed maximum pressures and volumes without
1035 initiating or propagating fractures in the confining zone(s) or causing non-transmissive faults to
1036 become transmissive.

1037
1038 (b) Owners or operators of Class VI wells must identify and characterize additional
1039 zones, if they exist, that will impede vertical fluid movement, allow for pressure dissipation, and
1040 provide additional opportunities for monitoring, mitigation and remediation. Vertical faults and
1041 fractures that transect these zones must be identified.

1042
1043 Section 8. **Area of review delineation and corrective action.**

1044
1045 (a) The area of review is based on computational modeling that accounts for the
1046 physical and chemical properties of all phases of the injected carbon dioxide stream.

1047
1048 (i) The owner or operator will re-evaluate the area of review at least every
1049 two (2) years during the operational life of the facility, and then no less frequently than every five
1050 (5) years through the post-injection site care period until the geologic sequestration project is
1051 closed in accordance with department rules and regulations.

1052
1053 (b) The owner or operator of a Class VI well must prepare, maintain, and comply
1054 with a plan to delineate the area of review for a proposed geologic sequestration project, re-
1055 evaluate the delineation, and perform corrective action that meets the requirements of this section
1056 and is acceptable to the administrator. As a part of the permit application for approval by the
1057 Aadministrator, the owner or operator must submit an area of review and corrective action plan
1058 that includes the following information:

1059
1060 (i) The method for delineating the area of review that meets the
1061 requirements of paragraph (c) of this section, including the name, version and availability of the
1062 model to be used, assumptions that will be made, and the site characterization data on which the
1063 model will be based;

1064
1065 (ii) A description of:

1066
1067 (A) The monitoring and operational conditions that would warrant a
1068 re-evaluation of the area of review prior to the next scheduled re-evaluation as determined by the
1069 minimum fixed frequency established in paragraph (a)(i) of this section.

1070

1071 (B) How monitoring and operational data (e.g., injection rate and
1072 pressure) will be used to evaluate the area of review; and

1073
1074 (C) How corrective action will be conducted to meet the
1075 requirements of paragraph (d) of this section, including:

1076
1077 (I) What corrective action will be performed prior to
1078 injection;

1079
1080 (II) What, if any, portions of the area of review will have
1081 corrective action addressed on a phased basis, and how the phasing will be determined;

1082
1083 (III) How corrective action will be adjusted if there are
1084 changes in the area of review; and

1085
1086 (IV) How site access will be ensured for future corrective
1087 action.

1088
1089 (c) Owners or operators of Class VI wells must perform the following actions to
1090 delineate the area of review, identify all wells that require corrective action, and perform
1091 corrective action on those wells:

1092 (i) Predict, using computational modeling:

1093 (A) The projected lateral and vertical migration of the carbon dioxide
1094 plume and formation fluids in the subsurface from the commencement of injection activities until
1095 the plume movement ceases;

1096 (B) The pressure differentials, and demonstrate that pressure
1097 differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW
1098 or to otherwise threaten human health, safety, or the environment will not be present (or for a
1099 fixed time period as determined by the Administrator);

1100 (C) The potential need for brine removal, and;

1101 (D) The long-term effects of pressure buildup if brine is not
1102 removed.

1103
1104
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1108 (ii) The modeling must:

1109 (A) Be based on:

1110 (I) Detailed geologic data available or collected to
1111 characterize the injection zone, confining zone and any additional zones; and

1112 (II) Anticipated operating data, including injection pressures,
1113 rates and total volumes over the proposed operational life of the facility.

1114
1115
1116
1117
1118

- 1119 (B) Take into account any relevant geologic heterogeneities, data
1120 quality, and their possible impact on model predictions; and
1121
- 1122 (C) Consider potential migration through faults, fractures, and
1123 artificial penetrations.
1124
- 1125 (iii) Using methods approved by the Administrator, identify all penetrations,
1126 including active and abandoned wells and underground mines, in the area of review that may
1127 penetrate the confining zone. Provide a description of each well's type, construction, date drilled,
1128 location, depth, record of plugging and/or completion, and any additional information the
1129 Administrator may require; and
1130
- 1131 (iv) Determine which abandoned wells in the area of review have been
1132 plugged in a manner that prevents the movement of:
1133
- 1134 (A) Carbon dioxide that may endanger USDWs or otherwise threaten
1135 human health, safety, or the environment, or;
1136
- 1137 (B) Displaced formation fluids that may endanger USDWs or
1138 otherwise threaten human health, safety, or the environment.
1139
- 1140 (d) Owners or operators of Class VI wells must perform corrective action on all
1141 wells in the area of review that are determined to need corrective action using methods necessary
1142 to prevent the movement of fluid into or between USDWs including use of ~~corrosion-resistant~~
1143 ~~materials~~ materials compatible with the carbon dioxide stream, where appropriate.
1144
- 1145 (e) At a fixed frequency, not to exceed two (2) years during the operational life of
1146 the facility, or five (5) years during the post-injection site care period (until the geologic
1147 sequestration project is closed) as specified in the area of review and corrective action plan, or
1148 when monitoring and operational conditions warrant, owners or operators must:
1149
- 1150 (i) Re-evaluate the area of review in the same manner specified in paragraph
1151 (c)(i) of this section;
1152
- 1153 (ii) Identify all wells in the re-evaluated area of review that require
1154 corrective action in the same manner specified in paragraph (c)(iv) of this section;
1155
- 1156 (iii) Perform corrective action on wells requiring corrective action in the
1157 reevaluated area of review in the same manner specified in paragraph (d) of this section; and
1158
- 1159 (iv) Submit an amended area of review and corrective action plan or
1160 demonstrate to the Administrator through monitoring data and modeling results that no change
1161 to the area of review and corrective action plan is needed.
1162
- 1163 (A) Any amendments to the area of review and corrective action plan
1164 must be approved by the administrator;
1165
- 1166 (B) Any amendments to the area of review must be incorporated into
1167 the permit; and

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(C) Any amendments to the area of review are subject to the permit modification requirements at Section 4 of this chapter, as appropriate.

(f) The emergency and remedial response plan (as required by Section ~~17~~18) and a demonstration of financial responsibility (as described by Section ~~10~~19) must account for the entire area of review [as modified], regardless of whether or not corrective action in the area of review is phased.

(g) All modeling inputs and data used to support area of review reevaluations under paragraph (e) of this section shall be retained for 10 years.

Section 9. Construction and operation standards for Class VI wells.

(a) The owner or operator must ensure that all Class VI wells are designed, at a minimum, to the construction standards set forth by the department and the Wyoming oil and gas conservation commission, as applicable, and constructed and completed to:

(i) Prevent the movement of fluids into or between USDWs or into any unauthorized zones;

(ii) Permit the use of appropriate testing devices and workover tools; and

(iii) Permit continuous monitoring of the annulus space between the injection tubing and long string casing.

(b) Casing and cement or other materials used in the construction of each Class VI well must have sufficient structural strength and be designed for the life of the well.

(i) All well materials must be compatible with fluids with which the materials may be expected to come into contact, and meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Administrator.

(ii) The casing and cementing program must be designed to prevent the movement of fluids into or between USDWs.

(iii) In order to allow the Administrator to determine and specify casing and cementing requirements, the owner or operator must provide the following information:

(A) Depth to the injection zone;

(B) Injection pressure, external pressure, internal pressure and axial loading;

(C) Hole size;

- 1215 (D) Size and grade of all casing strings (wall thickness, external
1216 diameter, nominal weight, length, joint specification and construction material), including
1217 whether the casing is new, or used;
1218
- 1219 (E) Composition of the carbon dioxide stream; and formation fluids;
1220
- 1221 (F) Down-hole temperatures and pressures;
1222
- 1223 (G) Lithology of injection and confining zones;
1224
- 1225 (H) Type or grade of cement and additives; and
1226
- 1227 (I) Quantity, chemical composition, and temperature of the carbon
1228 dioxide stream.
1229
- 1230 (iv) Surface casing must extend through the base of the lowermost USDW
1231 above the injection zone and be cemented to the surface.
1232
- 1233 (v) At least one long string casing, using a sufficient number of centralizers,
1234 must be set in a manner so as to create a cement bond through the overlying and/or underlying
1235 confining zones(s). The long string casing must extend to the injection zone must be cemented
1236 by circulating cement to the surface in one or more stages, and must be isolated by placing
1237 cement and/or other isolation techniques as necessary to provide adequate isolation of the
1238 injection zone and provide for protection of USDWs, human health, safety, and the environment.
1239
- 1240 (A) Circulation of cement may be accomplished by staging. The
1241 administrator may approve an alternative method of cementing in cases where the cement cannot
1242 be recirculated to the surface, provided the owner or operator can demonstrate by using logs that
1243 the cement does not allow fluid movement behind the well bore.
1244
- 1245 (vi) Cement and cement additives must be suitable for use with the carbon
1246 dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity
1247 over the operating life of the well.
1248
- 1249 (vii) The integrity and location of the cement shall be verified using
1250 technology capable of evaluating cement quality radially with sufficient resolution to identify the
1251 location of channels, voids, or other areas of missing cement to ensure that USDWs are not
1252 endangered and that human health, safety, and the environment are protected.
1253
- 1254 (c) All owner and operators of Class VI wells must inject fluids through tubing with
1255 a packer set at a depth opposite a cemented interval at the location approved by the
1256 ~~A~~ administrator.
1257
- 1258 (i) Tubing and packer materials used in the construction of each Class VI
1259 well must be compatible with fluids with which the materials may be expected to come into
1260 contact and must meet or exceed standards developed for such materials by the American
1261 Petroleum Institute, ASTM International, or comparable standards acceptable to the
1262 administrator.
1263

1264 (ii) In order for the Administrator to determine and specify requirements for
1265 tubing and packer, the owner or operator must submit the following information:

- 1266
1267 (A) Depth of setting;
1268
1269 (B) Characteristics of the carbon dioxide stream (e.g., chemical
1270 content, corrosiveness, temperature, and density) and formation fluids;
1271
1272 (C) Maximum proposed injection pressure;
1273
1274 (D) Maximum proposed annular pressure;
1275
1276 (E) Maximum proposed injection rate (intermittent or continuous)
1277 and volume of the carbon dioxide stream;
1278
1279 (F) Size of tubing and casing; and
1280
1281 (G) Tubing tensile, burst, and collapse strengths.
1282

1283 **Section 10. Class VI Injection Depth Waiver Requirements**

1284
1285 (a) The owner and/or operator seeking a waiver of the requirement to inject below
1286 the lowermost USDW shall submit a supplemental report concurrent with the permit application.
1287 The report shall contain the following:

1288
1289 (i) A demonstration that the injection zone(s) is/are laterally continuous, is
1290 not a USDW, and is not hydraulically connected to USDW's; does not outcrop; has adequate
1291 injectivity; volume, and sufficient porosity to safely contain the injected carbon dioxide and
1292 formation fluids; and has appropriate geochemistry.

