

Chapter 24
CLASS VI INJECTION WELLS AND FACILITIES

Table of Contents

Section 1.	Authority and Purpose.....	1
Section 2.	Definitions.....	1
Section 3.	Applicability.....	5
Section 4.	Permits required; processing of permits; and requirements applicable to all permits.....	7
Section 5.	Permit application.....	14
Section 6.	Prohibitions.....	21
Section 7.	Minimum criteria for siting Class VI wells.....	21
Section 8.	Area of review delineation and corrective action.....	22
Section 9.	Construction and operation standards for Class VI wells.....	25
Section 10.	Class VI Injection Depth Waiver Requirements	27
Section 11.	Logging, sampling, and testing prior to injection well operation.....	30
Section 12.	Injection well operating requirements.....	32
Section 13.	Mechanical integrity.....	34
Section 14.	Testing and monitoring requirements.....	35
Section 15.	Reporting requirements.....	38
Section 16.	Injection well plugging.....	39
Section 17.	Post-injection site care and site closure.....	40
Section 18.	Emergency and remedial response.....	43
Section 19.	Financial responsibility.....	44
Section 20.	Public participation, public notice and public hearing requirements.....	51
Appendix A	Risk Activity Table.....	A-1

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CHAPTER 24

Class VI Injection Wells and Facilities Underground Injection Control Program

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

17
18 These rules and regulations also provide financial assurance for the purposes specified in
19 35-11-313.

20
21 **Section 2. Definitions.** The following definitions supplement those definitions
22 contained in Section 35-11-103 of the Wyoming Environmental Quality Act.

23
24 (a) “Administrator” means the administrator of the Water Quality Division of the
25 Department of Environmental Quality.

26
27 (b) "Aquifer" means a zone, stratum or group of strata that can store and transmit
28 water in sufficient quantities for a specific use.

29
30 (c) “Area of review” means the subsurface three-dimensional extent of the carbon
31 dioxide plume, associated pressure front, and displaced fluids, as well as the overlying formations
32 and surface area above that delineated region.

33
34 (d) "Background" means the constituents or parameters and the concentrations or
35 measurements which describe water quality and water quality variability prior to the subsurface
36 discharge.

37
38 (e) “Bore/casing annulus” means the space between the well bore and the well
39 casing.

40
41 (f) “Carbon dioxide plume” means the underground extent, in three dimensions, of
42 an injected carbon dioxide stream.

43
44 (g) “Carbon dioxide stream” means carbon dioxide, plus associated substances
45 derived from the source materials and any processing, and any substances added to the stream to
46 enable or improve the injection process. This chapter does not apply to any carbon dioxide
47 stream that meets the definition of a hazardous waste under 40 CFR Part 261.

48
49 (h) “Casing/tubing annulus” means the space between the well casing and the tubing.

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

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

(k) “Confining zone” means a geological formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).

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

(m) “Director” means the director of the Department of Environmental Quality.

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

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

(p) “Endangerment” means exposure to actions or activities which could pollute an Underground Source of Drinking Water (USDW).

(q) “Excursion detection” means the detection of migrating carbon dioxide at or beyond the boundary of the geologic sequestration site.

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

99 (s) "Fluid" means any material which flows or moves, whether semisolid, liquid,
100 sludge, gas or any other form or state.
101

102 (t) "Geologic sequestration project" means an injection well or wells used to
103 emplace a carbon dioxide stream into an injection zone for geologic sequestration. It includes the
104 subsurface three-dimensional extent of the carbon dioxide plume, associated pressure front, and
105 displaced brine, as well as the surface area above that delineated region. (Reference Section
106 35-11-103(c) of the Wyoming Environmental Quality Act for definitions of *geologic*
107 *sequestration*, *geologic sequestration site*, and *geologic sequestration facilities*.)

108
109 (u) "Groundwater" means subsurface water that fills available openings in rock or
110 soil materials such that they may be considered water saturated under hydrostatic pressure.
111

112 (v) "Groundwaters of the state" are all bodies of underground water which are
113 wholly or partially within the boundaries of the state.
114

115 (w) "Hazardous waste" means a hazardous waste as defined in 40 CFR 261.3.
116

117 (x) "Individual permit" means a permit issued for a specific facility operated by an
118 individual operator, company, municipality, or agency. An individual permit may be established
119 as an area permit and include multiple points of discharge that are all operated by the same
120 person.
121

122 (y) "Injectate" means the material being disposed of through any underground
123 injection facility after it has received whatever pretreatment is done.
124

125 (z) "Injection zone" means a geologic formation, group of formations, or part of a
126 formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon
127 dioxide through a well or wells associated with a geologic 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 that is continuous from at least the top of
137 the injection interval to the surface and 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 (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 (ff) "Permit" means a Wyoming Underground Injection Control permit, unless
148 otherwise specified.
149
- 150 (gg) "Permittee" means the named permit holder.
151
- 152 (hh) "Plume stabilization" means the carbon dioxide that has been injected subsurface
153 essentially no longer expands vertically or horizontally and poses no threat to USDWs, human
154 health, safety, or the environment, as demonstrated by a minimum of three (3) consecutive years
155 of monitoring data.
156
- 157 (ii) "Point of compliance" means a point at which the permittee shall meet all permit
158 and regulatory requirements.
159
- 160 (jj) "Point of injection" means the last accessible sampling point prior to a fluid
161 being released into the subsurface environment through a Class VI injection well.
162
- 163 (kk) "Post-injection site care" means monitoring, measurement, verification, and other
164 actions (including corrective action) following closure of injection wells until plume stabilization
165 has been achieved and certified by the administrator, as required under Section 17 of this chapter.
166
- 167 (ll) "Pressure front" means the zone of elevated pressure that is created by the
168 injection of the carbon dioxide stream into the subsurface. The pressure front of a carbon dioxide
169 plume refers to a zone where there is a pressure differential sufficient to cause movement of
170 injected fluids or formation fluid if a migration pathway or conduit were to exist.
171
- 172 (mm) "Public hearing" means a non-adversary hearing held by the administrator or
173 director of the department. The hearing is conducted pursuant to Chapter 3 of the Wyoming
174 Department of Environmental Quality Rules of Practice and Procedure.
175
- 176 (nn) "Radioactive waste" means any waste that contains radioactive material in
177 concentrations that exceed those listed in 10 CFR Part 20, Appendix B, Table II, Column 2 as of
178 December 22, 1993.
179
- 180 (oo) "Receiver" means any zone, interval, formation or unit in the subsurface into
181 which a carbon dioxide stream is injected.
182
- 183 (pp) "Responsible corporate officer" means a president, secretary, treasurer, or vice
184 president of the corporation in charge of a principal business function, or any other person who
185 performs similar policy- or decision-making functions for the corporation.
186
- 187 (qq) "Secondarily affected aquifer" means any aquifer affected by migration of fluids
188 from an injection facility, when the aquifer is not directly discharged into.
189
- 190 (rr) "Site closure" means the point/time, as certified by the administrator following
191 the requirements of Section 17, at which time the owner or operator of a geologic sequestration
192 project is released from post-injection site care responsibilities.
193
- 194 (ss) "Subsurface discharge" means a discharge into a receiver.
195

196 (tt) "Transmissive fault or fracture" means a fault or fracture that has sufficient
197 permeability and vertical extent to allow fluids to move beyond the confining zone.

198
199 (uu) "USDW" or "Underground source of drinking water" means those aquifers or
200 portions thereof that have a total dissolved solids content of less than 10,000 mg/L, and are
201 classified as either Class I, II, III, IV (a), or Special (A), pursuant to Chapter 8, Quality Standards
202 for Wyoming Groundwaters, Water Quality Rules and Regulations.

203
204 (vv) "US EPA regional administrator" means the regional administrator of the US
205 EPA's Region 8 office in Denver, Colorado.

206
207 (ww) "Vadose Zone" means the unsaturated zone in the earth, between the land surface
208 and the top of the first saturated aquifer. The vadose zone contains water at less than saturated
209 conditions.

210
211 (xx) "Water quality management area" means the area delineated for the protection of
212 water quality under a department approved plan developed under Sections 303, 208 and/or 201 of
213 the Federal Clean Water Act, as amended.

214
215 (yy) "Well" means an opening, excavation, shaft or hole in the ground allowing or
216 used for an underground injection, or for monitoring.

217
218 (zz) "Workover" means to pull the tubing, packer, or any downhole hardware from
219 the well and inspect, replace, or refurbish it prior to placing that hardware back in service, or to
220 enter the hole with any drilling tool.

221
222 (aaa) "Wellhead protection area" means the area delineated for the protection of a
223 public water supply utilizing a groundwater source under a department approved plan developed
224 pursuant to Section 1528 of the federal Safe Drinking Water Act.

225 **Section 3. Applicability.**

226
227 (a) These regulations shall apply to all Class VI wells used to inject carbon dioxide
228 streams for the purpose of geologic sequestration.

229
230 (b) In addition, these regulations shall apply to owners and operators of Class I
231 industrial, Class II, or Class V experimental or demonstration carbon dioxide injection projects
232 who seek to apply for a Class VI geologic sequestration permit for their well or wells.

233
234 (i) Owners and/or operators of permitted Class I or Class V injection well(s)
235 seeking to convert their well(s) to a Class VI well shall apply for a Class VI permit and shall
236 demonstrate to the administrator that the well(s) was/were engineered and constructed to meet the
237 requirements outlined in Section 9 of these regulations and ensure protection of USDWs, in lieu
238 of requirements of Section 9(b) and Section 11(a) of this chapter.

239
240 (A) By December 10, 2011, owners or operators of either Class I
241 wells previously permitted for the purpose of geologic sequestration or Class V experimental
242 technology wells no longer being used for experimental purposes that will continue injection of
243 carbon dioxide for the purpose of geologic sequestration must apply for a Class VI permit.

244
245 (ii) If the administrator determines that USDWs will not be endangered, such
246 wells are exempt, at the administrator’s discretion, from the casing and cementing requirements
247 of Section 9(b)(i) through (vii) and Section 11(a)(i)(A) through (C).
248

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

252 (i) An owner and/or operator of a Class II enhanced recovery well that
253 injects carbon dioxide for the primary purpose of long term storage that results in an increased
254 risk to a USDW as compared to enhanced oil recovery operations shall apply for a Class VI
255 permit. The director’s determination of primary purpose and increased risk to a USDW shall
256 include, at a minimum, an evaluation of the following criteria:
257

- 258 (A) Increase in reservoir pressure within the injection zone(s).
- 259
- 260 (B) Increase in carbon dioxide injection rates.
- 261
- 262 (C) Decrease in reservoir production rates.
- 263
- 264 (D) Distance between the injection zone(s) and USDWs.
- 265
- 266 (E) Suitability of the Class II area of review delineation.
- 267
- 268 (F) Quality of abandoned well plugs within the area of review.
- 269
- 270 (G) The owner’s and/or operator’s plan for recovery of carbon
271 dioxide at the cessation of injection.
- 272
- 273 (H) The source and properties of the injected carbon dioxide.
- 274
- 275 (I) Any additional site-specific factors as determined by the
276 administrator.
- 277

278 (ii) An owner and/or operator may apply for a Class VI permit upon
279 recommendation by the Oil and Gas Conservation Commission supervisor, or by the
280 Commission, that regulation of a Class II enhanced recovery operation be transferred to the
281 department.
282

283 (iii) An owner and/or operator of a Class II enhanced recovery operation shall
284 apply for a Class VI permit within thirty (30) days of receipt of written notice from the director
285 that a Class VI permit is required.
286

287 (d) These regulations do not apply to the injection of any carbon dioxide stream that
288 meets the definition of a hazardous waste.
289

290 **Section 4. Permits required; processing of permits; and requirements**
291 **applicable to all permits.**

292
293 (a) Permits required.

294
295 (i) Owners or operators of Class VI wells must obtain a permit in
296 accordance with these regulations. Class VI wells are not authorized by rule to inject.

297
298 (ii) Construction, installation, operation, monitoring, testing, plugging, post-
299 injection site care, and modification to, or of, any Class VI well shall be allowed only in
300 accordance with these regulations.

301
302 (iii) Injections from Class VI wells shall be restricted to those receivers
303 defined as Class V (Hydrocarbon Commercial) or Class VI groundwaters by the department
304 pursuant to Chapter 8, Quality Standards for Wyoming Groundwaters, Water Quality Rules and
305 Regulations.

306
307 (iv) A separate permit to construct is not required under Chapter 3, Water
308 Quality Rules and Regulations for any Class VI facility.

309
310 (v) Permits for Class VI wells shall be issued for the operating life of the
311 facility and extend through the post-injection site care period until the geologic sequestration
312 project is closed in accordance with department rules and regulations.

313
314 (vi) Permits may be issued for individual Class VI wells and shall not be
315 issued on an area basis for multiple points of discharge operated by the same person.

316
317 (vii) Each permit shall be reviewed by the department at least once every five
318 (5) years for continued validity of all permit conditions and contents. Permits that do not satisfy
319 the requirements of these regulations are subject to modification, revocation and reissuance, or
320 termination pursuant to this chapter.

321
322 (viii) Sections of permit applications filed under this chapter that represent
323 engineering work shall be sealed, signed, and dated by a licensed professional engineer as
324 required by Wyoming Statutes, Title 33, Chapter 29.

325
326 (ix) Sections of permit applications filed under this chapter that represent
327 geologic work shall be sealed, signed, and dated by a licensed professional geologist as required
328 by Wyoming Statutes, Title 33, Chapter 41.

329
330 (b) Permit processing procedures applicable to all Class VI facilities, individual and
331 general permits:

332
333 (i) The applicant shall submit five (5) copies of the permit application to the
334 division.

335
336 (ii) Within 60 days of submission of the application, the administrator shall
337 make an initial determination of completeness. An application shall be determined complete

338 when the administrator receives an application and any supplemental information necessary to
 339 determine compliance with these regulations.

340

341 (iii) Re-submittal of information by an applicant for an incomplete
 342 application will begin the process described in paragraph (b) of this section.

343

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

347

348 (v) The administrator may deny an individual permit for any of the
 349 following reasons:

350

(A) The application is incomplete;

351

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

354

355 (C) The application contains a proposed construction or operation
 356 that does not meet the requirements of this chapter;

357

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

361

362 (E) Other justifiable reasons necessary to carry out the provisions of
 363 the Wyoming Environmental Quality Act.

364

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

368

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

373

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

379

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

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(ix) The administrator may modify a permit when:

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

(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.

(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:

- 436
437 (A) Correct typographical errors;
438
439 (B) Require more frequent monitoring or reporting by the permittee;
440
441 (C) Change an interim compliance date in a schedule of compliance,
442 provided the new date is not more than 120 days after the date specified in the existing permit and
443 does not interfere with attainment of the final compliance date requirement;
444
445 (D) Allow for a change in ownership or operational control of a
446 facility where the administrator determines that no other change in the permit is necessary,
447 provided that a written agreement containing a specific date for transfer of permit responsibility,
448 coverage, and liability between the current and new permittees have been submitted to the
449 administrator;
450
451 (E) Change quantities or types of fluids injected which are within the
452 capacity of the facility as permitted and, in the judgment of the administrator, would not interfere
453 with the operation of the facility or its ability to meet conditions described in the permit and
454 would not change its classification; or
455
456 (F) Change construction requirements approved by the administrator
457 pursuant to department rules and regulations provided that any such alteration shall comply with
458 the requirements of this chapter.
459
460 (G) Amend a plugging and abandonment plan which has been
461 updated under Section 16 of this chapter.
462
463 (H) Amend a Class VI injection well testing and monitoring plan,
464 plugging plan, post-injection site care and site closure plan, or emergency and remedial response
465 plan where the modifications merely clarify or correct the plan, as determined by the
466 administrator.
467
468 (xii) The administrator may revoke and reissue or terminate a permit for any
469 of the following reasons:
470
471 (A) Noncompliance with terms and conditions of the permit;
472
473 (B) Failure in the application or during the issuance process to
474 disclose fully all relevant facts, or misrepresenting any relevant facts at any time; or
475
476 (C) A determination that the activity endangers human health or the
477 environment and can only be regulated to acceptable levels by a permit modification or
478 termination.
479
480 (xiii) The administrator may modify a permit to resolve issues that could lead
481 to the revocation of the permit under Section 5(b) of this chapter. The administrator, as part of
482 any notification of intent to terminate a permit, shall order the permittee to proceed with
483 reclamation on a reasonable time period.
484

485 If the administrator tentatively decides to modify or revoke and reissue a permit, a draft
486 permit incorporating the proposed changes shall be prepared. The administrator may request
487 additional information and, in the case of a modified permit, may require the submission of an
488 updated application. In the case of revoked and reissued permits, the administrator shall require
489 the submission of a new application.
490

491 (xiv) In a permit modification under Section 4(b) of this chapter, only those
492 conditions to be modified shall be reopened when a new draft permit is prepared. All other
493 aspects of the existing permit shall remain in effect for the duration of the unmodified permit and
494 the modified permit shall expire on the date when the original permit would have expired. When
495 a permit is revoked and reissued under this section, the entire permit is reopened as if the permit
496 has expired and is being reissued. During any revocation and reissuance proceeding, the
497 permittee shall comply with all conditions of the existing permit until a new final permit is issued.
498

499 (xv) Permit modifications, revocations or terminations shall be developed as a
500 draft permit and are subject to the public notice and hearing requirements outlined in Section 20.
501

502 (xvi) Transfer of a permit is allowed only upon approval by the administrator.
503 When a permit transfer occurs pursuant to this section, the permit rights of the previous permittee
504 will automatically terminate.
505

506 (A) The proposed permit holder shall apply in writing as though that
507 person was the original applicant for the permit and shall further agree to be bound by all of the
508 terms and conditions of the permit; and
509

510 (B) Transfer will not be allowed if the permittee is in noncompliance
511 with any term and conditions of the permit, unless the transferee agrees to bring the facility back
512 into compliance with the permit.
513

514 (C) When a permit transfer occurs, the administrator may modify a
515 permit pursuant to this section. The administrator shall provide public notice pursuant to Section
516 20 for any modification other than a minor modification defined by this section.
517

518 (c) Permit conditions.
519

520 (i) All individual permits issued under this chapter shall contain the
521 following conditions:
522

523 (A) A requirement that the permittee comply with all conditions of
524 the permit, and any permit noncompliance constitutes a violation of these regulations and is
525 grounds for enforcement action, permit termination, revocation, or modification;
526

527 (B) A requirement that if the permittee wishes to continue injection
528 activity after the expiration date of the permit, the permittee must apply to the administrator for,
529 and obtain, a new permit prior to expiration of the existing permit;
530

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

534
535 (D) A requirement that the permittee shall take all reasonable steps to
536 minimize or correct any adverse impact on the environment resulting from noncompliance with
537 this permit;

538
539 (E) A requirement that the permittee properly operate and maintain
540 all facilities and systems of treatment and control that are installed or used by the permittee to
541 achieve compliance with the conditions of this permit. Proper operation and maintenance includes
542 effective performance, adequate funding and operator staffing and training, and adequate
543 laboratory and process controls including appropriate quality assurance procedures. This
544 provision requires the operation of back-up or auxiliary facilities or similar systems only when
545 necessary to achieve compliance with the conditions of the permit;

546
547 (F) A stipulation that the filing of a request by the permittee, or at
548 the instigation of the administrator, for a permit modification, revocation, termination, or
549 notification of planned changes or anticipated non-compliance, shall not stay any permit
550 condition;

551
552 (G) A stipulation that this permit does not convey any property rights
553 of any sort, or any exclusive privilege;

554
555 (H) A stipulation that the permittee shall furnish to the administrator,
556 within a specified time, any information which the administrator may request to determine
557 whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to
558 determine compliance with the permit. The permittee shall also furnish to the administrator, upon
559 request, copies of records required to be kept by the permit;

560
561 (I) A requirement that the permittee shall allow the administrator, or
562 an authorized representative of the administrator, upon the presentation of credentials, during
563 normal working hours, to enter the premises where a regulated facility is located, or where
564 records are kept under the conditions of this permit, and inspect the discharge and related
565 facilities, review and copy reports and records required by the permit, collect fluid samples for
566 analysis, measure and record water levels, and perform any other function authorized by law or
567 regulation;

568
569 (J) A requirement that the permittee furnish any information
570 necessary to establish a monitoring program pursuant to Section 14 of this chapter;

571
572 (K) A requirement that all samples and measurements taken for the
573 purpose of monitoring shall be representative of the monitored activity, and records of all
574 monitoring information be retained by the permittee. The monitoring information to be retained
575 shall be that information stipulated in the monitoring program established pursuant to the criteria
576 in Section 14 of this chapter;

577
578 (L) A requirement that all applications, reports, and other
579 information submitted to the administrator contain certifications as required in Section 5(d) of
580 this chapter, and be signed by a person who meets the requirements to sign permit applications
581 found in Section 5(c), or for routine reports, a duly authorized representative;

582

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

587
588 (N) A requirement that any modification that may result in a
589 violation of a permit condition shall be reported to the administrator, and any modification that
590 will result in a violation of a permit condition shall be reported to the administrator through the
591 submission of a new or amended permit application;

592
593 (O) A requirement that any transfer of a permit must first be
594 approved by the administrator, and that no transfer will be approved if the facility is not in
595 compliance with the existing permit unless the proposed permittee agrees to bring the facility into
596 compliance;

597
598 (P) A requirement that monitoring results shall be reported at the
599 intervals specified elsewhere in the permit;

600
601 (Q) A requirement that reports of compliance or non-compliance
602 with, or any progress reports on interim and final requirements contained in any compliance
603 schedule, if one is required by the administrator, shall be submitted no later than 30 days
604 following each schedule date;

605
606 (R) Any noncompliance with a permit condition or malfunction of
607 the injection system which may cause fluid migration into or between USDWs must be orally
608 reported to the administrator within 24 hours, and a written submission shall be provided within
609 five (5) days of the time the permittee becomes aware of the excursion. The written submission
610 shall contain:

611
612 (I) A description of the noncompliance and its cause;

613
614 (II) The period of noncompliance, including exact dates and
615 times, and, if the noncompliance has not been controlled, the anticipated time it is expected to
616 continue; and

617
618 (III) Steps taken or planned to reduce, eliminate, and prevent
619 reoccurrence of the noncompliance.

620
621 (S) A requirement that the permittee report all instances of
622 noncompliance not already required to be reported under paragraphs (c)(i)(Q) through (R) of this
623 section, at the time monitoring reports are submitted. The reports shall contain the information
624 listed in paragraph (c)(i)(R) of this section;

625
626 (T) A requirement that in the situation where the permittee becomes
627 aware that it failed to submit any relevant facts in a permit application, or submitted incorrect
628 information in a permit application or in any report to the administrator, the permittee shall
629 promptly submit such facts or information;

630

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

635
636 (V) A requirement that the permittee notify the administrator at such
637 times as the permit requires before conversion or abandonment of the facility; and

638
639 (W) A requirement that injection may not commence until
640 construction is complete.

641
642 (X) A requirement that the owner or operator of a Class VI well
643 permitted under this part shall establish mechanical integrity prior to commencing injection or on
644 a schedule determined by the administrator. Thereafter, the owner or operator of Class VI wells
645 must maintain mechanical integrity as defined in Section 13 of this chapter.

646
647 (Y) A requirement that when the administrator determines that a
648 Class VI well lacks mechanical integrity pursuant to Section 13 of this chapter, he/she shall give
649 written notice of his/her determination to the owner or operator.

650
651 (Z) A requirement that, for any Class VI well that lacks mechanical
652 integrity, injection operations are prohibited until the permittee shows to the satisfaction of the
653 administrator under Section 13 that the well has mechanical integrity.

654
655 (AA) A Class VI permit shall include conditions which meet the
656 requirements set forth in Section 16 of this chapter. Where the plan meets the requirements of
657 Section 16 of this chapter, the administrator shall incorporate it into the permit as a permit
658 condition.

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

661
662 (ii) In addition to the conditions required of all permits, the administrator
663 shall establish, on a case-by-case basis, conditions as required for monitoring, schedules of
664 compliance, and such additional conditions as are necessary to prevent the migration of fluids
665 into underground sources of drinking water.

666 **Section 5. Permit application.**

667
668 (a) It is the operator's responsibility to make application for and obtain a permit in
669 accordance with these regulations. Each application must be submitted with all supporting data.

670
671 (b) A complete application for a Class VI well shall include:

672
673 (i) A brief description of the nature of the business and the activities to be
674 conducted that require the applicant to obtain a permit under this chapter.

675
676 (ii) The name, address and telephone number of the operator, and the
677 operator's ownership status and status as a Federal, State, private, public or other entity.
678

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

681
682 (iv) The name, address, and telephone number of the facility. Additionally,
683 the location of the geologic sequestration project shall be identified by section, township, range
684 and county, noting which, if any, sections include Indian lands.

685
686 (v) Within the area of review, a listing and status of all permits or
687 construction approvals associated with the geologic sequestration project received or applied for
688 by the applicant under any of the following programs:

689
690 (A) Hazardous Waste Management under the Resource Conservation
691 and Recovery Act (RCRA).

692
693 (B) UIC Program under the Safe Drinking Water Act.

694
695 (C) National Pollutant Discharge Elimination System (NPDES)
696 under the Clean Water Act.

697
698 (D) Prevention of Significant Deterioration (PSD) program under the
699 Clean Air Act.

700
701 (E) National Emissions Standards for Hazardous Air Pollutants
702 (NESHAPs) pre-construction approval under the Clean Air Act.

703
704 (F) Dredge and fill permits under section 404 of the Clean Water
705 Act.

706
707 (G) Within the area of review, a list of other relevant permits,
708 whether federal or state, associated with the geologic sequestration project that the applicant has
709 been required to obtain, such as construction permits. This includes a statement as to whether or
710 not the facility is within a state approved water quality management plan area, a state approved
711 wellhead protection area or a state approved source water protection area.

712
713 (vi) A map showing the injection well(s) for which a permit is sought and the
714 applicable area of review, consistent with Section 8 of this chapter.

715
716 (A) Within the area of review, the map must show the number, or
717 name and location of all known injection wells, producing wells, abandoned wells, plugged wells
718 or dry holes, deep stratigraphic boreholes, state or EPA approved subsurface cleanup sites, public
719 drinking water supply wellhead or source water protection areas, surface bodies of water, springs,
720 mines (surface and subsurface), quarries, water wells and other pertinent surface features
721 including structures intended for human occupancy, state, tribal, and territory boundaries, and
722 roads.

723
724 (B) Only information of public record is required to be included on
725 this map.

726

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

730
731 (A) A Class VI area of review shall never be less than the area of
732 potentially affected groundwater.

733
734 (B) All areas of review shall be legally described by township, range
735 and section to the nearest ten (10) acres as described under the general land survey system.