1293
1294 (ii) A demonstration that the injection zone(s) is/are bounded by laterally
1295 continuous, impermeable confining units above and below the injection zone(s) adequate to
1296 prevent fluid movement and pressure buildup outside of the injection zone(s); and that the
1297 confining unit(s) is/are free of transmissive faults and fractures. The report shall further
1298 characterize the regional fracture properties and contain a demonstration that the fractures will
1299 not interfere with injection, serve as conduits, or endanger USDWs.

1300
1301 (iii) A computer model demonstrating that USDWs above and below the
1302 injection zone will not be endangered as a result of fluid movement. The modeling shall be done
1303 in conjunction with the area of review determination, as described in Section 8 of this chapter,
1304 and is subject to requirements, as described in Section 8(c) of this chapter, and periodic
1305 reevaluation, as described in Section 8(e) of this chapter.

1306
1307 (iv) A demonstration that well design and construction, in conjunction with
1308 the waiver, will ensure isolation of the injectate in lieu of the requirements of Section 9 (a)(i) and
1309 will meet the well construction requirements of paragraph (e) if this section.
1310

1359 (iv) Any written waiver-related information submitted by the Public Water
1360 System Supervision Director(s) to the (UIC) Director.

1361
1362 (c) Concurrent with the Class VI permit application public notice process, the
1363 administrator shall give public notice that an injection depth waiver request has been submitted.
1364 The notice shall clearly state:

1365
1366 (i) The depth of the proposed injection zone(s).

1367
1368 (ii) The location of the injection wells.

1369
1370 (iii) The name and depth of all USDWs within the area of review.

1371
1372 (iv) A map of the area of review.

1373
1374 (v) The names of any public water supplies affected, reasonably likely to be
1375 affected, or served by the USDWs in the area of review.

1376
1377 (vi) The results of any consultation between the UIC program and the Public
1378 Water System Supervision program within the area of review.

1379
1380 (d) Following the injection depth waiver application public notice, the administrator
1381 shall provide all the information received through the waiver application process to the US EPA
1382 regional administrator. Based on the information provided, the US EPA regional administrator
1383 shall provide written concurrence or non-concurrence regarding waiver issuance.

1384
1385 (i) If the US EPA regional administrator requires additional information to
1386 make a decision, the administrator shall provide the information. The US EPA regional
1387 administrator may require public notice of the new information.

1388
1389 (ii) In no case shall the administrator of a State-approved program issue an
1390 injection depth waiver without receipt of written concurrence from the US EPA regional
1391 administrator.

1392
1393 (e) If an injection depth waiver is issued, within thirty (30) days of issuance, the
1394 EPA shall post the following information on the Office of Water's website:

1395
1396 (i) The depth of the proposed injection zone(s).

1397
1398 (ii) The location of the injection wells.

1399
1400 (iii) The name and depth of all USDWs within the area of review.

1401
1402 (iv) A map of the area of review.

1403
1404 (v) The names of any public water supplies affected, reasonably likely to be
1405 affected, or served by the USDWs in the area of review.

1406
1407 (vi) The date of waiver issuance.

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(f) Upon receipt of a waiver of the requirement to inject below the lowermost USDW for geologic sequestration, the owner or operator of a Class VI well must comply with the following:

(i) All requirements of Sections 8, 11, 12, 13, 15, 16, 18, and 19 of this chapter.

(ii) All the requirements of Section 9 of this chapter with the following modified requirements:

(A) The Class VI well shall be constructed and completed to prevent the movement of fluids into any unauthorized zones including USDWs, in lieu of requirements of Section 9(a)(1) of this chapter.

(B) The casing and cementing program shall be designed to prevent the movement of fluids into any unauthorized zones including USDWs, in lieu of requirements of Section 9(b) and 9(b)(1) of this chapter.

(C) The surface casing shall extend through the base of the nearest USDW directly above the injection zone and shall be cemented to the surface; or at the administrator's discretion, another formation above the injection zone and below the nearest USDW above the injection zone.

(iii) All the requirements of Sections 14 and 17 of this chapter with the following modified requirements:

(A) The owner or operator shall monitor the groundwater quality, geochemical changes, and pressure in the first USDWs immediately above and below the injection zone(s); and any other formation at the discretion of the administrator.

(B) Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods to monitor for pressure changes in the injection zone(s); and, indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the administrator determines, based on site-specific geology, that such methods are not appropriate.

(iv) All requirements at Section 17 with the following, modified post-injection site care monitoring requirements:

(A) The owner or operator shall monitor the groundwater quality, geochemical changes and pressure in the first USDWs immediately above and below the injection zone; and in any other formations at the discretion of the administrator.

(B) Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods in the injection zone(s); and indirect methods (e.g., seismic, electrical, gravity, or

1456 electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the
1457 administrator determines based on site-specific geology, that such methods are not appropriate;

1458
1459 (v) Any additional requirements requested by the administrator to ensure
1460 protection of USDWs above and below the injection zone(s).

1461
1462 Section ~~10~~ 11. **Logging, sampling, and testing prior to injection well operation.**

1463
1464 (a) During the drilling and construction of a Class VI injection well, the owner or
1465 operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness,
1466 porosity, permeability, and lithology of, and the salinity of any formation fluids within, for all
1467 relevant geologic formations in order to ensure conformance with the injection well construction
1468 requirements under Section 9, and to establish accurate baseline data against which future
1469 measurements may be compared.

1470
1471 (i) The owner or operator must submit to the Aadministrator a descriptive
1472 report prepared by a knowledgeable log analyst that includes an interpretation of the results of
1473 such logs and tests. ~~The Administrator may require such logs and tests as may be needed after~~
1474 ~~taking into account the availability of similar data in the area of the drilling site, the construction~~
1475 ~~plan, and the need for additional information that may arise from time to time as the construction~~
1476 ~~of the well progresses, and these may include the following~~ At a minimum, such logs and tests
1477 must include:

1478
1479 (A) Deviation checks measured during, ~~or after~~ drilling on all holes
1480 constructed by drilling a pilot hole ~~which~~ that is subsequently enlarged by reaming or another
1481 method. Such checks must be at sufficiently frequent intervals to determine the location of the
1482 borehole and to ensure that vertical avenues for fluid movement in the form of diverging holes are
1483 not created during drilling; and

1484
1485 (B) Before and upon installation of the surface casing, ~~unless waived~~
1486 ~~in writing by the Administrator:~~

1487
1488 (I) Resistivity, spontaneous potential, and caliper logs
1489 before the casing is installed; and

1490
1491 (II) A Cement evaluation logs, bond and variable density
1492 log to evaluate cement quality radially with sufficient resolution to identify channels, voids, or
1493 other areas of missing cement, and a temperature log after the casing is set and cemented, ~~to~~
1494 ~~evaluate cement quality radially with sufficient resolution to identify channels, voids, or other~~
1495 ~~areas of missing cement.~~

1496
1497 (C) Before and upon installation of the long string casing:

1498
1499 (I) Resistivity, spontaneous potential, porosity, caliper,
1500 gamma ray, fracture finder logs, and any other logs the Aadministrator requires for the given
1501 geology before the casing is installed; and

1502

1503 (II) A cement bond and variable density log, ~~to evaluate~~
1504 ~~cement quality radially with sufficient resolution to identify channels, voids, or other areas of~~
1505 ~~missing cement,~~ and a temperature log after the casing is set and cemented.

1506
1507
1508 (D) Test(s) designed to demonstrate the internal and external
1509 mechanical integrity of injection wells, which may include:

- 1510 (I) A pressure test with liquid or gas;
1511
1512 (II) Diagnostic tools, such as oxygen-activation logging;
1513
1514 (III) A temperature or noise log; and
1515
1516 (IV) A casing inspection log.
1517

1518 (E) Any alternative methods that provide equivalent or better
1519 information and that are required of, and/or approved by the ~~A~~administrator.