736
737 (viii) A description of the general geology of the area to be affected by the
738 injection of carbon dioxide including geochemistry, structure and faulting, fracturing and seals,
739 and stratigraphy and lithology including petrophysical attributes. The description shall also
740 include sufficient information on the geologic structure and reservoir properties of the proposed
741 storage site and overlying formations, including:

742
743 (A) Isopach maps of the proposed injection and confining zone(s), a
744 structural contour map aligned with the top of the proposed injection zone, and at least two
745 geologic cross sections of the area of review reasonably perpendicular to each other and showing
746 the geologic formations from the surface to total depth;

747
748 (B) Location, orientation, and properties of known or suspected
749 faults and fractures that may transect the confining zone(s) in the area of review and a
750 determination that they would not interfere with containment;

751
752 (C) Information on seismic history that have affected the proposed
753 area of review including knowledge of previous seismic events and history of these events, the
754 presence and depth of seismic sources, and a determination that the seismicity would not
755 compromise containment;

756
757 (D) Data sufficient to demonstrate the effectiveness of the injection
758 and confining zone(s), including data on the depth, areal extent, thickness, mineralogy, porosity,
759 vertical permeability and reservoir pressure of the injection and confining zone(s) within the area
760 of review, and geologic changes based on field data which may include geologic cores, outcrop
761 data, seismic surveys, well logs, capillary pressure tests and names and lithologic descriptions;

762
763 (E) Geomechanical information on fractures, stress, ductility, rock
764 strength, and in situ fluid pressures within the confining zone; and

765
766 (F) Geologic and topographic maps and cross sections illustrating
767 regional geology, hydrogeology, and the geologic structure of the local area.

768
769 (ix) A compilation of all wells and other drill holes within, and adjacent
770 (within 1 mile) to the area of review. Such data must include a description of each well and drill
771 hole type, construction, date drilled, location, depth, record of plugging and/or completion, and
772 any additional information the administrator may require.

773

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

777
778 (B) Applicants shall perform mapping with sufficient resolution as to
779 make a comprehensive effort to identify wells that are not in the public record using aerial
780 photography, aerial survey, physical traverse, or other methods acceptable to the administrator.

781
782 (C) Applicants shall perform corrective action as specified in Section
783 8.

784
785 (x) Maps and stratigraphic cross sections indicating the general vertical and
786 lateral limits of all USDWs, the location of water wells and springs within the area of review,
787 their positions relative to the injection zone(s), and the direction of water movement, where
788 known;

789
790 (xi) A characterization of the injection zone and aquifers above and below
791 the injection zone which may be affected, including applicable pressure and fluid chemistry data
792 to describe the projected effects of injection activities, and background water quality data which
793 will facilitate the classification of any groundwaters which may be affected by the proposed
794 discharge. This must include information necessary for the division to classify the receiver and
795 any secondarily affected aquifers under Chapter 8, Wyoming Water Quality Rules and
796 Regulations;

797 (xii) Baseline geochemical data on subsurface formations, including all
798 USDWs in the area of review.

799
800 (xiii) Proposed operating data:

801
802 (A) Average and maximum daily rate and volume and/or mass and
803 total anticipated volume and/or mass of the carbon dioxide stream;

804
805 (B) Average and maximum surface injection pressure;

806
807 (C) The source of the carbon dioxide stream; and

808
809 (D) An analysis of the chemical and physical characteristics of the
810 carbon dioxide stream and any other substance(s) proposed for inclusion in the injectate stream;
811 and

812
813 (E) Anticipated duration of the proposed injection period(s).

814
815 (xiv) The compatibility of the carbon dioxide stream with fluids in the
816 injection zone and minerals in both the injection and the confining zone(s), based on the results of
817 the formation testing program, and with the materials used to construct the well;

818
819 (xv) An assessment of the impact to fluid resources, on subsurface structures
820 and the surface of lands that may reasonably be expected to be impacted, and the measures
821 required to mitigate such impacts;

822

- 823 (xvi) Proposed formation testing program to obtain an analysis of the chemical
824 and physical characteristics of the injection zone and confining zone and that meets the
825 requirements of Section 11 of this chapter;
826
- 827 (xvii) Proposed stimulation program, a description of stimulation fluids to be
828 used and a determination that stimulation will not compromise containment;
829
- 830 (A) All stimulation programs must be approved by the administrator
831 as part of the permit application and incorporated into the permit.
832
- 833 (xviii) Proposed procedure to outline steps necessary to conduct injection
834 operation;
835
- 836 (xix) A wellbore schematic of the subsurface construction details and surface
837 wellhead construction of the injection and monitoring wells;
838
- 839 (xx) Injection well design and construction procedures that meet the
840 requirements of Section 9;
841
- 842 (xxi) Proposed area of review and corrective action plan that meets the
843 requirements under Section 8;
844
- 845 (xxii) The status of corrective action on wells in the area of review;
846
- 847 (xxiii) All available logging and testing program data on the well(s) required by
848 Section 11;
849
- 850 (xxiv) A demonstration of mechanical integrity pursuant to Section 13;
851
- 852 (xxv) A demonstration, satisfactory to the administrator, that the applicant has
853 met the financial responsibility requirements under Section 19;
854
- 855 (xxvi) Proposed testing and monitoring plan required by Section 14;
856
- 857 (xxvii) Proposed injection and monitoring well(s) plugging plan required by
858 Section 16(b);
859
- 860 (A) Where the plan meets the requirements of Section 16(b) of this
861 chapter, the administrator shall incorporate it into the permit as a permit condition.
862
- 863 (I) For purposes of this subparagraph, temporary or
864 intermittent cessation of injection operations is not abandonment.
865
- 866 (xxviii) Proposed post-injection site care plan required by Section 17(a);
867
- 868 (xxix) At the administrator's discretion, a demonstration of an alternative post-
869 injection site care timeframe required by Section 17 of this chapter;
870
- 871 (xxx) Proposed emergency and remedial response plan required by Section 18;

872
873 (xxxix) A site and facilities description, including a description of the proposed
874 geologic sequestration facilities;

875
876 (xxxix) Documentation sufficient to demonstrate that the applicant has all legal
877 rights, including but not limited to the right to surface use, necessary to sequester carbon dioxide
878 and associated constituents;

879
880 (xxxix) Proof of notice to surface owners, mineral claimants, mineral owners,
881 lessees and other owners of record of subsurface interests as to the contents of such notice.
882 Notice requirements shall at a minimum require:

883
884 (A) The publishing of notice of the application in a newspaper of
885 general circulation in each county of the proposed operation at weekly intervals for four (4)
886 consecutive weeks; and

887
888 (B) A copy of the notice shall also be mailed to all surface owners,
889 mineral claimants, mineral owners, lessees and other owners of record of subsurface interests that
890 are located within one (1) mile of the proposed boundary of the geologic sequestration site as
891 defined by W.S. 35-11-103(c)(xxi).

892
893 (xxxix) A list of contacts, submitted to the administrator, for those Tribes
894 identified to be within the area of review of the Class VI project based on information provided in
895 subparagraphs (b)(vi), (b)(vi)(A), and (b)(vi)(B) of this section; and

896
897 (xxxix) Any other information requested by the administrator.

898
899 (c) The administrator shall notify, in writing, any Tribes within the area of review of
900 the Class VI project based on information provided in subparagraphs (b)(vi), (b)(vi)(A),
901 (b)(vi)(B), and (b)(xxxix) of this section.

902
903 (d) Prior to granting approval for the operation of a Class VI well, the administrator
904 shall consider the following information:

905
906 (i) The final area of review based on modeling, using data obtained during
907 logging and testing of the well and the formation as required by subparagraphs (b)(xiv), (b)(xvii),
908 (b)(xxiii), and (b)(xxiv) of this section;

909
910 (ii) Any relevant updates, based on data obtained during logging and testing
911 of the well and the formation as required by subparagraphs (b)(xiv), (b)(xvii), (b)(xxiii), and
912 (b)(xxiv) of this section, to the information on the geologic structure and hydrogeologic
913 properties of the proposed storage site and overlying formations, submitted to satisfy the
914 requirements of subparagraph (b)(viii) of this section;

915
916 (iii) The results of the formation testing program as required in paragraph
917 (b)(xvi) of this section;

918
919 (iv) Final injection well construction procedures that meet the requirements
920 of Section 9 of this chapter;

921
922 (v) Any updates to the proposed area of review and corrective action plan,
923 testing and monitoring plan, injection well plugging plan, post-injection site care and site closure
924 plan, or the emergency and remedial response plan submitted under paragraph (a) of this section,
925 which are necessary to address new information collected during logging and testing of the well
926 and the formation as required by all paragraphs of this section, and any updates to the alternative
927 post-injection site care timeframe demonstration submitted under paragraph (a) of this section,
928 which are necessary to address new information collected during the logging and testing of the
929 well and the formation as required by all paragraphs of this section; and
930

931 (vi) Owners or operators seeking a waiver of the requirement to inject below
932 the lowermost USDW must also refer to Section 10 of this chapter and submit a supplemental
933 report, as required at Section 10(a). The supplemental report is not part of the permit application.
934

935 (e) An applicant applying for a Class VI well permit must obtain public liability
936 insurance to cover the geologic sequestration activities for which a permit is sought.
937

938 (i) The public liability insurance shall be in addition to the financial
939 assurance required in Section 19 of this chapter.
940

941 (ii) The insurance policy shall provide for personal injury and property
942 damage protection and shall be in place until a completion and release certificate has been
943 obtained from the administrator certifying that plume stabilization has been achieved.
944

945 (iii) The minimum insurance coverage for public liability insurance as
946 required by W.S. §35-11-313(f)(ii)(O) shall be five hundred thousand dollars (\$500,000) for each
947 occurrence of bodily injury or property damage, and one million dollars (\$1,000,000) aggregate.
948

949 (iv) The public liability insurance shall include a rider requiring that the
950 insurer notify the administrator whenever substantive changes are made to the policy, including
951 any termination or failure to renew.
952

953 (v) Self-insurance in lieu of public liability insurance must meet state or
954 federal requirements and be approved by the administrator.
955

956 (f) All applications for permits, reports, or information to be submitted to the
957 administrator shall be signed by a responsible officer as follows:
958

959 (i) For a corporation - a responsible corporate officer means:
960

961 (A) A president, secretary, treasurer, or vice president of the
962 corporation in charge of a principal business function, or any other person who performs similar
963 policy or decision making functions for the corporation; or
964

965 (B) The manager of one or more manufacturing, production, or
966 operating facilities employing more than 250 persons or having gross annual sales or expendi-
967 tures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has
968 been assigned or delegated to the manager in accordance with corporate procedures.
969

970 (ii) For a partnership or sole proprietorship -- by a general partner or the
971 proprietor, respectively;

972
973 (iii) For a municipality, state, federal or other public agency -- by either the
974 principal executive officer or ranking elected official.

975
976 (g) The application shall contain the following certification by the person signing the
977 application:

978
979 "I certify under penalty of law that this document and all attachments were prepared
980 under my direction or supervision in accordance with a system designed to ensure that qualified
981 personnel properly gather and evaluate the information submitted. Based on my inquiry of the
982 person or persons who manage the system, or those persons directly responsible for gathering the
983 information, the information submitted is, to the best of my knowledge and belief, true, accurate,
984 and complete. I am aware that there are significant penalties for submitting false information,
985 including the possibility of fine and imprisonment for knowing violations."

986
987 (h) All data used to complete permit applications shall be kept by the applicant for
988 for the life of the geologic sequestration project and for 10 years following site closure.

989 **Section 6. Prohibitions.**

990
991 (a) In addition to the requirements in W.S. 35-11-301(a), no person shall:

992
993 (i) Discharge into, construct, operate, or modify any Class VI well unless
994 permitted pursuant to this chapter;

995
996 (ii) Discharge to any zone except the authorized discharge zone as described
997 in the permit;

998
999 (iii) Conduct any authorized injection activity in a manner that results in a
1000 violation of any permit condition, representations made in the application, or the request for
1001 coverage under the individual permit. A permit condition supersedes any application content.

1002
1003 (b) No person shall inject any hazardous waste that has been banned from land
1004 disposal pursuant to Chapter 1, Wyoming Hazardous Waste Rules.

1005
1006 (c) The construction of new, or operation or maintenance of any existing Class V
1007 wells for non-experimental geologic sequestration is prohibited.

1008
1009 (d) Other than EPA approved aquifer exemption expansions that meet the criteria set
1010 forth in Wyoming Oil and Gas Conservation Commission Rules and Regulations, Chapter 4,
1011 Section 12, new aquifer exemptions shall not be issued for Class VI injection wells. Even if an
1012 aquifer has not been specifically identified by the administrator, it is an underground source of
1013 drinking water if it meets the definition in Section 2 of this chapter.

1014 **Section 7. Minimum criteria for siting Class VI wells.**

1015

1016 (a) Owners or operators of Class VI wells must demonstrate to the satisfaction of the
1017 administrator that the wells will be sited in areas with a suitable geologic system. The geologic
1018 system must be comprised of:

1019
1020 (i) An injection zone of sufficient areal extent, thickness, porosity, and
1021 permeability to receive the total anticipated volume of the carbon dioxide stream; and
1022

1023 (ii) A confining zone(s) that is free of transmissive faults or fractures and of
1024 sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced
1025 formation fluids and allow injection at proposed maximum pressures and volumes without
1026 initiating or propagating fractures in the confining zone(s) or causing non-transmissive faults to
1027 become transmissive.
1028

1029 (b) Owners or operators of Class VI wells must identify and characterize additional
1030 zones, if they exist, that will impede vertical fluid movement, allow for pressure dissipation, and
1031 provide additional opportunities for monitoring, mitigation and remediation. Vertical faults and
1032 fractures that transect these zones must be identified.

1033 **Section 8. Area of review delineation and corrective action.**

1034
1035 (a) The area of review is based on computational modeling that accounts for the
1036 physical and chemical properties of all phases of the injected carbon dioxide stream.
1037

1038 (i) The owner or operator will re-evaluate the area of review at least every
1039 two (2) years during the operational life of the facility, and then no less frequently than every five
1040 (5) years through the post-injection site care period until the geologic sequestration project is
1041 closed in accordance with department rules and regulations.
1042

1043 (b) The owner or operator of a Class VI well must prepare, maintain, and comply
1044 with a plan to delineate the area of review for a proposed geologic sequestration project, re-
1045 evaluate the delineation, and perform corrective action that meets the requirements of this section
1046 and is acceptable to the administrator. As a part of the permit application for approval by the
1047 administrator, the owner or operator must submit an area of review and corrective action plan that
1048 includes the following information:
1049

1050 (i) The method for delineating the area of review that meets the
1051 requirements of paragraph (c) of this section, including the name, version and availability of the
1052 model to be used, assumptions that will be made, and the site characterization data on which the
1053 model will be based;
1054

1055 (ii) A description of:
1056

1057 (A) The monitoring and operational conditions that would warrant a
1058 re-evaluation of the area of review prior to the next scheduled re-evaluation as determined by the
1059 minimum fixed frequency established in paragraph (a)(i) of this section.
1060

1061 (B) How monitoring and operational data (e.g., injection rate and
1062 pressure) will be used to evaluate the area of review; and
1063

- 1064 (C) How corrective action will be conducted to meet the
1065 requirements of paragraph (d) of this section, including:
1066
1067 (I) What corrective action will be performed prior to
1068 injection;
1069
1070 (II) What, if any, portions of the area of review will have
1071 corrective action addressed on a phased basis, and how the phasing will be determined;
1072
1073 (III) How corrective action will be adjusted if there are
1074 changes in the area of review; and
1075
1076 (IV) How site access will be ensured for future corrective
1077 action.
1078
1079 (c) Owners or operators of Class VI wells must perform the following actions to
1080 delineate the area of review, identify all wells that require corrective action, and perform
1081 corrective action on those wells:
1082
1083 (i) Predict, using computational modeling:
1084
1085 (A) The projected lateral and vertical migration of the carbon dioxide
1086 plume and formation fluids in the subsurface from the commencement of injection activities until
1087 the plume movement ceases;
1088 (B) The pressure differentials, and demonstrate that pressure
1089 differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW
1090 or to otherwise threaten human health, safety, or the environment will not be present (or for a
1091 fixed time period as determined by the administrator);
1092
1093 (C) The potential need for brine removal, and;
1094
1095 (D) The long-term effects of pressure buildup if brine is not
1096 removed.
1097
1098 (ii) The modeling must:
1099
1100 (A) Be based on:
1101
1102 (I) Detailed geologic data available or collected to
1103 characterize the injection zone, confining zone and any additional zones; and
1104
1105 (II) Anticipated operating data, including injection pressures,
1106 rates and total volumes over the proposed operational life of the facility.
1107
1108 (B) Take into account any relevant geologic heterogeneities, data
1109 quality, and their possible impact on model predictions; and
1110
1111 (C) Consider potential migration through faults, fractures, and
1112 artificial penetrations.

- 1113
1114 (iii) Using methods approved by the administrator, identify all penetrations,
1115 including active and abandoned wells and underground mines, in the area of review that may
1116 penetrate the confining zone. Provide a description of each well's type, construction, date drilled,
1117 location, depth, record of plugging and/or completion, and any additional information the
1118 administrator may require; and
1119
- 1120 (iv) Determine which abandoned wells in the area of review have been
1121 plugged in a manner that prevents the movement of:
1122
- 1123 (A) Carbon dioxide that may endanger USDWs or otherwise threaten
1124 human health, safety, or the environment, or;
1125
- 1126 (B) Displaced formation fluids that may endanger USDWs or
1127 otherwise threaten human health, safety, or the environment.
1128
- 1129 (d) Owners or operators of Class VI wells must perform corrective action on all
1130 wells in the area of review that are determined to need corrective action using methods necessary
1131 to prevent the movement of fluid into or between USDWs including use of materials compatible
1132 with the carbon dioxide stream, where appropriate.
1133
- 1134 (e) At a fixed frequency, not to exceed two (2) years during the operational life of
1135 the facility, or five (5) years during the post-injection site care period (until the geologic
1136 sequestration project is closed) as specified in the area of review and corrective action plan, or
1137 when monitoring and operational conditions warrant, owners or operators must:
1138
- 1139 (i) Re-evaluate the area of review in the same manner specified in paragraph
1140 (c)(i) of this section;
1141
- 1142 (ii) Identify all wells in the re-evaluated area of review that require
1143 corrective action in the same manner specified in paragraph (c)(iv) of this section;
1144
- 1145 (iii) Perform corrective action on wells requiring corrective action in the
1146 reevaluated area of review in the same manner specified in paragraph (d) of this section; and
1147
- 1148 (iv) Submit an amended area of review and corrective action plan or
1149 demonstrate to the administrator through monitoring data and modeling results that no change to
1150 the area of review and corrective action plan is needed.
1151
- 1152 (A) Any amendments to the area of review and corrective action plan
1153 must be approved by the administrator;
1154
- 1155 (B) Any amendments to the area of review must be incorporated into
1156 the permit; and
1157
- 1158 (C) Any amendments to the area of review are subject to the permit
1159 modification requirements of Section 4 of this chapter, as appropriate.
1160

1161 (f) The emergency and remedial response plan (as required by Section 18) and a
 1162 demonstration of financial responsibility (as described by Section 19) must account for the entire
 1163 area of review [as modified], regardless of whether or not corrective action in the area of review
 1164 is phased.

1165
 1166 (g) All modeling inputs and data used to support area of review reevaluations under
 1167 paragraph (e) of this section shall be retained for 10 years.

1168 **Section 9. Construction and operation standards for Class VI wells.**

1169
 1170 (a) The owner or operator must ensure that all Class VI wells are designed, at a
 1171 minimum, to the construction standards set forth by the department and the Wyoming oil and gas
 1172 conservation commission, as applicable, and constructed and completed to:

- 1173
 1174 (i) Prevent the movement of fluids into or between USDWs or into any
 1175 unauthorized zones;
 1176
 1177 (ii) Permit the use of appropriate testing devices and workover tools; and
 1178
 1179 (iii) Permit continuous monitoring of the annulus space between the injection
 1180 tubing and long string casing.

1181
 1182 (b) Casing and cement or other materials used in the construction of each Class VI
 1183 well must have sufficient structural strength and be designed for the life of the well.

1184
 1185 (i) All well materials must be compatible with fluids with which the
 1186 materials may be expected to come into contact, and meet or exceed standards developed for such
 1187 materials by the American Petroleum Institute, ASTM International, or comparable standards
 1188 acceptable to the administrator.

1189
 1190 (ii) The casing and cementing program must be designed to prevent the
 1191 movement of fluids into or between USDWs.

1192
 1193 (iii) In order to allow the administrator to determine and specify casing and
 1194 cementing requirements, the owner or operator must provide the following information:

- 1195
 1196 (A) Depth to the injection zone;
 1197
 1198 (B) Injection pressure, external pressure, internal pressure and axial
 1199 loading;
 1200
 1201 (C) Hole size;
 1202
 1203 (D) Size and grade of all casing strings (wall thickness, external
 1204 diameter, nominal weight, length, joint specification and construction material), including
 1205 whether the casing is new, or used;
 1206
 1207 (E) Composition of the carbon dioxide stream and formation fluids;
 1208

- 1209 (F) Down-hole temperatures and pressures;
1210
1211 (G) Lithology of injection and confining zones;
1212
1213 (H) Type or grade of cement and additives; and
1214
1215 (I) Quantity, chemical composition, and temperature of the carbon
1216 dioxide stream.
1217
1218 (iv) Casing must extend through the base of the lowermost USDW above the
1219 injection zone and be cemented to the surface through the use of a single or multiple strings of
1220 casing and cement.
1221
1222 (v) At least one long string casing, using a sufficient number of centralizers,
1223 must be set in a manner so as to create a cement bond through the overlying and/or underlying
1224 confining zones(s). The long string casing must extend to the injection zone, must be cemented
1225 by circulating cement to the surface in one or more stages, and must be isolated by placing
1226 cement and/or other isolation techniques as necessary to provide adequate isolation of the
1227 injection zone and provide for protection of USDWs, human health, safety, and the environment.
1228
1229 (A) Circulation of cement may be accomplished by staging. The
1230 administrator may approve an alternative method of cementing in cases where the cement cannot
1231 be recirculated to the surface, provided the owner or operator can demonstrate by using logs that
1232 the cement does not allow fluid movement behind the well bore.
1233
1234 (vi) Cement and cement additives must be suitable for use with the carbon
1235 dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity
1236 over the operating life of the well.
1237
1238 (vii) The integrity and location of the cement shall be verified using
1239 technology capable of evaluating cement quality radially with sufficient resolution to identify the
1240 location of channels, voids, or other areas of missing cement to ensure that USDWs are not
1241 endangered and that human health, safety, and the environment are protected.
1242
1243 (c) All owner and operators of Class VI wells must inject fluids through tubing with
1244 a packer set at a depth opposite a cemented interval at the location approved by the administrator.
1245
1246 (i) Tubing and packer materials used in the construction of each Class VI
1247 well must be compatible with fluids with which the materials may be expected to come into
1248 contact and must meet or exceed standards developed for such materials by the American
1249 Petroleum Institute, ASTM International, or comparable standards acceptable to the
1250 administrator.
1251
1252 (ii) In order for the administrator to determine and specify requirements for
1253 tubing and packer, the owner or operator must submit the following information:
1254
1255 (A) Depth of setting;
1256

- 1257 (B) Characteristics of the carbon dioxide stream (e.g., chemical
1258 content, corrosiveness, temperature, and density) and formation fluids;
- 1259
- 1260 (C) Maximum proposed injection pressure;
- 1261
- 1262 (D) Maximum proposed annular pressure;
- 1263
- 1264 (E) Maximum proposed injection rate (intermittent or continuous)
1265 and volume of the carbon dioxide stream;
- 1266
- 1267 (F) Size of tubing and casing; and
- 1268
- 1269 (G) Tubing tensile, burst, and collapse strengths.

1270 **Section 10. Class VI Injection Depth Waiver Requirements**

1271
1272 (a) The owner and/or operator seeking a waiver of the requirement to inject below
1273 the lowermost USDW shall submit a supplemental report concurrent with the permit application.
1274 The report shall contain the following:

1275
1276 (i) A demonstration that the injection zone(s) is/are laterally continuous, is
1277 not a USDW, and is not hydraulically connected to USDWs; does not outcrop within the area of
1278 review; has adequate injectivity; volume, and sufficient porosity to safely contain the injected
1279 carbon dioxide and formation fluids; and has appropriate geochemistry.

1280
1281 (ii) A demonstration that the injection zone(s) is/are bounded by laterally
1282 continuous, impermeable confining units above and below the injection zone(s) adequate to
1283 prevent fluid movement and pressure buildup outside of the injection zone(s); and that the
1284 confining unit(s) is/are free of transmissive faults and fractures. The report shall further
1285 characterize the regional fracture properties and contain a demonstration that the fractures will
1286 not interfere with injection, serve as conduits, or endanger USDWs.

1287
1288 (iii) A computer model demonstrating that USDWs above and below the
1289 injection zone will not be endangered as a result of fluid movement. The modeling shall be done
1290 in conjunction with the area of review determination, as described in Section 8 of this chapter,
1291 and is subject to requirements, as described in Section 8(c) of this chapter, and periodic
1292 reevaluation, as described in Section 8(e) of this chapter.

1293
1294 (iv) A demonstration that well design and construction, in conjunction with
1295 the waiver, will ensure isolation of the injectate in lieu of the requirements of Section 9 (a)(i) and
1296 will meet the well construction requirements of paragraph (e) if this section.

1297
1298 (v) A description of how the monitoring and testing and any additional plans
1299 will be tailored to this geologic sequestration project to ensure protection of USDWs above and
1300 below the injection zone.

1301
1302 (vi) Information on the location of all public water supplies affected,
1303 reasonably likely to be affected, or served by USDWs in the area of review.