1520
1521 (b) The owner or operator must take ~~and submit to the Administrator a report~~
1522 ~~describing~~ whole cores or sidewall cores of the injection zone and confining system, and
1523 formation fluid samples from the injection zone(s) and submit to the administrator a detailed
1524 report prepared by a log analyst that includes:
1525

- 1526 (i) Well log analyses (including well logs);
1527
1528 (ii) Core analyses; and
1529
1530 (iii) Formation fluid sample information.
1531

1532 (iv) ~~The~~ ~~A~~administrator may accept data from cores and fluid samples from
1533 nearby wells if the owner or operator can demonstrate that such data are representative of
1534 conditions in the wellbore.
1535

1536 (c) Prior to injection well operation, the owner or operator must record the formation
1537 fluid temperature, formation fluid pH and conductivity, ~~and~~ reservoir pressure, and static fluid
1538 level of the injection zone(s).
1539

1540 (d) At any time prior to injection well operation, the owner or operator must
1541 determine fracture pressures of the injection and confining zones and ~~conduct tests to~~ verify
1542 hydrogeologic and geo-mechanical characteristics of the injection zone; ~~e.g., injectivity tests.~~ by
1543 conducting the following tests:
1544

- 1545 (i) A pressure fall-off test; and,
1546
1547 (ii) A pump test; or
1548
1549 (iii) Injectivity tests.
1550
1551

1552 (e) The owner or operator must provide the ~~A~~administrator with the opportunity to
1553 witness all logging and testing by this subpart.

1554
1555 (i) The owner or operator must submit a schedule of such activities to the
1556 ~~A~~administrator upon spudding the well and notify the ~~A~~administrator of any changes to the
1557 schedule at least ~~48 hours~~ thirty (30) days prior to the scheduled test.

1558
1559 Section ~~11~~ 12. **Injection well operating requirements.**

1560
1561 (a) The owner or operator must ~~comply with a maximum injection pressure limit~~
1562 ~~approved by the Director and specified in the permit. In approving a maximum injection pressure~~
1563 ~~limit, the Director shall consider the results of well tests and, where appropriate, geomechanical~~
1564 ~~or other studies that assess the risks of tensile failure and shear failure. The Director shall~~
1565 ~~approve limits that, with a reasonable degree of certainty, will avoid initiation or propagation of~~
1566 ~~fractures in the confining zone or cause non-transmissive faults transecting the confining zone to~~
1567 ~~become transmissive. ensure that injection pressure does not exceed 90 percent of the fracture~~
1568 ~~pressure of the injection zone(s) so as to ensure that the injection does not initiate new fractures~~
1569 ~~or propagate existing fractures in the injection zone(s).~~ In no case may injection pressure cause
1570 movement of injection or formation fluids in a manner that endangers a USDW, or otherwise
1571 threatens human health, safety, or the environment.

1572
1573 (i) In no case may injection pressure initiate fractures in the confining
1574 zone(s) or cause the movement of injectate or formation fluids that endangers a USDW or
1575 otherwise threatens human health, safety, or the environment.

1576
1577 (b) Injection of the carbon dioxide stream between the outermost casing protecting
1578 USDWs and the well bore is prohibited.

1579
1580 (c) The owner or operator must fill the annulus between the tubing and the long
1581 string casing with a non-corrosive fluid approved by the ~~A~~administrator.

1582
1583 (i) The owner or operator must maintain ~~a positive pressure~~ on the annulus a
1584 pressure that exceeds the operating injection pressure, unless the administrator determines that
1585 such requirement might harm the integrity of the well or endanger USDWs.

1586
1587 (d) Other than during periods of well workover (maintenance) approved by the
1588 ~~A~~administrator in which the sealed tubing-casing annulus is, by necessity, disassembled for
1589 maintenance or corrective procedures, the owner or operator must maintain mechanical integrity
1590 of the injection well at all times.

1591
1592 (e) The owner or operator must install and use continuous recording devices to
1593 monitor:

1594
1595 (i) Injection pressure; and

1596
1597 (ii) Rate, volume, and temperature of the carbon dioxide stream.

1598

1599 (f) The owner or operator must ~~regularly monitor~~ install and use continuous
1600 recording devices to monitor the pressure on the annulus between the tubing and the long string
1601 casing and annulus fluid volume.

1602
1603 (g) The owner or operator must install, test, and use alarms and automatic surface
1604 shut-off systems, or at the discretion of the administrator use down-hole shut-off systems (e.g.,
1605 automatic shut-off, check valves), or other mechanical devices that provide equivalent protection,
1606 designed to alert the operator and shut-in the well when operating parameters such as injection
1607 rate, injection pressure, or other parameters approved by the Aadministrator diverge beyond
1608 ranges and/or gradients specified in the permit.

1609
1610 (h) If an automatic shutdown is triggered or a loss of mechanical integrity is
1611 discovered, the owner or operator must immediately investigate and identify as expeditiously as
1612 possible the cause.

1613
1614 (i) If, upon such investigation, the well appears to be lacking mechanical
1615 integrity, or if monitoring required under paragraphs (e), (f), and (g) of this section otherwise
1616 indicates that the well may be lacking mechanical integrity, the owner or operator must:

1617 (A) Immediately cease injection;
1618
1619 (B) Take all steps reasonably necessary to determine whether there
1620 may have been a release of the injected carbon dioxide stream or formation fluids into any
1621 unauthorized zone;

1622
1623 (C) Notify the Aadministrator within 24 hours;

1624
1625 (D) Restore and demonstrate mechanical integrity to the satisfaction
1626 of the Aadministrator as soon as practicable and prior to resuming injection; and

1627
1628 (E) Notify the Aadministrator when injection can be expected to
1629 resume.

1630
1631
1632 Section ~~12~~ 13. **Mechanical integrity.**

1633
1634 (a) A Class VI well has mechanical integrity if:

1635 (i) There is no significant leak in the casing, tubing or packer; and

1636
1637 (ii) There is no significant fluid movement into a USDW through channels
1638 adjacent to the injection well bore.

1639
1640 (b) To evaluate the absence of significant leaks under paragraph (a)(i) of this section,
1641 owners or operators must, following an initial annulus pressure test, continuously monitor
1642 injection pressure, rate, injected volumes, and pressure on the annulus between tubing and long
1643 string casing and annulus fluid volume as specified in Section ~~13~~ 12 (e) and (f);

1644
1645 (c) At least once per year, the owner or operator must ~~confirm the absence of~~
1646 ~~significant fluid movement under paragraph (a)(ii) of this section using a method acceptable to~~
1647

1648 ~~the Administrator (e.g., diagnostic surveys such as oxygen activation or temperature or noise~~
1649 ~~logs).~~ use one of the following methods to determine the absence of significant fluid movement
1650 under subparagraph (a)(ii) of this section:

1651
1652 (i) An approved tracer survey such as an oxygen-activation log; or

1653
1654 (ii) A temperature or noise log.

1655
1656 (d) If required by the administrator, at a frequency specified in the testing and
1657 monitoring plan required in Section 14 of this chapter, the owner or operator must run a casing
1658 inspection log to determine the presence or absence of corrosion in the long-string casing.

1659
1660 ~~(d)(e)~~ The Administrator may require any other test to evaluate mechanical integrity
1661 under paragraph (a)(i) or (a)(ii) of this section. Also, the Administrator may allow the use of a
1662 test to demonstrate mechanical integrity other than those listed above, with the written approval
1663 of the US EPA regional Administrator.

1664
1665 (i) To obtain approval, the Administrator must submit a written request to
1666 the US EPA regional Administrator, ~~which that~~ must set forth the proposed test and all technical
1667 data supporting its use.

1668
1669 ~~(e)(f)~~ In conducting and evaluating the tests enumerated in this section or others to be
1670 allowed by the Administrator, the owner or operator and the Administrator must apply methods
1671 and standards generally accepted in the industry.

1672
1673 (i) When the owner or operator reports the results of mechanical integrity
1674 tests to the Administrator, he/she shall include a description of the test(s) and the method(s)
1675 used.

1676
1677 (ii) In making his/her evaluation, the Administrator must review monitoring
1678 and other test data submitted since the previous evaluation.

1679
1680 ~~(f)(g)~~ The Administrator may require additional or alternative tests if the results
1681 presented by the owner or operator under paragraph (e) of this section are not satisfactory to the
1682 Administrator to demonstrate that there is no significant leak in the casing, tubing or packer, or
1683 significant movement of fluid into or between USDWs resulting from the injection activity as
1684 stated in paragraphs (a)(i) and (a)(ii) of this section.

1685
1686 Section ~~13~~ 14. **Testing and monitoring requirements.**

1687
1688 (a) The owner or operator of a Class VI well must prepare, maintain, and comply
1689 with a testing and monitoring plan to verify that the geologic sequestration project is operating as
1690 permitted and is not endangering USDWs.

1691
1692 (i) The requirement to maintain and implement an approved plan is directly
1693 enforceable regardless of whether the requirement is a condition of the permit.

1694
1695 ~~(i)(ii)~~ The testing and monitoring plan must be submitted with the permit
1696 application, for Administrator approval, and must include a description of how the owner or

1697 operator will meet the requirements of this section, including accessing sites for all necessary
1698 monitoring and testing during the life of the project. .

1699
1700 (b) Testing and monitoring associated with geologic sequestration projects must, at a
1701 minimum, include:

1702
1703 (i) Plans and procedures for environmental surveillance and excursion
1704 detection, prevention and control programs, including a monitoring plan to:

1705
1706 (A) Assess the migration of the injected carbon dioxide; and

1707
1708 (B) Insure the retention of the carbon dioxide in the geologic
1709 sequestration site.

1710
1711 (C) For purposes of this section, “excursion” shall mean the
1712 detection of migrating carbon dioxide at or beyond the boundary of the geologic sequestration site
1713 as defined in W.S. 35-11-103(c).

1714
1715 (ii) Analysis of the carbon dioxide stream with sufficient frequency to yield
1716 data representative of its chemical and physical characteristics;

1717
1718 (iii) Installation and use, except during well workovers, of continuous
1719 recording devices to monitor:

1720
1721 (A) Injection pressure,

1722
1723 (B) Rate and volume;

1724
1725 (C) Pressure on the annulus between the tubing and the long string
1726 casing; and

1727
1728 (D) The annulus fluid volume added.

1729
1730 ~~(iv)~~ (E) Recording, at least daily, the pressure on the annulus between the
1731 tubing and the long string casing.

1732
1733 ~~(iv)~~ (iv) Corrosion monitoring of the well materials for loss of mass, thickness,
1734 cracking, pitting and other signs of corrosion must be performed and recorded at least quarterly
1735 ~~(or less frequently as approved by the Administrator, based on construction materials, operating~~
1736 ~~conditions, and monitoring history)~~ to ensure that the well components meet the minimum
1737 standards for material strength and performance set forth in Section 9(b) by:

1738
1739 (A) Analyzing coupons of the well construction materials placed in
1740 contact with the carbon dioxide stream; or

1741
1742 (B) Routing the carbon dioxide stream through a loop constructed
1743 with the material used in the well and inspecting the materials in the loop; or
1744

1745 (C) Using an alternative method, materials, or time period approved
1746 by the Aadministrator.

1747
1748 ~~(vi)~~(v) Periodic monitoring of the reservoir fluid quality in a permeable and
1749 porous formation as near as practicable to the confining zone(s) for geochemical changes that
1750 may be a result of carbon dioxide or displaced formation fluid movement:

1751
1752 (A) The location and number of monitoring wells must be based on
1753 specific information about the geologic sequestration project, including injection rate and volume,
1754 geology, the presence of artificial penetrations and other relevant factors; and

1755
1756 (B) The monitoring frequency and spatial distribution of monitoring
1757 wells ~~must be~~ based on ~~geological, baseline~~ geological, baseline geochemical, ~~and geophysical~~
1758 collected under Section 5(b)(xi) and any modeling results in the area of review evaluation
1759 required by Section 8(c).

1760
1761 ~~(vii)~~(vi) A demonstration of external mechanical integrity pursuant to
1762 Section ~~12~~ 13(c) at least once per year until the well is plugged; and if required by the
1763 administrator, a casing inspection log pursuant to requirements at Section 13(d) of this chapter at
1764 a frequency established in the testing and monitoring plan;

1765
1766 ~~(viii)~~(vii) A pressure fall-off test or other equivalent test that identifies
1767 reservoir conditions with respect to flow dynamics at least once every five years unless more
1768 frequent testing is required by the Aadministrator based on site specific information; and

1769
1770 ~~(ix)~~(viii) Testing and monitoring to track the extent of the carbon dioxide
1771 plume, the position of the pressure front, and surface displacement; by using:

1772
1773 (A) Direct methods in the injection zone(s); and

1774
1775 (B) Indirect methods (e.g., seismic, electrical, gravity, or
1776 electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the
1777 administrator determines, based on site-specific geology, that such methods are not appropriate;

1778
1779 ~~(x)~~(ix) At the Aadministrator's discretion, based on site-specific conditions,
1780 surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that
1781 could endanger a USDW, or otherwise threaten human health, safety, or the environment.

1782
1783 (A) The testing and monitoring plan must be based on ~~site-specific~~
1784 ~~geologic factors~~ potential risks to USDWs, and modeling within the area of review;

1785
1786 (B) The monitoring frequency and spatial distribution of surface air
1787 monitoring and/or soil gas monitoring must reflect baseline data. The monitoring plan must
1788 specify how the proposed monitoring will yield useful information on the area of review
1789 delineation and the potential movement of fluid containing any contaminant into USDWs in
1790 exceedence of any primary drinking water regulation under 40 CFR Part ~~142~~ 141, or which may
1791 otherwise adversely affect human health, safety, or the environment.

1792

1793 (x) If an owner or operator demonstrates that monitoring employed under 40
1794 CFR §§98.440 to 98.449 ~~of this chapter~~ (Clean Air Act, 42 U.S.C. 7401 et seq.) accomplishes the
1795 goals of (h)(1) and (2) of this section, and meets the requirements pursuant to §146.91(c)(5), a
1796 Director that requires surface air/soil gas monitoring must approve the use of monitoring
1797 employed under 40 CFR §§98.440 to 98.449 ~~of this chapter~~. Compliance with §§98.440 to 98.449
1798 ~~of this chapter~~ pursuant to this provision is considered a condition of the Class VI permit;
1799

1800 (xi) Any additional monitoring, as required by the ~~A~~administrator, necessary
1801 to support, upgrade, and improve computational modeling of the area of review re-evaluation
1802 required under Section 8(e) and as necessary to demonstrate that there is no movement of fluid
1803 containing any contaminant into underground sources of drinking water in exceedence of any
1804 primary drinking water regulation under 40 CFR Part ~~142~~ 141, or which could otherwise
1805 adversely affect human health, safety, or the environment; ~~and~~
1806

1807 (xii) The owner or operator shall periodically review the testing and
1808 monitoring plan to incorporate monitoring data collected under this subpart, operational data
1809 collected under Section 11 of this chapter, and the most recent area of review reevaluation
1810 performed under Section 8 of this chapter. In no case shall the owner or operator review the
1811 testing and monitoring plan less often than once every five years. Based on this review, the owner
1812 or operator shall submit an amended testing and monitoring plan or demonstrate to the
1813 administrator that no amendment to the testing and monitoring plan is needed. Any amendments
1814 to the testing and monitoring plan must be approved by the administrator, must be incorporated
1815 into the permit, and are subject to the permit modification requirements at Section 4 of this
1816 chapter, as appropriate. Amended plans or demonstrations shall be submitted to the administrator
1817 as follows:
1818

1819 (A) Within one year of an area of review reevaluation;
1820

1821 (B) Following any significant changes to the facility, such as
1822 addition of monitoring wells or newly permitted injection wells within the area of review, on a
1823 schedule determined by the administrator; or
1824

1825 (C) When required by the administrator.
1826

1827 ~~(xii)(xiii)~~ A quality assurance and surveillance plan for all testing and
1828 monitoring requirements.
1829

1830 Section ~~14~~ 15. **Reporting requirements.**
1831

1832 (a) The owner or operator must, at a minimum, provide the following reports to the
1833 ~~A~~administrator, for each permitted Class VI well:
1834

1835 (i) Semi-annual reports ~~(or less frequent at the discretion of the~~
1836 ~~A~~administrator) containing:
1837

1838 (A) Any changes to the physical, chemical and other relevant
1839 characteristics of the carbon dioxide stream from the proposed operating data;
1840

- 1841 (B) Monthly average, maximum and minimum values for injection
1842 pressure, flow rate and volume, and annular pressure;
1843
1844 (C) A description of any event that exceeds operating parameters for
1845 annulus pressure or injection pressure as specified in the permit;
1846
1847 (D) A description of any event ~~which~~ that triggers a shutdown device
1848 required pursuant to Section ~~11~~ 12(g), and the response taken;
1849
1850 (E) The monthly volume of the carbon dioxide stream injected over
1851 the reporting period and project cumulatively;
1852
1853 (F) Monthly annulus fluid volume added; and
1854
1855 (G) The results of monitoring prescribed under Section ~~13~~ 14.
1856
1857 (ii) Report, within 30 days the results of:
1858
1859 (A) Periodic tests of mechanical integrity;
1860
1861 (B) Any other test of the injection well conducted by the permittee if
1862 required by the ~~A~~ administrator; and
1863
1864 (C) Any well workover.
1865
1866 (iii) Report, within 24 hours:
1867
1868 (A) Any evidence that the injected carbon dioxide stream or
1869 associated pressure front may cause an endangerment to a USDW;
1870
1871 (B) Any noncompliance with a permit condition, or malfunction of
1872 the injection system, which may cause fluid migration into or between USDWs;
1873
1874 (C) Any triggering of a shut-off system (i.e., down-hole or at the
1875 surface);
1876
1877 (D) Pursuant to compliance with the requirement at Section 14(b)(x)
1878 of this chapter for surface air/soil gas monitoring or other monitoring technologies, if required by
1879 the administrator, any release of carbon dioxide to the atmosphere or biosphere.
1880
1881 (iv) Owners or operators must notify the Director in writing 30 days in
1882 advance of:
1883
1884 (A) Any planned well workover;
1885
1886 (B) Any planned stimulation activities, other than stimulation for
1887 formation testing conducted under Section 5 of this chapter; and
1888

- 1889 (C) Any other planned test of the injection well conducted by the
1890 permittee.
- 1891
- 1892 (b) Reports required by the permit shall be submitted to the Aadministrator within 30
1893 days following the end of the period covered in the report.
- 1894
- 1895 (c) Owners or operators must submit all required reports, submittals, and
1896 notifications to both the administrator and to EPA, in an electronic format acceptable to ~~the~~
1897 ~~Administrator to EPA. At the discretion of the Administrator, other formats may be accepted.~~
1898
- 1899 (d) The permittee shall submit a written report to the Aadministrator of all remedial
1900 work concerning the failure of equipment or operational procedures ~~which that~~ resulted in a
1901 violation of a permit condition, at the completion of the remedial work.
- 1902
- 1903 (e) For any aborted or curtailed operation, a complete report shall be submitted
1904 within 30 days of complete termination of the discharge or associated activity.
- 1905
- 1906 (f) The permittee shall retain all monitoring records required by the permit for a
1907 period of ~~three (3)~~ ten (10) years following facility closure. The administrator may require the
1908 owner or operator to deliver the records to the administrator at the conclusion of the retention
1909 period.