1304

- 1305 (vii) Any other information requested by the administrator.
1306
- 1307 (b) To inform the EPA regional administrator’s decision on whether to grant a
1308 waiver of the injection depth requirements of 40 CFR §§ 144.6, 146.5(f), and 146.86(a)(1), the
1309 administrator must submit, to the EPA regional administrator, documentation of the following:
1310
- 1311 (i) An evaluation of the following information as it relates to siting,
1312 construction, and operation of a geologic sequestration project with a waiver:
1313
- 1314 (A) The integrity of the upper and lower confining units;
1315
- 1316 (B) The suitability of the injection zone(s) (e.g., lateral continuity;
1317 lack of transmissive faults and fractures; knowledge of current or planned artificial penetrations
1318 into the injection zone(s) or formations below the injection zone);
1319
- 1320 (C) The potential capacity of the geologic formation(s) to sequester
1321 carbon dioxide, accounting for the availability of alternative injection sites;
1322
- 1323 (D) All other site characterization data, the proposed emergency and
1324 remedial response plan, and a demonstration of financial responsibility;
1325
- 1326 (E) Community needs, demands, and supply from drinking water
1327 resources;
1328
- 1329 (F) Planned needs, potential and/or future use of USDWs and non-
1330 USDWs in the area;
1331
- 1332 (G) Planned or permitted water, hydrocarbon, or mineral resource
1333 exploitation potential of the proposed injection formation(s) and other formations both above and
1334 below the injection zone to determine if there are any plans to drill through the formation to
1335 access resources in or beneath the proposed injection zone(s)/formation(s);
1336
- 1337 (H) The proposed plan for securing alternative resources or treating
1338 USDW formation waters in the event of contamination related to the Class VI injection activity;
1339 and,
- 1340 (ii) Any other applicable considerations or information requested by the
1341 administrator.
1342
- 1343 (iii) Consultation with the Public Water System Supervision Directors of all
1344 States and Tribes having jurisdiction over lands within the area of review of a well for which a
1345 waiver is sought.
1346
- 1347 (iv) Any written waiver-related information submitted by the Public Water
1348 System Supervision Director(s) to the (UIC) Director.
1349
- 1350 (c) Concurrent with the Class VI permit application public notice process, the
1351 administrator shall give public notice that an injection depth waiver request has been submitted.
1352 The notice shall clearly state:
1353

- 1354 (i) The depth of the proposed injection zone(s).
1355
1356 (ii) The location of the injection wells.
1357
1358 (iii) The name and depth of all USDWs within the area of review.
1359
1360 (iv) A map of the area of review.
1361
1362 (v) The names of any public water supplies affected, reasonably likely to be
1363 affected, or served by the USDWs in the area of review.
1364
1365 (vi) The results of any consultation between the UIC program and the Public
1366 Water System Supervision program within the area of review.
1367
1368 (d) Following the injection depth waiver application public notice, the administrator
1369 of the Water Quality Division of the Department of Environmental Quality shall provide all the
1370 information received through the waiver application process to the US EPA regional
1371 administrator. Based on the information provided, the US EPA regional administrator shall
1372 provide written concurrence or non-concurrence regarding waiver issuance.
1373
1374 (i) If the US EPA regional administrator requires additional information to
1375 make a decision, the administrator of the Water Quality Division of the Department of
1376 Environmental Quality shall provide the information. The US EPA regional administrator may
1377 require public notice of the new information.
1378
1379 (ii) In no case shall the administrator of a State-approved program issue a
1380 depth injection waiver without receipt of written concurrence from the US EPA Administrator.
1381
1382 (e) If an injection depth waiver is issued, within thirty (30) days of issuance, the
1383 EPA shall post the following information on the Office of Water's website:
1384
1385 (i) The depth of the proposed injection zone(s).
1386
1387 (ii) The location of the injection wells.
1388
1389 (iii) The name and depth of all USDWs within the area of review.
1390
1391 (iv) A map of the area of review.
1392
1393 (v) The names of any public water supplies affected, reasonably likely to be
1394 affected, or served by the USDWs in the area of review.
1395
1396 (vi) The date of waiver issuance.
1397
1398 (f) Upon receipt of a waiver of the requirement to inject below the lowermost
1399 USDW for geologic sequestration, the owner or operator of a Class VI well must comply with the
1400 following:
1401 (i) All requirements of Sections 8, 11, 12, 13, 15, 16, 18, and 19 of this
1402 chapter.

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(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 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 of 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 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;

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

Section 11. Logging, sampling, and testing prior to injection well operation.

1451 (a) During the drilling and construction of a Class VI injection well, the owner or
1452 operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness,
1453 porosity, permeability, and lithology of, and the salinity of any formation fluids within, for all
1454 relevant geologic formations in order to ensure conformance with the injection well construction
1455 requirements under Section 9, and to establish accurate baseline data against which future
1456 measurements may be compared.

1457
1458 (i) The owner or operator must submit to the administrator a descriptive
1459 report prepared by a knowledgeable log analyst that includes an interpretation of the results of
1460 such logs and tests. At a minimum, such logs and tests must include:

1461 (A) Deviation checks measured during drilling on all holes
1462 constructed by drilling a pilot hole that is subsequently enlarged by reaming or another method.
1463 Such checks must be at sufficiently frequent intervals to determine the location of the borehole
1464 and to ensure that vertical avenues for fluid movement in the form of diverging holes are not
1465 created during drilling; and
1466

1467 (B) Before and upon installation of the surface casing:

1468 (I) Resistivity, spontaneous potential, and caliper logs
1469 before the casing is installed; and
1470

1471 (II) A cement bond, variable density log, or other approved
1472 device to evaluate cement quality radially with sufficient resolution to identify channels, voids, or
1473 other areas of missing cement, and a temperature log, after the casing is set and cemented.
1474

1475 (C) Before and upon installation of the long string casing:

1476 (I) Resistivity, spontaneous potential, porosity, caliper,
1477 gamma ray, fracture finder logs, and any other logs the administrator requires for the given
1478 geology before the casing is installed; and
1479

1480 (II) A cement bond and variable density log, and a
1481 temperature log after the casing is set and cemented.
1482

1483 (D) Test(s) designed to demonstrate the internal and external
1484 mechanical integrity of injection wells, which may include:
1485

1486 (I) A pressure test with liquid or gas;
1487

1488 (II) Diagnostic tools, such as oxygen-activation logging;
1489

1490 (III) A temperature or noise log; and
1491

1492 (IV) A casing inspection log.
1493

1494 (E) Any alternative methods that provide equivalent or better
1495 information and that are required of, and/or approved by the administrator.
1496

1497
1498
1499

1500 (b) The owner or operator must take whole cores or sidewall cores of the injection
1501 zone and confining system, and formation fluid samples from the injection zone(s) and submit to
1502 the administrator a detailed report prepared by a log analyst that includes:

- 1503
1504 (i) Well log analyses (including well logs);
1505
1506 (ii) Core analyses; and
1507
1508 (iii) Formation fluid sample information.

1509
1510 (i) (iv) The Administrator may accept data from cores and fluid samples from
1511 nearby wells if the owner or operator can demonstrate that such data are representative of
1512 conditions in the wellbore.

1513 (c) Prior to injection well operation, the owner or operator must record the formation
1514 fluid temperature, formation fluid pH and conductivity, reservoir pressure, and static fluid level of
1515 the injection zone(s).

1516
1517 (d) At any time prior to injection well operation, the owner or operator must
1518 determine fracture pressures of the injection and confining zones and verify hydrogeologic and
1519 geo-mechanical characteristics of the injection zone by conducting the following tests:

- 1520
1521 (i) A pressure fall-off test; and,
1522
1523 (ii) A pump test; or
1524
1525 (iii) Injectivity tests.

1526
1527 (e) The owner or operator must provide the administrator with the opportunity to
1528 witness all logging and testing by this subpart.

1529
1530 (i) The owner or operator must submit a schedule of such activities to the
1531 administrator upon spudding the well and notify the administrator of any changes to the schedule
1532 at least thirty (30) days prior to the scheduled test.

1533 **Section 12. Injection well operating requirements.**

1534
1535 (a) The owner or operator must ensure that injection pressure does not exceed 90
1536 percent of the fracture pressure of the injection zone(s) so as to ensure that the injection does not
1537 initiate new fractures or propagate existing fractures in the injection zone(s). In no case may
1538 injection pressure cause movement of injection or formation fluids in a manner that endangers a
1539 USDW, or otherwise threatens human health, safety, or the environment.

1540
1541 (i) In no case may injection pressure initiate fractures in the confining
1542 zone(s) or cause the movement of injectate or formation fluids that endangers a USDW or
1543 otherwise threatens human health, safety, or the environment.

1544
1545 (b) Injection of the carbon dioxide stream between the outermost casing protecting
1546 USDWs and the well bore is prohibited.
1547

1548 (c) The owner or operator must fill the annulus between the tubing and the long
1549 string casing with a non-corrosive fluid approved by the administrator.

1550
1551 (i) The owner or operator must maintain on the annulus a pressure that
1552 exceeds the operating injection pressure, unless the administrator determines that such
1553 requirement might harm the integrity of the well or endanger USDWs.

1554
1555 (d) Other than during periods of well workover (maintenance) approved by the
1556 administrator in which the sealed tubing-casing annulus is, by necessity, disassembled for
1557 maintenance or corrective procedures, the owner or operator must maintain mechanical integrity
1558 of the injection well at all times.

1559
1560 (e) The owner or operator must install and use continuous recording devices to
1561 monitor:

1562
1563 (i) Injection pressure; and

1564
1565 (ii) Rate, volume, and temperature of the carbon dioxide stream.

1566
1567 (f) The owner or operator must install and use continuous recording devices to
1568 monitor the pressure on the annulus between the tubing and the long string casing and annulus
1569 fluid volume.

1570
1571 (g) The owner or operator must install, test, and use alarms and automatic surface
1572 shut-off systems, or at the discretion of the administrator use down-hole shut-off systems (e.g.,
1573 automatic shut-off, check valves), or other mechanical devices that provide equivalent protection,
1574 designed to alert the operator and shut-in the well when operating parameters such as injection
1575 rate, injection pressure, or other parameters approved by the administrator diverge beyond ranges
1576 and/or gradients specified in the permit.

1577
1578 (h) If an automatic shutdown is triggered or a loss of mechanical integrity is
1579 discovered, the owner or operator must immediately investigate and identify as expeditiously as
1580 possible the cause.

1581
1582 (i) If, upon such investigation, the well appears to be lacking mechanical
1583 integrity, or if monitoring required under paragraphs (e), (f), and (g) of this section otherwise
1584 indicates that the well may be lacking mechanical integrity, the owner or operator must:

1585
1586 (A) Immediately cease injection;

1587
1588 (B) Take all steps reasonably necessary to determine whether there
1589 may have been a release of the injected carbon dioxide stream or formation fluids into any
1590 unauthorized zone;

1591
1592 (C) Notify the administrator within 24 hours;

1593
1594 (D) Restore and demonstrate mechanical integrity to the satisfaction
1595 of the administrator as soon as practicable and prior to resuming injection; and

1596

1597 (E) Notify the administrator when injection can be expected to
 1598 resume.

1599 **Section 13. Mechanical integrity.**

- 1600 (a) A Class VI well has mechanical integrity if:
- 1601 (i) There is no significant leak in the casing, tubing or packer; and
- 1602 (ii) There is no significant fluid movement into a USDW through channels
 1603 adjacent to the injection well bore.
- 1604 (b) To evaluate the absence of significant leaks under paragraph (a)(i) of this section,
 1605 owners or operators must, following an initial annulus pressure test, continuously monitor
 1606 injection pressure, rate, injected volumes, and pressure on the annulus between tubing and long
 1607 string casing and annulus fluid volume as specified in Section 12 (e) and (f);
- 1608 (c) At least once per year, the owner or operator must use one of the following
 1609 methods to determine the absence of significant fluid movement under subparagraph (a)(ii) of this
 1610 section:
- 1611 (i) An approved tracer survey such as an oxygen-activation log; or
- 1612 (ii) A temperature or noise log.
- 1613 (d) If required by the administrator, at a frequency specified in the testing and
 1614 monitoring plan required in Section 14 of this chapter, the owner or operator must run a casing
 1615 inspection log to determine the presence or absence of corrosion in the long-string casing.
- 1616 (e) The administrator may require any other test to evaluate mechanical integrity
 1617 under paragraph (a)(i) or (a)(ii) of this section. Also, the administrator may allow the use of a test
 1618 to demonstrate mechanical integrity other than those listed above, with the written approval of the
 1619 US EPA regional administrator.
- 1620 (i) To obtain approval, the administrator must submit a written request to
 1621 the US EPA regional administrator that must set forth the proposed test and all technical data
 1622 supporting its use.
- 1623 (f) In conducting and evaluating the tests enumerated in this section or others to be
 1624 allowed by the administrator, the owner or operator and the administrator must apply methods
 1625 and standards generally accepted in the industry.
- 1626 (i) When the owner or operator reports the results of mechanical integrity
 1627 tests to the administrator, he/she shall include a description of the test(s) and the method(s) used.
- 1628 (ii) In making his/her evaluation, the administrator must review monitoring
 1629 and other test data submitted since the previous evaluation.
- 1630 (g) The administrator may require additional or alternative tests if the results
 1631 presented by the owner or operator under paragraph (e) of this section are not satisfactory to the
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1645 administrator to demonstrate that there is no significant leak in the casing, tubing or packer, or
 1646 significant movement of fluid into or between USDWs resulting from the injection activity as
 1647 stated in paragraphs (a)(i) and (a)(ii) of this section.