1910

1911 Section ~~15~~ 16. **Injection well plugging.**

1912

- 1913 (a) Prior to the well plugging, the owner or operator must flush each Class VI
1914 injection well with a buffer fluid, determine bottom hole reservoir pressure, and perform a final
1915 external mechanical integrity test in accordance with Section ~~12~~ 13.
- 1916
- 1917 (b) The owner or operator of a Class VI well must prepare, maintain, update on the
1918 same schedule as the update to the area of review delineation, and comply with a well plugging
1919 plan that is acceptable to the Aadministrator.
- 1920
- 1921 (i) The requirement to maintain and implement an approved plan is directly
1922 enforceable regardless of whether the requirement is a condition of the permit.
- 1923
- 1924 (ii) The well plugging plan must be submitted as part of the permit
1925 application and must include the following information:
- 1926
- 1927 (A) Appropriate test or measure to determine bottom hole reservoir
1928 pressure;
- 1929 (B) Appropriate testing methods to ensure final external mechanical
1930 integrity as specified in Section ~~12~~ 13;
- 1931
- 1932 (C) The type and number of plugs to be used;
- 1933
- 1934 (D) The placement of each plug including the elevation of the top
1935 and bottom of each plug;
- 1936

- 1937
1938 plugging;
- (E) The type and grade and quantity of material to be used in
- 1939
1940
1941 dioxide stream.
- (I) The material must be suitable for use with the carbon
- 1942
1943
1944
- (F) A description of the method of placement of the plugs.
- 1945 (c) The owner or operator must notify the ~~A~~administrator, in writing, at least 60 days
- 1946 before plugging a well.
- 1947
- (i) If any changes have been made to the original well plugging plan, the
- 1948 owner or operator must also provide the revised well plugging plan.
- 1949
- (ii) At the discretion of the ~~A~~administrator, a shorter notice period may be
- 1950 allowed.
- 1951
- (iii) Any amendments to the injection well plugging plan must be approved
- 1952 by the administrator, must be incorporated into the permit, and are subject to the permit
- 1953 modification requirements at Section 4 of this chapter, as appropriate.
- 1954
- (d) Within 60 days after completion of plugging and abandonment of a well or well
- 1955 field the permittee shall submit to the ~~A~~administrator a final report ~~which~~ that includes:
- 1956
- (i) Certification of completion in accordance with approved plans and
- 1957 specifications by a licensed professional engineer or a licensed professional geologist.
- 1958
- (ii) Certification of accuracy by the owner or operator and by the person who
- 1959 performed the plugging operation (if other than the owner or operator.
- 1960
- (iii) The owner or operator shall retain the well plugging report for ten (10)
- 1961 years following site closure.
- 1962
- 1963
- 1964
- 1965
- 1966
- 1967
- 1968
- 1969
- 1970 Section ~~16~~ 17. **Post-injection site care and site closure.**
- 1971
- (a) The owner or operator of a Class VI well must prepare, maintain, update on the
- 1972 same schedule as the update to the area of review delineation, and comply with a plan for post-
- 1973 injection site care and site closure that meets the requirements of subpart (a)(ii) of this section and
- 1974 is acceptable to the ~~A~~administrator. The requirement to maintain and implement an approved plan
- 1975 is directly enforceable regardless of whether the requirement is a condition of the permit.
- 1976
- 1977
- (i) The owner or operator must submit the post-injection site care and site
- 1978 closure plan as a part of the permit application to be approved by the ~~A~~administrator.
- 1979
- (ii) The post-injection site care and site closure plan must include the
- 1980 following information:
- 1981
- (A) Detailed plans for post-injection monitoring, verification,
- 1982 maintenance, and mitigation;
- 1983
- 1984
- 1985

1986
1987 (B) The pressure differential between pre-injection and predicted
1988 post-injection pressures in the injection zone;
1989
1990 (C) The predicted position of the carbon dioxide plume and
1991 associated pressure front at the time when plume movement has ceased and pressure differentials
1992 sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer
1993 present, as demonstrated in the area of review evaluation required under Section 8(c)(i);
1994
1995 (D) A description of post-injection monitoring locations, methods,
1996 and proposed frequency; and
1997
1998 (E) A proposed schedule for submitting post-injection site care
1999 monitoring results ~~to the Administrator~~ pursuant to subsection 15(c) of this chapter.
2000
2001 (iii) Upon cessation of injection, owners or operators of Class VI wells must
2002 either submit an amended post-injection site care and site closure plan or demonstrate to the
2003 ~~A~~ administrator through monitoring data and modeling results that no amendment to the plan is
2004 needed.
2005
2006 (A) Any amendments to the post-injection site care and site closure
2007 plan must be:
2008
2009 (I) Approved by the administrator.
2010
2011 (II) Incorporated into the permit.
2012
2013 (III) Subject to the permit modification requirements at
2014 Section 4 of this chapter, as appropriate.
2015
2016 (iv) The owner or operator may modify and resubmit the post-injection site
2017 care and site closure plan for the ~~A~~ administrator's approval within 30 days of such change.
2018
2019 (b) The owner or operator shall monitor the site following the cessation of injection
2020 to show the position of the carbon dioxide plume and pressure front and demonstrate that
2021 USDW's are not being endangered.
2022
2023 (i) The owner or operator shall continue to conduct monitoring as specified
2024 in the ~~A~~ administrator-approved post-injection site care and site closure plan until closure is
2025 ~~authorized~~ certified by the ~~Director~~ administrator.
2026
2027 (ii) The owner or operator can request and demonstrate to the satisfaction of
2028 the ~~A~~ administrator that the post-injection site care and site closure plan should be revised to
2029 reduce the frequency of monitoring.
2030
2031 (iii) Prior to authorization for site closure, the owner or operator must
2032 demonstrate to the ~~Director~~ administrator, based on monitoring, other site-specific data, and
2033 modeling that is reasonably consistent with site performance, that no additional monitoring is
2034 needed to ensure that the geologic sequestration project does not, and is not expected to pose an

2035 endangerment to a USDW or otherwise threaten human health, safety, or the environment. In
2036 addition, the owner or operator must demonstrate, based on the best available understanding of
2037 the site, including monitoring data and/or modeling, that all other site closure standards and
2038 requirements have been met.

2039
2040 (iv) If such a demonstration cannot be made, the owner or operator must
2041 continue post-injection site care.

2042
2043 (v) The owner or operator must notify the ~~Director~~ administrator , in writing,
2044 at least 120 days before filing a request for site closure. At this time, if any changes have been
2045 made to the original post-injection site care and site closure plan, the owner or operator must also
2046 provide the revised plan. At the discretion of the ~~Director~~ administrator, a shorter notice period
2047 may be allowed.

2048
2049 (c) After the ~~Director~~ administrator has ~~authorized~~ certified site closure, the owner or
2050 operator must plug all monitoring wells, as determined by the administrator, in a manner which
2051 that will not allow movement of injection or formation fluids.

2052
2053 (d) Once the ~~Director~~ administrator has ~~authorized~~ certified-site closure, the owner or
2054 operator must submit a site closure report within 90 days after completion of all closure
2055 operations. The report must thereafter be retained at a location designated by the administrator for
2056 ten (10) years. The report must include:

2057
2058 (i) Documentation of appropriate injection and monitoring well plugging as
2059 specified in Section ~~15-16~~ and paragraph (c) of this section.

2060
2061 (ii) The owner or operator must provide a copy of a survey plat which that
2062 has been submitted to the local zoning authority designated by the ~~D~~director.

2063
2064 (A) The plat must indicate the location of the injection well(s) and
2065 monitoring wells relative to permanently surveyed benchmarks.

2066
2067 (B) The owner or operator must also submit a copy of the plat to the
2068 ~~Regional administrator of the appropriate EPA Regional Office~~ US EPA regional administrator.

2069
2070 (iii) Documentation of appropriate notification and information to such State,
2071 local and tribal authorities as have authority over drilling activities to enable such State and local
2072 authorities to impose appropriate conditions on subsequent drilling activities that may penetrate
2073 the injection and confining zone(s)

2074
2075 (iv) Proof of providing notice to surface owners, mineral claimants, mineral
2076 owners, lessees and other owners of record of subsurface interests as to the proposed site closure.
2077 Notice requirements at a minimum shall include:

2078
2079 (A) The publishing of notice of the application in a newspaper of
2080 general circulation in each county of the proposed operation at weekly intervals for four (4)
2081 consecutive weeks;

2082

2132 (A) Amended plans or demonstrations shall be submitted to the
2133 administrator as follows:

2134 (I) Within one year of an area of review reevaluation;

2135 (II) Following any significant changes to the facility, such as
2136 addition of injection or monitoring wells, on a schedule determined by the administrator; or

2137 (III) When required by the administrator.

2141 (b) If monitoring data, or other evidence obtained by the the owner or operator
2142 indicate that the injected carbon dioxide stream, displaced formation fluids or associated pressure
2143 front may endanger a USDW or threatens human health, safety, or the environment, the owner or
2144 operator must:

2145 (i) Immediately cease injection;

2146 (ii) Take all steps reasonably necessary to identify and characterize ~~the~~
2147 ~~endangerment posed~~ any release;

2148 (iii) ~~As soon as practical~~ Within 24 hours, provide verbal notice to the
2149 ~~eD~~Department of ~~eE~~Environmental ~~eQ~~Quality of any excursion after the excursion is discovered,
2150 followed by written notice to all surface owners, mineral claimants, mineral owners, lessees and
2151 other owners of record of subsurface interests within thirty (30) days of when the excursion is
2152 discovered; and

2153 (iv) Implement the emergency and remedial response plan approved by the
2154 Aadministrator.

2155 (c) The Aadministrator may allow the operator to resume injection prior to
2156 remediation if the owner or operator demonstrates that the injection operation will not endanger
2157 USDWs or otherwise threaten human health, safety, or the environment

2158 (d) The owner or operator must notify the Aadministrator or the designated
2159 representative prior to conducting any well workover.

2160 Section ~~18~~ 19. **Financial responsibility.**

2161 ~~(a) — The owner or operator must demonstrate and maintain financial responsibility~~
2162 ~~and resources for corrective action (that meets the requirements of Section 8), injection well~~
2163 ~~plugging (that meets the requirements of Section 16), post injection site care and site closure (that~~
2164 ~~meets the requirements of Section 17), and emergency and remedial response (that meets the~~
2165 ~~requirements of Section 18) in a manner prescribed by the Director until:~~

2166 ~~(i) — The Administrator receives the well plugging report identified in Section~~
2167 ~~16(d), or the post injection site care and site closure plan requirements are met, as appropriate; or~~

2168 ~~(ii) — The Director authorizes site closure.~~

2180

2181 ~~(b) — The owner or operator must provide to the Administrator annual written updates~~
2182 ~~of adjustments to the cost estimate to account for any amendments to the area of review and~~
2183 ~~corrective action plan (Section 8), the injection well plugging plan (Section 16), and the post-~~
2184 ~~injection site care and site closure plan (Section 17).~~

2185
2186 ~~(e) — The owner or operator must notify the administrator of adverse financial~~
2187 ~~conditions that may affect the ability to carry out injection well plugging and post injection site~~
2188 ~~care and site closure.~~

2189
2190 ~~(d) — The operator must provide an adjustment of the cost estimate to the administrator~~
2191 ~~if the administrator has reason to believe that the most recent demonstration is no longer adequate~~
2192 ~~to cover the cost of injection well plugging (as required by Section 16) and post injection site care~~
2193 ~~and site closure (as required by Section 17).~~

2194
2195 (a) Financial responsibility requirements are to ensure that owners or operators have
2196 the financial resources to carry out activities related to closing and remediating geologic
2197 sequestration sites if needed so they do not endanger USDWs.

2198
2199 (b) Owners or operators of Class VI wells must demonstrate and maintain financial
2200 responsibility for all applicable phases of the geologic sequestration project including complete
2201 site reclamation in the event of default. The phases of a geologic sequestration project are as
2202 follows:

2203 (i) Permitting/Characterization

2204 (ii) Operations (injection and permanent well closure activities)

2205 (iii) Post-injection site care (“plume stabilization” – monitoring until
2206 certified by the administrator; above ground reclamation completed.)

2207 (iv) Emergency and remedial response (that meets the requirements of
2208 Section 18 of this chapter).

2209
2210
2211
2212 (c) The requirement to maintain adequate financial responsibility and resources is
2213 directly enforceable regardless of whether the requirement is a condition of the permit.

2214
2215
2216 (d) To demonstrate financial responsibility, the owner or operator must submit a
2217 detailed written estimate, at the time of permit application and in current dollars, of the cost of
2218 performing corrective action on wells in the area of review, plugging the injection well(s), post
2219 injection site care and site closure, and emergency and remedial response, including the
2220 requirements of Section 18 of this chapter. The cost estimate determines the submission
2221 requirements for the financial responsibility instrument(s).

2222
2223 (i) The financial assurance cost estimate for the various phases of the
2224 sequestration project shall consider the following events:

2225
2226 (A) Contamination of underground sources of water including
2227 drinking water supplies.

2228 (B) Mineral rights infringement.

2229

- 2230 (C) Single large-volume release of carbon dioxide that impacts
2231 human health and safety and/or causes ecological damage.
2232
- 2233 (D) Low-level leakage of carbon dioxide to the surface that impacts
2234 human health and safety and/or causes ecological damage.
2235
- 2236 (E) Storage rights infringement.
2237
- 2238 (F) Property and infrastructure damage including changes to surface
2239 topography and structures.
2240
- 2241 (G) Entrained contaminant releases (non-CO2).
2242
- 2243 (H) Accidents/unplanned events.
2244
- 2245 (I) Well capping and permitted abandonment.
2246
- 2247 (J) Removal of above ground facilities and site reclamation.
2248
- 2249 (ii) The Risk Activity matrix in Appendix A shall be considered or evaluated
2250 during the risk assessment process.
2251
- 2252 (iii) The cost estimate shall be based upon a multi-disciplinary analytical
2253 framework such as Monte Carlo or other commonly accepted stochastic modeling tools.
2254
- 2255 (A) Cost curves shall combine risk probabilities, event outcomes and
2256 damages assessment to calculate expected losses under a series of events.
2257
- 2258 (B) The probability distributions for potential damages should be
2259 identified for 50 percent, 95 percent and 99 percent of all cases.
2260
- 2261 (e) The owner or operator must also submit a proposed cost-estimate for
2262 measurement, monitoring, and verification of plume stabilization following post-closure
2263 certification and release of all other financial assurance instruments.
2264
- 2265 (f) The cost estimate must be performed for each phase separately and must be
2266 based on the costs to the regulatory agency of hiring a third party to perform the required
2267 activities. A third party is a party who is not within the corporate structure of the owner or
2268 operator.
2269
- 2270 (g) The required demonstration of financial responsibility shall be from the
2271 following list of qualifying instruments:
2272
- 2273 (i) Trust Funds
2274
- 2275 (ii) Surety Bonds
2276
- 2277 (iii) Letter of Credit
2278

- 2279 (iv) Insurance
- 2280
- 2281 (A) Any insurance instruments submitted for financial assurance
- 2282 purposes shall include the state of Wyoming as an additional insured, which inclusion shall not be
- 2283 deemed a waiver of sovereign immunity.
- 2284
- 2285 (v) Self-Insurance (i.e., Financial Test and Corporate Guarantee)
- 2286
- 2287 (vi) Escrow Account
- 2288
- 2289 (vii) Any other instrument(s) satisfactory to the administrator
- 2290
- 2291 (h) The qualifying financial responsibility instrument(s) must comprise protective
- 2292 conditions of coverage that include at a minimum cancellation, renewal, continuation provisions,
- 2293 specifications on when the provider becomes liable following a notice of cancellation, and
- 2294 requirements for the provider to meet a minimum rating, minimum capitalization, and the ability
- 2295 to pass the bond rating when applicable.
- 2296
- 2297 (i) Cancellation – An owner or operator must provide that their financial
- 2298 mechanism may not cancel, terminate or fail to renew except for failure to pay such financial
- 2299 instrument. If there is a failure to pay the financial instrument, the financial institution may elect
- 2300 to cancel, terminate, or fail to renew the instrument by sending notice by certified mail to the
- 2301 owner or operator and the administrator. The cancellation must not be final for 120 days after
- 2302 receipt of cancellation notice. The owner or operator must provide an alternate financial
- 2303 responsibility demonstration within 60 days of notice of cancellation, and if an alternate financial
- 2304 responsibility demonstration is not acceptable (or possible), any funds from the instrument being
- 2305 cancelled must be released within 60 days of notification by the administrator.
- 2306
- 2307 (ii) Renewal – Owners or operators must renew all financial instruments, if
- 2308 an instrument expires, for the entire term of the geologic sequestration project. The instrument
- 2309 may be automatically renewed as long as, at a minimum, the owner or operator has the option of
- 2310 renewal at the face amount of the expiring instrument.
- 2311
- 2312 (iii) Continuation – Cancellation, termination, or failure to renew may not
- 2313 occur and the financial instrument shall remain in full force and effect in the event that on or
- 2314 before the date of expiration:
- 2315
- 2316 (A) The administrator deems the facility abandoned.
- 2317
- 2318 (B) The permit is terminated, revoked, or a new permit is denied.
- 2319
- 2320 (C) Closure is ordered by the administrator, a U.S. district court, or
- 2321 other court of competent jurisdiction.
- 2322
- 2323 (D) The owner or operator is named as debtor in a voluntary or
- 2324 involuntary proceeding under Title 11 (Bankruptcy), U.S. Code.
- 2325
- 2326 (E) The amount due is paid.
- 2327

2328 (i) The qualifying financial responsibility instrument(s) must be approved by the
2329 administrator. The administrator shall also approve the use and length of pay-in-periods for trust
2330 funds and escrow accounts.

2331
2332 (i) The administrator shall consider and approve the financial responsibility
2333 demonstration for all the phases of the geologic sequestration project prior to issuing a Class VI
2334 permit.

2335
2336 (ii) The administrator may find that the financial responsibility
2337 demonstration is unsatisfactory for any reason, as long as that reason is not arbitrary or
2338 capricious. The administrator may exercise discretion in negotiating a satisfactory financial
2339 responsibility demonstration or to deny a demonstration.

2340
2341 (iii) The owner or operator must provide any updated information related to
2342 their financial responsibility instrument(s) on an annual basis and if there are any changes, the
2343 director must evaluate the financial responsibility demonstration to confirm that the instrument(s)
2344 used remain adequate for use. The owner or operator must maintain financial responsibility
2345 requirements regardless of the status of the administrator's review of the financial responsibility
2346 demonstration.

2347
2348 (iv) The owner or operator must provide an adjustment of the cost estimate to
2349 the administrator within 60 days of notification by the administrator, if the administrator
2350 determines during the annual evaluation of the qualifying financial responsibility instrument(s)
2351 that the most recent demonstration is no longer adequate to cover the cost of corrective action (as
2352 required by Section 8), injection well plugging (as required by Section 16), post-injection site
2353 care and site closure (as required by Section 17), and emergency and remedial response (as
2354 required by Section 18).