1648 **Section 14. Testing and monitoring requirements.**

1649 (a) The owner or operator of a Class VI well must prepare, maintain, and comply
 1650 with a testing and monitoring plan to verify that the geologic sequestration project is operating as
 1651 permitted and is not endangering USDWs.
 1652

1653 (i) The requirement to maintain and implement an approved plan is directly
 1654 enforceable regardless of whether the requirement is a condition of the permit.
 1655

1656 (ii) The testing and monitoring plan must be submitted with the permit
 1657 application, for administrator approval, and must include a description of how the owner or
 1658 operator will meet the requirements of this section, including accessing sites for all necessary
 1659 monitoring and testing during the life of the project.
 1660

1661 (b) Testing and monitoring associated with geologic sequestration projects must, at a
 1662 minimum, include:
 1663

1664 (i) Plans and procedures for environmental surveillance and excursion
 1665 detection, prevention and control programs, including a monitoring plan to:
 1666

1667 (A) Assess the migration of the injected carbon dioxide; and
 1668

1669 (B) Insure the retention of the carbon dioxide in the geologic
 1670 sequestration site.
 1671

1672 (C) For purposes of this section, “excursion” shall mean the
 1673 detection of migrating carbon dioxide at or beyond the boundary of the geologic sequestration site
 1674 as defined in W.S. 35-11-103(c).
 1675

1676 (ii) Analysis of the carbon dioxide stream with sufficient frequency to yield
 1677 data representative of its chemical and physical characteristics;
 1678

1679 (iii) Installation and use, except during well workovers, of continuous
 1680 recording devices to monitor:
 1681

1682 (A) Injection pressure,
 1683

1684 (B) Rate and volume;
 1685

1686 (C) Pressure on the annulus between the tubing and the long string
 1687 casing; and
 1688

1689 (D) The annulus fluid volume added.
 1690

1691

- 1692 (E) The pressure on the annulus between the tubing and the long
1693 string casing.
1694
- 1695 (iv) Corrosion monitoring of the well materials for loss of mass, thickness,
1696 cracking, pitting and other signs of corrosion must be performed and recorded at least quarterly
1697 to ensure that the well components meet the minimum standards for material strength and
1698 performance set forth in Section 9(b) by:
1699
- 1700 (A) Analyzing coupons of the well construction materials placed in
1701 contact with the carbon dioxide stream; or
1702
- 1703 (B) Routing the carbon dioxide stream through a loop constructed
1704 with the material used in the well and inspecting the materials in the loop; or
1705
- 1706 (C) Using an alternative method, materials, or time period approved
1707 by the administrator.
1708
- 1709 (v) Periodic monitoring of the reservoir fluid quality in a permeable and
1710 porous formation as near as practicable to the confining zone(s) for geochemical changes that
1711 may be a result of carbon dioxide or displaced formation fluid movement:
1712
- 1713 (A) The location and number of monitoring wells must be based on
1714 specific information about the geologic sequestration project, including injection rate and volume,
1715 geology, the presence of artificial penetrations and other relevant factors; and
1716
- 1717 (B) The monitoring frequency and spatial distribution of monitoring
1718 wells based on baseline geochemical data that have been collected under Section 5(b)(xi) and any
1719 modeling results in the area of review evaluation required by Section 8(c).
1720
- 1721 (vi) A demonstration of external mechanical integrity pursuant to Section
1722 13(c) at least once per year until the well is plugged; and if required by the administrator, a casing
1723 inspection log pursuant to requirements of Section 13(d) of this chapter at a frequency established
1724 in the testing and monitoring plan;
1725
- 1726 (vii) A pressure fall-off test or other equivalent test that identifies reservoir
1727 conditions with respect to flow dynamics at least once every five years unless more frequent
1728 testing is required by the administrator based on site specific information; and
1729
- 1730 (viii) Testing and monitoring to track the extent of the carbon dioxide plume,
1731 the position of the pressure front, and surface displacement by using:
1732
- 1733 (A) Direct methods in the injection zone(s); and
1734
- 1735 (B) Indirect methods (e.g., seismic, electrical, gravity, or
1736 electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the
1737 administrator determines, based on site-specific geology, that such methods are not appropriate;
1738

1739 (ix) At the administrator's discretion, based on site-specific conditions,
1740 surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that
1741 could endanger a USDW, or otherwise threaten human health, safety, or the environment.
1742

1743 (A) The testing and monitoring plan must be based on potential risks
1744 to USDWs, and modeling within the area of review;
1745

1746 (B) The monitoring frequency and spatial distribution of surface air
1747 monitoring and/or soil gas monitoring must reflect baseline data. The monitoring plan must
1748 specify how the proposed monitoring will yield useful information on the area of review
1749 delineation and the potential movement of fluid containing any contaminant into USDWs in
1750 exceedence of any primary drinking water regulation under 40 CFR Part 141, or which may
1751 otherwise adversely affect human health, safety, or the environment.
1752

1753 (x) If an owner or operator demonstrates that monitoring employed under 40
1754 CFR §§98.440 to 98.449 (Clean Air Act, 42 U.S.C. 7401 et seq.) accomplishes the goals of (h)(1)
1755 and (2) of this section, and meets the requirements pursuant to §146.91(c)(5), a Director that
1756 requires surface air/soil gas monitoring must approve the use of monitoring employed under 40
1757 CFR §§98.440 to 98.449. Compliance with §§98.440 to 98.449 pursuant to this provision is
1758 considered a condition of the Class VI permit;
1759

1760 (xi) Any additional monitoring, as required by the administrator, necessary to
1761 support, upgrade, and improve computational modeling of the area of review re-evaluation
1762 required under Section 8(e) and as necessary to demonstrate that there is no movement of fluid
1763 containing any contaminant into underground sources of drinking water in exceedence of any
1764 primary drinking water regulation under 40 CFR Part 141, or which could otherwise adversely
1765 affect human health, safety, or the environment;
1766

1767 (xii) The owner or operator shall periodically review the testing and
1768 monitoring plan to incorporate monitoring data collected under this subpart, operational data
1769 collected under Section 11 of this chapter, and the most recent area of review reevaluation
1770 performed under Section 8 of this chapter. In no case shall the owner or operator review the
1771 testing and monitoring plan less often than once every five years. Based on this review, the owner
1772 or operator shall submit an amended testing and monitoring plan or demonstrate to the
1773 administrator that no amendment to the testing and monitoring plan is needed. Any amendments
1774 to the testing and monitoring plan must be approved by the administrator, must be incorporated
1775 into the permit, and are subject to the permit modification requirements of Section 4 of this
1776 chapter, as appropriate. Amended plans or demonstrations shall be submitted to the administrator
1777 as follows:
1778

1779 (A) Within one year of an area of review reevaluation;
1780

1781 (B) Following any significant changes to the facility, such as
1782 addition of monitoring wells or newly permitted injection wells within the area of review, on a
1783 schedule determined by the administrator; or
1784

1785 (C) When required by the administrator.
1786

1787 (xiii) A quality assurance and surveillance plan for all testing and monitoring
 1788 requirements.

1789 **Section 15. Reporting requirements.**

1790
 1791 (a) The owner or operator must, at a minimum, provide the following reports to the
 1792 administrator, for each permitted Class VI well:

1793
 1794 (i) Semi-annual reports containing:

1795
 1796 (A) Any changes to the physical, chemical and other relevant
 1797 characteristics of the carbon dioxide stream from the proposed operating data;

1798
 1799 (B) Monthly average, maximum and minimum values for injection
 1800 pressure, flow rate and volume, and annular pressure;

1801
 1802 (C) A description of any event that exceeds operating parameters for
 1803 annulus pressure or injection pressure as specified in the permit;

1804
 1805 (D) A description of any event that triggers a shutdown device
 1806 required pursuant to Section 12(g), and the response taken;

1807
 1808 (E) The monthly volume of the carbon dioxide stream injected over
 1809 the reporting period and project cumulatively;

1810 (F) Monthly annulus fluid volume added; and

1811
 1812 (G) The results of monitoring prescribed under Section 14.

1813
 1814 (ii) Report, within 30 days the results of:

1815
 1816 (A) Periodic tests of mechanical integrity;

1817
 1818 (B) Any other test of the injection well conducted by the permittee if
 1819 required by the administrator; and

1820
 1821 (C) Any well workover.

1822
 1823 (iii) Report, within 24 hours:

1824
 1825 (A) Any evidence that the injected carbon dioxide stream or
 1826 associated pressure front may cause an endangerment to a USDW;

1827
 1828 (B) Any noncompliance with a permit condition, or malfunction of
 1829 the injection system, which may cause fluid migration into or between USDWs;

1830
 1831 (C) Any triggering of a shut-off system (i.e., down-hole or at the
 1832 surface);

1833

1834 (D) Pursuant to compliance with the requirement at Section 14(b)(x)
1835 of this chapter for surface air/soil gas monitoring or other monitoring technologies, if required by
1836 the administrator, any release of carbon dioxide to the atmosphere or biosphere.

1837
1838 (iv) Owners or operators must notify the administrator in writing 30 days in
1839 advance of:

1840
1841 (A) Any planned well workover;

1842
1843 (B) Any planned stimulation activities, other than stimulation for
1844 formation testing conducted under Section 5 of this chapter; and

1845
1846 (C) Any other planned test of the injection well conducted by the
1847 permittee.

1848
1849 (b) Reports required by the permit shall be submitted to the administrator within 30
1850 days following the end of the period covered in the report.

1851
1852 (c) Owners or operators must submit all required reports, submittals, and
1853 notifications to both the administrator and to EPA, in an electronic format acceptable to the EPA.

1854
1855 (d) The permittee shall submit a written report to the administrator of all remedial
1856 work concerning the failure of equipment or operational procedures that resulted in a violation of
1857 a permit condition, at the completion of the remedial work.

1858
1859 (e) For any aborted or curtailed operation, a complete report shall be submitted
1860 within 30 days of complete termination of the discharge or associated activity.

1861
1862 (f) The permittee shall retain all monitoring records required by the permit for a
1863 period of ten (10) years following facility closure. The administrator may require the owner or
1864 operator to deliver the records to the administrator at the conclusion of the retention period.

1865 **Section 16. Injection well plugging.**

1866
1867 (a) Prior to the well plugging, the owner or operator must flush each Class VI
1868 injection well with a buffer fluid, determine bottom hole reservoir pressure, and perform a final
1869 external mechanical integrity test in accordance with Section 13.

1870
1871 (b) The owner or operator of a Class VI well must prepare, maintain, update on the
1872 same schedule as the update to the area of review delineation, and comply with a well plugging
1873 plan that is acceptable to the administrator.

1874
1875 (i) The requirement to maintain and implement an approved plan is directly
1876 enforceable regardless of whether the requirement is a condition of the permit.

1877
1878 (ii) The well plugging plan must be submitted as part of the permit
1879 application and must include the following information:

1880

- 1881 (A) Appropriate test or measure to determine bottom hole reservoir
- 1882 pressure;
- 1883 (B) Appropriate testing methods to ensure final external mechanical
- 1884 integrity as specified in Section 13;
- 1885
- 1886 (C) The type and number of plugs to be used;
- 1887
- 1888 (D) The placement of each plug including the elevation of the top
- 1889 and bottom of each plug;
- 1890
- 1891 (E) The type and grade and quantity of material to be used in
- 1892 plugging;
- 1893
- 1894 (I) The material must be suitable for use with the carbon
- 1895 dioxide stream.
- 1896
- 1897 (F) A description of the method of placement of the plugs.
- 1898

1899 (c) The owner or operator must notify the administrator, in writing, at least 60 days
 1900 before plugging a well.

1901 (i) If any changes have been made to the original well plugging plan, the
 1902 owner or operator must also provide the revised well plugging plan.

1903 (ii) At the discretion of the administrator, a shorter notice period may be
 1904 allowed.

1905 (iii) Any amendments to the injection well plugging plan must be approved
 1906 by the administrator, must be incorporated into the permit, and are subject to the permit
 1907 modification requirements of Section 4 of this chapter, as appropriate.

1908 (d) Within 60 days after completion of plugging and abandonment of a well or well
 1909 field the permittee shall submit to the administrator a final report that includes:

1910 (i) Certification of completion in accordance with approved plans and
 1911 specifications by a licensed professional engineer or a licensed professional geologist.

1912 (ii) Certification of accuracy by the owner or operator and by the person who
 1913 performed the plugging operation (if other than the owner or operator).

1914 (iii) The owner or operator shall retain the well plugging report for ten (10)
 1915 years following site closure.

1916 **Section 17. Post-injection site care and site closure.**

1917 (a) 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 plan for post-
 1919 injection site care and site closure that meets the requirements of subpart (a)(ii) of this section and
 1920

1928 is acceptable to the administrator. The requirement to maintain and implement an approved plan
1929 is directly enforceable regardless of whether the requirement is a condition of the permit.

1930
1931 (i) The owner or operator must submit the post-injection site care and site
1932 closure plan as a part of the permit application to be approved by the administrator.

1933
1934 (ii) The post-injection site care and site closure plan must include the
1935 following information:

1936
1937 (A) Detailed plans for post-injection monitoring, verification,
1938 maintenance, and mitigation;

1939
1940 (B) The pressure differential between pre-injection and predicted
1941 post-injection pressures in the injection zone;

1942
1943 (C) The predicted position of the carbon dioxide plume and
1944 associated pressure front at the time when plume movement has ceased and pressure differentials
1945 sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer
1946 present, as demonstrated in the area of review evaluation required under Section 8(c)(i);

1947
1948 (D) A description of post-injection monitoring locations, methods,
1949 and proposed frequency; and

1950
1951 (E) A proposed schedule for submitting post-injection site care
1952 monitoring results pursuant to Section 15(c) of this chapter, as appropriate.

1953
1954 (iii) Upon cessation of injection, owners or operators of Class VI wells must
1955 either submit an amended post-injection site care and site closure plan or demonstrate to the
1956 administrator through monitoring data and modeling results that no amendment to the plan is
1957 needed.

1958
1959 (A) Any amendments to the post-injection site care and site closure
1960 plan must be:

1961
1962 (I) Approved by the administrator.

1963
1964 (II) Incorporated into the permit.

1965
1966 (III) Subject to the permit modification requirements of
1967 Section 4 of this chapter, as appropriate.

1968
1969 (iv) The owner or operator may modify and resubmit the post-injection site
1970 care and site closure plan for the administrator's approval within 30 days of such change.