2355
2356 (v) During the active life of the geologic sequestration project, the owner or
2357 operator must adjust the cost estimate for inflation within 60 days prior to the anniversary date of
2358 the establishment of the financial instrument(s) used to comply with paragraph (g) of this section
2359 and provide this adjustment to the administrator. The owner or operator must also provide to the
2360 administrator written updates of adjustments to the cost estimate within 60 days of any
2361 amendments to the area of review and corrective action plan (Section 8), the injection well
2362 plugging plan (Section 16), the post-injection site care and site closure plan (Section 17), the
2363 emergency and remedial response plan (Section 18), and mitigation or reclamation costs that the
2364 state may incur as a result of any default by the permit holder.

2365
2366 (vi) The administrator must approve any decrease or increase to the initial
2367 cost estimate. During the active life of the geologic sequestration project, the owner or operator
2368 must revise the cost estimate no later than 60 days after the administrator has approved the
2369 request to modify the area of review and corrective action plan (Section 8), the injection well
2370 plugging plan (Section 16), the post-injection site care and site closure plan (Section 17), and the
2371 emergency and response plan (Section 18), if the change in the plan increases the cost. If the
2372 change to the plans decreases the cost, any withdrawal of funds must be approved by the
2373 administrator. Any decrease to the value of the financial assurance instrument must first be
2374 approved by the administrator. The revised cost estimate must be adjusted for inflation as
2375 specified in the preceding paragraph.

2376

2377 (vii) Whenever the current cost estimate increases to an amount greater than
2378 the face amount of a financial instrument currently in use, the owner or operator, within 60 days
2379 after the increase, must either cause the face amount to be increased to an amount at least equal to
2380 the current cost estimate and submit evidence of such increase to the administrator, or obtain
2381 other financial responsibility instruments to cover the increase. Whenever the current cost
2382 estimate decreases, the face amount of the financial assurance instrument may be reduced to the
2383 amount of the current cost estimate only after the owner or operator has received written approval
2384 from the administrator.

2385
2386 (j) The owner or operator may demonstrate financial responsibility by using one or
2387 multiple qualifying financial instruments for specific phases of the geologic sequestration project.
2388

2389
2390 (i) In the event that the owner or operator combines more than one
2391 instrument for a specific geologic sequestration phase (e.g., well plugging), such combination
2392 must be limited to instruments that are not based on financial strength or performance (i.e., self-
2393 insurance or performance bond). For example trust funds, surety bonds guaranteeing payment
2394 into a trust fund, letters of credit, escrow account, and insurance. In this case, it is the
2395 combination of mechanisms, rather than the single mechanism, which must provide financial
2396 responsibility for an amount at least equal to the current cost estimate.
2397

2398 (ii) When using a third-party instrument to demonstrate financial
2399 responsibility, the owner or operator must provide proof that the third-party providers either have
2400 passed financial strength requirements based on credit ratings; or has met a minimum rating,
2401 minimum capitalization, and ability to pass the bond rating when applicable.
2402

2403 (iii) An owner or operator using certain types of third party instruments must
2404 establish a standby trust to enable the State of Wyoming to be party to the financial responsibility
2405 agreement without the State of Wyoming being the beneficiary of any funds. The standby trust
2406 fund must be used along with other financial responsibility instruments (e.g., surety bonds, letters
2407 of credit, or escrow accounts) to provide a location to place funds if needed.
2408

2409 (iv) An owner or operator may deposit money into an escrow account to
2410 cover financial responsibility requirements; this account must segregate funds sufficient to cover
2411 estimated costs for Class VI (geologic sequestration) financial responsibility from other accounts
2412 and uses.
2413

2414 (v) An owner or operator or its guarantor may use self-insurance to
2415 demonstrate financial responsibility for certain phases of geologic sequestration projects. In order
2416 to satisfy this requirement the owner or operator must meet a tangible net worth of an amount
2417 approved by the administrator, have a net working capital and tangible net worth each at least six
2418 times the sum of the current well plugging, post injection site care and site closure cost, have
2419 assets located in the United States amounting to at least 90 percent of total assets or at least six
2420 times the sum of the current well plugging, post injection site care and site closure cost, and must
2421 submit a report of its bond rating and financial information annually. In addition the owner or
2422 operator must either: have a bond rating test of AAA, AA, A, or BBB as issued by Standard &
2423 Poor's or Aaa, Aa, A, or Baa as issued by Moody's; or meet all of the following five financial
2424 ratio thresholds: a ratio of total liabilities to net worth less than 2.0; a ratio of current assets to
2425 current liabilities greater than 1.5; a ratio of the sum of net income plus depreciation, depletion,

2426 and amortization to total liabilities greater than 0.1; a ratio of current assets minus current
2427 liabilities to total assets greater than -0.1; and a net profit (revenues minus expenses) greater than
2428 0.

2429
2430 (vi) An owner or operator who is not able to meet corporate financial test
2431 criteria may arrange a corporate guarantee by demonstrating that its corporate parent meets the
2432 financial test requirements on its behalf. The parent's demonstration that it meets the financial
2433 test requirement is insufficient if it has not also guaranteed to fulfill the obligations for the owner
2434 or operator.

2435
2436 (vii) An owner or operator may obtain an insurance policy to cover the
2437 estimated costs of geologic sequestration activities requiring financial responsibility. This
2438 insurance policy must be obtained from a third party provider.

2439
2440 (k) The owner or operator must maintain financial responsibility and resources until
2441 the administrator receives and approves the completed post-injection site care and site closure
2442 plan and the administrator approves site closure.

2443
2444 (i) Post-injection site care shall be for a period of not less than ten (10) years
2445 after the date when all wells excluding monitoring wells have been appropriately plugged and
2446 abandoned, all subsurface operations and activities have ceased and all surface equipment and
2447 improvements have been removed or appropriately abandoned, or so long thereafter as necessary
2448 to obtain a completion and release certificate from the administrator certifying that plume
2449 stabilization has been achieved without the use of control equipment based on a minimum of
2450 three consecutive years of monitoring data.

2451
2452 (ii) The site closure plan shall address all reclamation, required monitoring,
2453 and remediation sufficient to show that the carbon dioxide injected into the geologic sequestration
2454 site will not harm or present a risk to human health, safety, the environment, or drinking water
2455 supplies.

2456
2457 (l) The owner or operator must notify the administrator by certified mail of adverse
2458 financial conditions such as bankruptcy that may affect the ability to carry out injection well
2459 plugging and post-injection site care and site closure.

2460
2461 (i) In the event that the owner or operator or the third party provider of a
2462 financial responsibility instrument is going through a bankruptcy, the owner or operator must
2463 notify the administrator by certified mail of the commencement of a voluntary or involuntary
2464 proceeding under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor,
2465 within 10 days after commencement of the proceeding.

2466
2467 (ii) A guarantor of a corporate guarantee must make such a notification to
2468 the administrator if he/she is named as debtor, as required under the terms of the corporate
2469 guarantee.

2470
2471 (iii) An owner or operator who fulfills the requirements of paragraph (g) of
2472 this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance
2473 policy will be deemed to be without the required financial assurance in the event of bankruptcy of
2474 the trustee or issuing institution, or a suspension or revocation of the authority of the trustee

2475 institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit,
2476 escrow account, or insurance policy. The owner or operator must establish other financial
2477 assurance within 60 days after such an event.

2478
2479 (m) The owner or operator may be released from a financial instrument in the
2480 following circumstances:

2481
2482 (i) The owner or operator has completed the phase of the geologic
2483 sequestration project for which the financial instrument was required and has fulfilled all its
2484 financial obligations as determined by the administrator, including obtaining financial
2485 responsibility for the next phase of the GS project, if required.

2486
2487 (ii) The owner or operator has submitted a replacement financial instrument
2488 and received written approval from the administrator accepting the new financial instrument and
2489 releasing the owner or operator from the previous financial instrument.

2490
2491 (iii) The owner or operator has submitted a revised cost estimate for the
2492 remaining phases of the geologic sequestration project. The revised cost estimate may
2493 demonstrate that a partial release of the financial instrument is warranted and can still provide
2494 adequate financial assurance for the remainder of the project. Partial release of the financial
2495 instrument is at the discretion of the administrator.

2496
2497 (n) Following the release of all financial assurance and receipt of a site closure
2498 certificate, the administrator must approve the cost estimate prepared for the post-closure
2499 measurement, monitoring and verification of a geologic sequestration site. The cost estimate
2500 shall only be provided after plume stabilization and all remediation work has been completed.

2501
2502
2503 Section ~~19~~ 20. **Public participation, public notice and public hearing requirements.**

2504
2505 (a) Public notice is not required for minor modifications as described by Section 4(b)
2506 ~~(x)~~(xi) of this chapter or for a permit denial where the application is determined incomplete.

2507
2508 (b) The ~~A~~a administrator shall give public notice if a draft permit has been prepared or
2509 a hearing has been scheduled.

2510
2511 (c) Public notice of the preparation of a draft permit shall allow at least 60 days for
2512 public comment. Public notice of a public hearing shall be given at least 30 days before the
2513 hearing. Public notice of the hearing may be given at the same time as public notice of the draft
2514 permit and the two notices may be combined.

2515
2516 (d) Public notice shall be given by:

2517 (i) Mailing a copy of the notice to the following persons:

2518 (A) The applicant, by certified or registered mail;

2519
2520 (B) The U.S. Environmental Protection Agency, Region 8 Drinking
2521 Water Program;
2522
2523

2524 (C) The U.S. Environmental Protection Agency, Region 8
2525 Underground Injection Control Program;
2526
2527 ~~(C)~~(D) Wyoming Game and Fish Department;
2528
2529 ~~(D)~~(E) Wyoming State Engineer;
2530
2531 ~~(E)~~(F) State Historical Preservation Officer;
2532
2533 ~~(F)~~(G) Wyoming Oil and Gas Conservation Commission;
2534
2535 (H) Wyoming Department of Environmental Quality, Land Quality
2536 Division
2537
2538 ~~(G)~~(I) Wyoming State Geological Survey;
2539
2540 ~~(H)~~(J) Wyoming Water Development Office;
2541
2542 ~~(I)~~(K) Persons on the mailing list developed by the department,
2543 including those who request in writing to be on the list and by soliciting participants in public
2544 hearings in that area for their interest in being included on “area” mailing lists; and
2545
2546 ~~(J)~~(L) Any unit of local government having jurisdiction over the area
2547 where the facility is proposed to be located.
2548
2549 (ii) Publication of the notice in a newspaper of general circulation in the
2550 location of the facility or operation; and
2551
2552 (iii) At the discretion of the ~~A~~administrator, any other method reasonably
2553 expected to give actual notice of the action in question to the persons potentially affected by it,
2554 including press releases or any other forum or medium to elicit public participation.
2555
2556 (e) All public notices issued under this chapter shall contain the following minimum
2557 information:
2558
2559 (i) Name and address of the department;
2560
2561 (ii) Name and address of permittee or permit applicant, and, if different, of
2562 the facility or activity regulated by the permit;
2563
2564 (iii) A brief description of the business conducted at the facility or activity
2565 described in the permit application or the draft permit;
2566
2567 (iv) Name, address and telephone number of a person from whom interested
2568 persons may obtain further information, including copies of the draft permit, as the case may be,
2569 statement of basis or fact sheet, and the application;
2570

- 2571 (v) A brief description of comment procedures, procedures to request a
2572 hearing, and other procedures which the public may use to participate in the final permit decision;
2573 and
2574
- 2575 (vi) Any additional information considered necessary and proper.
2576
- 2577 (f) In addition to the information required in (e) of this section, any notice for public
2578 hearing shall contain the following:
2579
- 2580 (i) Reference to the date of previous public notices relating to the permit;
2581
- 2582 (ii) Date, time and place of hearing; and
2583
- 2584 (iii) A brief description of the nature and purpose of the hearing, including
2585 applicable rules and procedures.
2586
- 2587 (g) The department shall provide an opportunity for the applicant, permittee, or any
2588 interested person to submit written comments regarding any aspect of a permit or to request a
2589 public hearing.
2590
- 2591 (h) All information received on or with the permit application shall be made
2592 available to the public for inspection and copying except such information as has been determined
2593 to constitute trade secrets or confidential information pursuant to W.S. 35-11-1101.
2594
- 2595 (i) During the public comment period, any interested person may submit written
2596 comments on the draft permit and may request a public hearing. Requests for public hearings
2597 must be made in writing to the ~~A~~administrator and shall state the reasons for the request.
2598
- 2599 (j) The ~~A~~administrator shall hold a hearing whenever the ~~A~~administrator finds, on
2600 the basis of requests, a significant degree of public interest in a draft permit. The ~~A~~administrator
2601 has the discretion to hold a hearing whenever such a hearing may clarify issues involved in a
2602 permit decision.
2603
- 2604 (k) The public comment period shall automatically extend to the close of any public
2605 hearing. The ~~A~~administrator may also extend the comment period by so stating at the public
2606 hearing.
2607
- 2608 (l) The ~~Director~~ administrator shall render a decision on the draft permit within 60
2609 days after the completion of the comment period if no hearing is requested. If a hearing is held,
2610 the ~~Director~~ administrator shall make a decision on any department hearing as soon as practicable
2611 after receipt of the transcript or after the expiration of the time set to receive written comments.
2612
- 2613 (m) At the time a final decision is issued, the department shall respond, in writing, to
2614 those comments received during the public comment period or comments received during the
2615 allotted time for a hearing held by the department. This response shall:
2616
- 2617 (i) Specify any changes that have been made to the permit; and
2618

2619 (ii) Briefly describe and respond to all comments voicing a legitimate
2620 technical or regulatory concern that is within the authority of the department to regulate.

2621
2622 (n) The response to comments shall also be available to the public.

2623
2624 (o) Requests for a contested case hearing on a permit issuance, denial, revocation,
2625 termination, or any other final department action appealable to the Council shall be in accordance
2626 with the department's rules of practice and procedure.
2627

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Appendix A
Risk Activity Table

	<u>Major Risk (Feature, Event, or Process)</u>
<u>1</u>	<u>Mineral Rights Infringement (Trespass)</u>
<u>1.1</u>	<u>Leakage migrates into mineral zone or hydraulic front impacts recoverable mineral zone; causes may include plume migration different than modeled.</u>
<u>1.2</u>	<u>Post injection discovery of recoverable minerals.</u>
<u>1.3</u>	<u>New technology (or economic conditions) enables recovery of previously un-economically recoverable minerals.</u>
<u>1.4</u>	<u>Act of God (e.g. seismic event).</u>
<u>1.5</u>	<u>Formation fluid impact due to CO2 injection.</u>
<u>1.6</u>	<u>See also contributing causes 3.1, 3.2, 3.3, 3.5, 4.3, and 4.4</u>
<u>2</u>	<u>Water Quality Contamination</u>
<u>2.1</u>	<u>Leakage of CO2 outside permitted area.</u>
<u>2.2</u>	<u>Leakage of drilling fluid contaminates potable water aquifer.</u>
<u>2.3</u>	<u>Rock/acid water (i.e. geochemistry) interaction contaminates potable water by carryover of dissolved contaminants.</u>
<u>2.4</u>	<u>Act of God (e.g. seismic event).</u>
<u>2.5</u>	<u>Formation fluid impact due to CO2 injection.</u>
<u>2.6</u>	<u>See also contributing causes 3.1, 3.2, 3.3, 3.5, 4.3, and 4.4</u>
<u>3</u>	<u>Single Large Volume CO2 Release to the Surface – Asphyxiation/Health/Ecological</u>
<u>3.1</u>	<u>Overpressurization (i.e. induced).</u>
<u>3.2</u>	<u>Caprock/reservoir failure.</u>
<u>3.3</u>	<u>Well blowout (e.g. at surface or bore failure below ground), includes monitoring wells – Causes could include seal failure (e.g. well, drilling or injection equipment).</u>
<u>3.4</u>	<u>Major mechanical failure of distribution system or storage facilities above ground or below ground (i.e. near the surface).</u>
<u>3.5</u>	<u>Orphan well failure (e.g. well not identified prior to injection).</u>
<u>3.6</u>	<u>Sabotage/Terrorist attack (e.g. on surface infrastructure).</u>
<u>3.7</u>	<u>Act of God (e.g. major seismic event)</u>
<u>4</u>	<u>Low Level CO2 Release to Surface – Ecological damage due to low-level releases; potential asphyxiation</u>
<u>4.1</u>	<u>Overpressurization (i.e. induced).</u>
<u>4.2</u>	<u>Caprock/reservoir failure (e.g. Plume migrates along fault line/fissure to surface).</u>
<u>4.3</u>	<u>Incomplete geological seal (e.g. Inaccurate characterization of sub-surface geology).</u>
<u>4.4</u>	<u>Well seal failure (e.g. well, drilling or injection equipment) including monitor wells</u>
<u>4.5</u>	<u>Mechanical failure of distribution system or storage facilities above or below ground (e.g. near surface).</u>
<u>4.6</u>	<u>Orphan wells (e.g. well not identified prior to injection).</u>
<u>4.7</u>	<u>Induced seismicity leading to leakage.</u>
<u>4.8</u>	<u>Act of God (e.g. seismic event).</u>

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Risk Activity Table (continued)

	<u>Major Risk (Feature, Event, or Process)</u>
<u>5</u>	<u>Storage Rights Infringement (CO2 or other entrained contaminant gases) – Form of Mineral Rights Infringement</u>
<u>5.1</u>	<u>Leakage migrates into adjacent pore space; causes may include plume migrates faster than modeled.</u>
<u>5.2</u>	<u>Post injection decision (e.g. due to new technology or changed economic conditions) to store gas in adjacent pore space.</u>
<u>5.3</u>	<u>Acts of God affecting storage capacity of pore space.</u>
<u>5.4</u>	<u>Formation fluid impact due to CO2 injection.</u>
	<u>Will also require primary contributing causes 3.1, 3.2, 3.3, 3.5, 4.3, and 4.4</u>
<u>6</u>	<u>Modified Surface Topography (subsidence or uplift) Resulting in Property/Infrastructure Damage</u>
<u>6.1</u>	<u>Induced Seismicity – Pressure of geochemistry induced reactivation of historic fault or dissolution of material caused by subsidence.</u>
<u>6.2</u>	<u>Formation fluid impact due to CO2 injection.</u>
<u>7</u>	<u>Entrained Contaminant (Non-CO2) Releases</u>
<u>7.1</u>	<u>Change in CO2 composition/properties (e.g. concentration of contaminate in CO2 supply increases).</u>
<u>7.2</u>	<u>Microbial activity initiated by injection process or composition.</u>
	<u>Will also require primary contributing causes 3.1, 3.2, 3.3, 3.5, 4.3, and 4.4</u>
<u>8</u>	<u>Accidents/Unplanned Events (Typical Insurable Events)</u>
<u>8.1</u>	<u>Surface infrastructure damage</u>
<u>8.2</u>	<u>Saline water releases from surface storage impoundment.</u>