1971
1972 (b) The owner or operator shall monitor the site following the cessation of injection
1973 to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs
1974 are not being endangered.

1975

1976 (i) The owner or operator shall continue to conduct monitoring as specified
1977 in the administrator-approved post-injection site care and site closure plan until closure is
1978 certified by the administrator.

1979
1980 (ii) The owner or operator can request and demonstrate to the satisfaction of
1981 the administrator that the post-injection site care and site closure plan should be revised to reduce
1982 the frequency of monitoring.

1983
1984 (iii) Prior to authorization for site closure, the owner or operator must
1985 demonstrate to the administrator, based on monitoring, other site-specific data, and modeling that
1986 is reasonably consistent with site performance, that no additional monitoring is needed to ensure
1987 that the geologic sequestration project does not, and is not expected to pose an endangerment to a
1988 USDW or otherwise threaten human health, safety, or the environment. In addition, the owner or
1989 operator must demonstrate, based on the best available understanding of the site, including
1990 monitoring data and/or modeling, that all other site closure standards and requirements have been
1991 met.

1992
1993 (iv) If such a demonstration cannot be made, the owner or operator must
1994 continue post-injection site care.

1995
1996 (v) The owner or operator must notify the administrator, in writing, at least
1997 120 days before filing a request for site closure. At this time, if any changes have been made to
1998 the original post-injection site care and site closure plan, the owner or operator must also provide
1999 the revised plan. At the discretion of the administrator, a shorter notice period may be allowed.

2000
2001 (c) After the administrator has certified site closure, the owner or operator must plug
2002 monitoring wells, as determined by the administrator, in a manner that will not allow movement
2003 of injection or formation fluids.

2004
2005 (d) Once the administrator has certified site closure, the owner or operator must
2006 submit a site closure report within 90 days after completion of all closure operations. The report
2007 must thereafter be retained at a location designated by the administrator for ten (10) years. The
2008 report must include:

2009
2010 (i) Documentation of appropriate injection and monitoring well plugging as
2011 specified in Section 16 and paragraph (c) of this section.

2012
2013 (ii) The owner or operator must provide a copy of a survey plat that has been
2014 submitted to the local zoning authority designated by the administrator.

2015
2016 (A) The plat must indicate the location of the injection well(s) and
2017 monitoring wells relative to permanently surveyed benchmarks.

2018
2019 (B) The owner or operator must also submit a copy of the plat to the
2020 US EPA regional administrator.

2021
2022 (iii) Documentation of appropriate notification and information to such State,
2023 local and tribal authorities as have authority over drilling activities to enable such State and local

2024 authorities to impose appropriate conditions on subsequent drilling activities that may penetrate
2025 the injection and confining zone(s)

2026
2027 (iv) Proof of providing notice to surface owners, mineral claimants, mineral
2028 owners, lessees and other owners of record of subsurface interests as to the proposed site closure.
2029 Notice requirements at a minimum shall include:

2030
2031 (A) The publishing of notice of the application in a newspaper of
2032 general circulation in each county of the proposed operation at weekly intervals for four (4)
2033 consecutive weeks;

2034
2035 (B) The published notice shall provide a mechanism to request a
2036 public hearing;

2037
2038 (C) A copy of the notice shall also be mailed to all surface owners,
2039 mineral claimants, mineral owners, lessees and other owners of record of subsurface interests that
2040 are located within one (1) mile of the proposed boundary of the geologic sequestration site.

2041
2042 (v) Records reflecting the nature, composition and volume of the carbon
2043 dioxide stream.

2044
2045 (e) Each owner or operator of a Class VI injection well must record a notation on the
2046 deed to the facility property or any other document that is normally examined during title search
2047 that will in perpetuity provide any potential purchaser of the property the following information:

2048
2049 (i) The fact that land has been used to sequester carbon dioxide;

2050
2051 (ii) The name of the State agency, local authority, and/or tribe with which
2052 the survey plat was filed, as well as the address of the Regional Environmental Protection Agency
2053 Office to which it was submitted; and

2054
2055 (iii) The volume of fluid injected, the injection zone or zones into which it
2056 was injected, and the period over which injection occurred.

2057
2058 (f) Well plugging reports, post-injection site care data, including, if appropriate, data
2059 and information used to develop the demonstration of the alternative post-injection site care time
2060 frame, and the site closure report collected pursuant to requirements of subsection (d) above shall
2061 be retained for 10 years following site closure.

2062
2063 (i) The owner or operator must deliver the records to the administrator at the
2064 conclusion of the retention period, and the records must thereafter be retained at a location
2065 designated by the administrator for that purpose.

2066 **Section 18. Emergency and remedial response.**

2067
2068 (a) As part of the permit application, the owner or operator must provide the
2069 administrator with an emergency and remedial response plan that describes actions to be taken to
2070 address movement of the injectate or formation fluids that may cause an endangerment to a
2071 USDW or threaten human health, safety, or the environment during construction, operation,

2072 closure and post-closure periods. The requirement to maintain and implement an approved plan is
2073 directly enforceable regardless of whether the requirement is a condition of the permit.

2074
2075 (i) The emergency and remedial response plan must be reviewed and
2076 updated, as necessary, on the same schedule as the update to the area of review delineation.

2077
2078 (ii) Any amendments to the emergency and remedial response plan must be
2079 approved by the administrator, must be incorporated into the permit, and are subject to the permit
2080 modification requirements of Section 4 of this chapter, as appropriate.

2081
2082 (A) Amended plans or demonstrations shall be submitted to the
2083 administrator as follows:

2084
2085 (I) Within one year of an area of review reevaluation;

2086
2087 (II) Following any significant changes to the facility, such as
2088 addition of injection or monitoring wells, on a schedule determined by the administrator; or

2089
2090 (III) When required by the administrator.

2091
2092 (b) If monitoring data, or other evidence obtained by the the owner or operator
2093 indicate that the injected carbon dioxide stream, displaced formation fluids or associated pressure
2094 front may endanger a USDW or threatens human health, safety, or the environment, the owner or
2095 operator must:

2096
2097 (i) Immediately cease injection;

2098
2099 (ii) Take all steps reasonably necessary to identify and characterize any
2100 release;

2101
2102 (iii) Within 24 hours, provide verbal notice to the Department of
2103 Environmental Quality of any excursion after the excursion is discovered, followed by written
2104 notice to all surface owners, mineral claimants, mineral owners, lessees and other owners of
2105 record of subsurface interests within thirty (30) days of when the excursion is discovered; and

2106
2107 (iv) Implement the emergency and remedial response plan approved by the
2108 administrator.

2109
2110 (c) The administrator may allow the operator to resume injection prior to
2111 remediation if the owner or operator demonstrates that the injection operation will not endanger
2112 USDWs or otherwise threaten human health, safety, or the environment

2113
2114 (d) The owner or operator must notify the administrator or the designated
2115 representative prior to conducting any well workover.

2116 **Section 19. Financial responsibility.**

2117

2118 (a) Financial responsibility requirements are to ensure that owners or operators have
 2119 the financial resources to carry out activities related to closing and remediating geologic
 2120 sequestration sites if needed so they do not endanger the environment or USDWs.

2121
 2122 (b) Owners or operators of Class VI wells must demonstrate and maintain financial
 2123 responsibility for all applicable phases of the geologic sequestration project including complete
 2124 site reclamation in the event of default. The phases of a geologic sequestration project are as
 2125 follows:

2126 (i) Permitting/Characterization

2127

2128 (ii) Operations (injection and permanent well closure activities)

2129

2130 (iii) Post-injection site care (“plume stabilization” – monitoring until certified
 2131 by the administrator; above ground reclamation completed.)

2132

2133 (iv) Emergency and remedial response (that meets the requirements of
 2134 Section 18 of this chapter).

2135

2136 (c) The requirement to maintain adequate financial responsibility and resources is
 2137 directly enforceable regardless of whether the requirement is a condition of the permit.

2138

2139 (d) To demonstrate financial responsibility, the owner or operator must submit a
 2140 detailed written estimate, at the time of permit application and in current dollars, performing
 2141 corrective action on wells in the area of review, plugging the injection well(s), post injection site
 2142 care and site closure, and emergency and remedial response, including the requirements of
 2143 Section 18 of this chapter. The submission requirements for the financial responsibility
 2144 instruments are based on results of the cost estimate.

2145

2146 (i) The financial assurance cost estimate for the various phases of the
 2147 sequestration project shall consider the following events:

2148

2149 (A) Contamination of underground sources of water including
 2150 drinking water supplies.

2151 (B) Mineral rights infringement.

2152

2153 (C) Single large volume release of carbon dioxide that impacts
 2154 human health and safety and/or causes ecological damage.

2155

2156 (D) Low level leakage of carbon dioxide to the surface that impacts
 2157 human health and safety and/or causes ecological damage.

2158

2159 (E) Storage rights infringement.

2160

2161 (F) Property and infrastructure damage including changes to surface
 2162 topography and structures.

2163

2164 (G) Entrained contaminant releases (non-CO₂).

2165

2166 (H) Accidents/unplanned events.

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- (I) Well capping and permitted abandonment.
- (J) Removal of above ground facilities and site reclamation.
- (ii) The Risk Activity matrix in Appendix A shall be considered during the risk assessment process.
- (iii) The cost estimate shall be based upon a multi-disciplinary analytical framework such as Monte Carlo or other commonly accepted stochastic modeling tools.
 - (A) Cost curves shall combine risk probabilities, event outcomes and damages assessment to calculate expected losses under a series of events.
 - (B) For all cases of potential damages, the probability distributions should be identified for 50 percent, 95 percent, and 99 percent probabilities of occurrence.
- (e) The owner or operator must also submit a proposed cost estimate for measurement, monitoring, and verification of plume stabilization following post-closure certification and release of all other financial assurance instruments.
- (f) The cost estimate must be performed for each phase separately and must be based on the costs to the regulatory agency of hiring a third party to perform the required activities. A third party is a party who is not within the corporate structure of the owner or operator.
- (g) The required demonstration of financial responsibility shall be from the following list of qualifying instruments:
 - (i) Trust Funds
 - (ii) Surety Bonds
 - (iii) Letter of Credit
 - (iv) Insurance
 - (A) Any insurance instruments submitted for financial assurance purposes shall include the state of Wyoming as an additional insured, which inclusion shall not be deemed a waiver of sovereign immunity.
 - (v) Self-insurance (i.e., Financial Test and Corporate Guarantee)
 - (vi) Escrow account
 - (vii) Any other instrument(s) satisfactory to the administrator
- (h) The qualifying financial responsibility instrument(s) must comprise protective conditions of coverage that include at a minimum cancellation, renewal, continuation provisions,

2216 specifications on when the provider becomes liable following a notice of cancellation, and
2217 requirements for the provider to meet a minimum rating, minimum capitalization, and the ability
2218 to pass the bond rating when applicable.

2219
2220 (i) Cancellation – An owner or operator must provide that their financial
2221 mechanism may not cancel, terminate or fail to renew except for failure to pay such financial
2222 instrument. If there is a failure to pay the financial instrument, the financial institution may elect
2223 to cancel, terminate, or fail to renew the instrument by sending notice by certified mail to the
2224 owner or operator and the administrator. The cancellation must not be final for 120 days after
2225 receipt of cancellation notice. The owner or operator must provide an alternate financial
2226 responsibility demonstration within 60 days of notice of cancellation, and if an alternate financial
2227 responsibility demonstration is not acceptable (or possible), any funds from the instrument being
2228 cancelled must be released within 60 days of notification by the administrator.

2229
2230 (ii) Renewal – Owners or operators must renew all financial instruments, if
2231 an instrument expires, for the entire term of the geologic sequestration project. The instrument
2232 may be automatically renewed as long as, at a minimum, the owner or operator has the option of
2233 renewal at the face amount of the expiring instrument.

2234
2235 (iii) Continuation – Cancellation, termination, or failure to renew may not
2236 occur and the financial instrument shall remain in full force and effect in the event that on or
2237 before the date of expiration:

- 2238
2239 (A) The administrator deems the facility abandoned.
2240
2241 (B) The permit is terminated, revoked, or a new permit is denied.
2242
2243 (C) Closure is ordered by the administrator, a U.S. district court, or
2244 other court of competent jurisdiction.
2245
2246 (D) The owner or operator is named as debtor in a voluntary or
2247 involuntary proceeding under Title 11 (Bankruptcy), U.S. Code.
2248
2249 (E) The amount due is paid.

2250
2251 (i) The qualifying financial responsibility instrument(s) must be approved by the
2252 administrator. The administrator shall also approve the use and length of pay-in-periods for trust
2253 funds and escrow accounts.

2254
2255 (i) The administrator shall consider and approve the financial responsibility
2256 demonstration for all the phases of the geologic sequestration project prior to issuing a Class VI
2257 permit.

2258
2259 (ii) The administrator may find that the financial responsibility
2260 demonstration is unsatisfactory for any reason, as long as that reason is not arbitrary or
2261 capricious. The administrator may exercise discretion in negotiating a satisfactory financial
2262 responsibility demonstration or to deny a demonstration.

2263

2264 (iii) The owner or operator must provide any updated information related to
2265 their financial responsibility instrument(s) on an annual basis and if there are any changes, the
2266 director must evaluate the financial responsibility demonstration to confirm that the instrument(s)
2267 used remain adequate for use. The owner or operator must maintain financial responsibility
2268 requirements regardless of the status of the administrator's review of the financial responsibility
2269 demonstration.

2270
2271 (iv) The owner or operator must provide an adjustment of the cost estimate to
2272 the administrator within 60 days of notification by the administrator, if the administrator
2273 determines during the annual evaluation of the qualifying financial responsibility instrument(s)
2274 that the most recent demonstration is no longer adequate to cover the cost of corrective action (as
2275 required by Section 8), injection well plugging (as required by Section 16), post-injection site
2276 care and site closure (as required by Section 17), and emergency and remedial response (as
2277 required by Section 18).

2278
2279 (v) During the active life of the geologic sequestration project, the owner or
2280 operator must adjust the cost estimate for inflation within 60 days prior to the anniversary date of
2281 the establishment of the financial instrument(s) used to comply with paragraph (g) of this section
2282 and provide this adjustment to the administrator. The owner or operator must also provide to the
2283 administrator written updates of adjustments to the cost estimate within 60 days of any
2284 amendments to the area of review and corrective action plan (Section 8), the injection well
2285 plugging plan (Section 16), the post-injection site care and site closure plan (Section 17), the
2286 emergency and remedial response plan (Section 18), and mitigation or reclamation costs that the
2287 state may incur as a result of any default by the permit holder.

2288
2289 (vi) The administrator must approve any decrease or increase to the initial
2290 cost estimate. During the active life of the geologic sequestration project, the owner or operator
2291 must revise the cost estimate no later than 60 days after the administrator has approved the
2292 request to modify the area of review and corrective action plan (Section 8), the injection well
2293 plugging plan (Section 16), the post-injection site care and site closure plan (Section 17), and the
2294 emergency and response plan (Section 18), if the change in the plan increases the cost. If the
2295 change to the plans decreases the cost, any withdrawal of funds must be approved by the
2296 administrator. Any decrease to the value of the financial assurance instrument must first be
2297 approved by the director. The revised cost estimate must be adjusted for inflation as specified in
2298 the preceding paragraph.

2299
2300 (vii) Whenever the current cost estimate increases to an amount greater than
2301 the face amount of a financial instrument currently in use, the owner or operator, within 60 days
2302 after the increase, must either cause the face amount to be increased to an amount at least equal to
2303 the current cost estimate and submit evidence of such increase to the administrator, or obtain
2304 other financial responsibility instruments to cover the increase. Whenever the current cost
2305 estimate decreases, the face amount of the financial assurance instrument may be reduced to the
2306 amount of the current cost estimate only after the owner or operator has received written approval
2307 from the administrator.

2308
2309 (j) The owner or operator may demonstrate financial responsibility by using one or
2310 multiple qualifying financial instruments for specific phases of the geologic sequestration project.
2311

2312 (i) In the event that the owner or operator combines more than one
2313 instrument for a specific geologic sequestration phase (e.g., well plugging), such combination
2314 must be limited to instruments that are not based on financial strength or performance (i.e., self-
2315 insurance or performance bond). For example trust funds, surety bonds guaranteeing payment
2316 into a trust fund, letters of credit, escrow account, and insurance.
2317

2318 (ii) When using a third-party instrument to demonstrate financial
2319 responsibility, the owner or operator must provide proof that the third-party providers either have
2320 passed financial strength requirements based on credit ratings; or has met a minimum rating,
2321 minimum capitalization, and ability to pass the bond rating when applicable.
2322

2323 (iii) An owner or operator using certain types of third party instruments must
2324 establish a standby trust to enable the State of Wyoming to be party to the financial responsibility
2325 agreement without the State of Wyoming being the beneficiary of any funds. The standby trust
2326 fund must be used along with other financial responsibility instruments (e.g., surety bonds, letters
2327 of credit, or escrow accounts) to provide a location to place funds if needed.
2328

2329 (iv) An owner or operator may deposit money into an escrow account to
2330 cover financial responsibility requirements; this account must segregate funds sufficient to cover
2331 estimated costs for Class VI (geologic sequestration) financial responsibility from other accounts
2332 and uses.
2333

2334 (v) An owner or operator or its guarantor may use self-insurance to
2335 demonstrate financial responsibility for certain phases of geologic sequestration projects. In order
2336 to satisfy this requirement the owner or operator must meet a tangible net worth of an amount
2337 approved by the administrator, have a net working capital and tangible net worth each at least six
2338 times the sum of the current well plugging, post injection site care and site closure cost, have
2339 assets located in the United States amounting to at least 90 percent of total assets or at least six
2340 times the sum of the current well plugging, post injection site care and site closure cost, and must
2341 submit a report of its bond rating and financial information annually. In addition the owner or
2342 operator must either: have a bond rating test of AAA, AA, A, or BBB as issued by Standard &
2343 Poor's or Aaa, Aa, A, or Baa as issued by Moody's; or meet all of the following five financial
2344 ratio thresholds: a ratio of total liabilities to net worth less than 2.0; a ratio of current assets to
2345 current liabilities greater than 1.5; a ratio of the sum of net income plus depreciation, depletion,
2346 and amortization to total liabilities greater than 0.1; a ratio of current assets minus current
2347 liabilities to total assets greater than -0.1; and a net profit (revenues minus expenses) greater than
2348 0.
2349

2350 (vi) An owner or operator who is not able to meet corporate financial test
2351 criteria may arrange a corporate guarantee by demonstrating that its corporate parent meets the
2352 financial test requirements on its behalf. The parent's demonstration that it meets the financial
2353 test requirement is insufficient if it has not also guaranteed to fulfill the obligations for the owner
2354 or operator.
2355

2356 (vii) An owner or operator may obtain an insurance policy to cover the
2357 estimated costs of geologic sequestration activities requiring financial responsibility. This
2358 insurance policy must be obtained from a third party provider.
2359

2360 (k) The owner or operator must maintain financial responsibility and resources until
2361 the administrator receives and approves the completed post-injection site care and site closure
2362 plan and the administrator approves site closure.

2363
2364 (i) Post-injection site care shall be for a period of not less than ten (10) years
2365 after the date when all wells excluding monitoring wells have been appropriately plugged and
2366 abandoned, all subsurface operations and activities have ceased and all surface equipment and
2367 improvements have been removed or appropriately abandoned, or so long thereafter as necessary
2368 to obtain a completion and release certificate from the administrator certifying that plume
2369 stabilization has been achieved without the use of control equipment based on a minimum of
2370 three consecutive years of monitoring data.

2371
2372 (ii) The site closure plan shall address all reclamation, required monitoring,
2373 and remediation sufficient to show that the carbon dioxide injected into the geologic sequestration
2374 site will not harm human health, safety, the environment, or drinking water supplies.

2375
2376 (l) The owner or operator must notify the administrator by certified mail of adverse
2377 financial conditions such as bankruptcy that may affect the ability to carry out injection well
2378 plugging and post-injection site care and site closure.

2379
2380 (i) In the event that the owner or operator or the third party provider of a
2381 financial responsibility instrument is going through a bankruptcy, the owner or operator must
2382 notify the administrator by certified mail of the commencement of a voluntary or involuntary
2383 proceeding under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor,
2384 within 10 days after commencement of the proceeding.

2385
2386 (ii) A guarantor of a corporate guarantee must make such a notification to
2387 the administrator if he/she is named as debtor, as required under the terms of the corporate
2388 guarantee.

2389
2390 (iii) An owner or operator who fulfills the requirements of paragraph (g) of
2391 this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance
2392 policy will be deemed to be without the required financial assurance in the event of bankruptcy of
2393 the trustee or issuing institution, or a suspension or revocation of the authority of the trustee
2394 institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit,
2395 escrow account, or insurance policy. The owner or operator must establish other financial
2396 assurance within 60 days after such an event.

2397
2398 (m) The owner or operator may be released from a financial instrument in the
2399 following circumstances:

2400
2401 (i) The owner or operator has completed the phase of the geologic
2402 sequestration project for which the financial instrument was required and has fulfilled all its
2403 financial obligations as determined by the administrator, including obtaining financial
2404 responsibility for the next phase of the GS project, if required.

2405
2406 (ii) The owner or operator has submitted a replacement financial instrument
2407 and received written approval from the administrator accepting the new financial instrument and
2408 releasing the owner or operator from the previous financial instrument.

2409
2410 (iii) The owner or operator has submitted a revised cost estimate for the
2411 remaining phases of the geologic sequestration project. The revised cost estimate may
2412 demonstrate that a partial release of the financial instrument is warranted and can still provide
2413 adequate financial assurance for the remainder of the project. Partial release of the financial
2414 instrument is at the discretion of the administrator.
2415

2416 (n) Following the release of all financial assurance and receipt of a site closure
2417 certificate, the administrator must approve the cost estimate prepared for the post-closure
2418 measurement, monitoring and verification of a geologic sequestration site. The cost estimate
2419 shall only be provided after plume stabilization and all remediation work has been completed.

2420 **Section 20. Public participation, public notice and public hearing requirements.**

2421
2422 (a) Public notice is not required for minor modifications as described by Section 4(b)
2423 (xi) of this chapter or for a permit denial where the application is determined incomplete.
2424

2425 (b) The administrator shall give public notice if a draft permit has been prepared or a
2426 hearing has been scheduled.
2427

2428 (c) Public notice of the preparation of a draft permit shall allow at least 60 days for
2429 public comment. Public notice of a public hearing shall be given at least 30 days before the
2430 hearing. Public notice of the hearing may be given at the same time as public notice of the draft
2431 permit and the two notices may be combined.
2432

2433 (d) Public notice shall be given by:

2434 (i) Mailing a copy of the notice to the following persons:

2435 (A) The applicant, by certified or registered mail;

2436 (B) The U.S. Environmental Protection Agency, Region 8 Drinking
2437 Water Program;

2438 (C) The U.S. Environmental Protection Agency, Underground
2439 Injection Control Program;

2440 (D) Wyoming Game and Fish Department;

2441 (E) Wyoming State Engineer;

2442 (F) State Historical Preservation Officer;

2443 (G) Wyoming Oil and Gas Conservation Commission;

2444 (H) Wyoming Department of Environmental Quality, Land Quality
2445 Division

2446 (I) Wyoming State Geological Survey;

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(J) Wyoming Water Development Office;

(K) Persons on the mailing list developed by the department, including those who request in writing to be on the list and by soliciting participants in public hearings in that area for their interest in being included on “area” mailing lists; and

(L) Any unit of local government having jurisdiction over the area where the facility is proposed to be located.

(ii) Publication of the notice in a newspaper of general circulation in the location of the facility or operation; and

(iii) At the discretion of the administrator, any other method reasonably expected to give actual notice of the action in question to the persons potentially affected by it, including press releases or any other forum or medium to elicit public participation.

(e) All public notices issued under this chapter shall contain the following minimum information:

(i) Name and address of the department;

(ii) Name and address of permittee or permit applicant, and, if different, of the facility or activity regulated by the permit;

(iii) A brief description of the business conducted at the facility or activity described in the permit application or the draft permit;

(iv) Name, address and telephone number of a person from whom interested persons may obtain further information, including copies of the draft permit, as the case may be, statement of basis or fact sheet, and the application;

(v) A brief description of comment procedures, procedures to request a hearing, and other procedures which the public may use to participate in the final permit decision; and

(vi) Any additional information considered necessary and proper.

(f) In addition to the information required in (e) of this section, any notice for public hearing shall contain the following:

(i) Reference to the date of previous public notices relating to the permit;

(ii) Date, time and place of hearing; and

(iii) A brief description of the nature and purpose of the hearing, including applicable rules and procedures.

2505 (g) The department shall provide an opportunity for the applicant, permittee, or any
2506 interested person to submit written comments regarding any aspect of a permit or to request a
2507 public hearing.
2508

2509 (h) All information received on or with the permit application shall be made
2510 available to the public for inspection and copying except such information as has been determined
2511 to constitute trade secrets or confidential information pursuant to W.S. 35-11-1101.
2512

2513 (i) During the public comment period, any interested person may submit written
2514 comments on the draft permit and may request a public hearing. Requests for public hearings
2515 must be made in writing to the administrator and shall state the reasons for the request.
2516

2517 (j) The administrator shall hold a hearing whenever the administrator finds, on the
2518 basis of requests, a significant degree of public interest in a draft permit. The administrator has
2519 the discretion to hold a hearing whenever such a hearing may clarify issues involved in a permit
2520 decision.
2521

2522 (k) The public comment period shall automatically extend to the close of any public
2523 hearing. The administrator may also extend the comment period by so stating at the public
2524 hearing.
2525

2526 (l) The administrator shall render a decision on the draft permit within 60 days after
2527 the completion of the comment period if no hearing is requested. If a hearing is held, the
2528 administrator shall make a decision on any department hearing as soon as practicable after receipt
2529 of the transcript or after the expiration of the time set to receive written comments.
2530

2531 (m) At the time a final decision is issued, the department shall respond, in writing, to
2532 those comments received during the public comment period or comments received during the
2533 allotted time for a hearing held by the department. This response shall:
2534

2535 (i) Specify any changes that have been made to the permit; and
2536

2537 (ii) Briefly describe and respond to all comments voicing a legitimate
2538 technical or regulatory concern that is within the authority of the department to regulate.
2539

2540 (n) The response to comments shall also be available to the public.
2541

2542 (o) Requests for a contested case hearing on a permit issuance, denial, revocation,
2543 termination, or any other final department action appealable to the Council shall be in accordance
2544 with the department's rules of practice and procedure.

Appendix A

Risk Activity Table

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

Risk Activity Table (continued)

	Major Risk (Feature, Event, or Process)
5	Storage Rights Infringement (CO₂ or other entrained contaminant gases) – Form of Mineral Rights Infringement
5.1	Leakage migrates into adjacent pore space; causes may include plume migrates faster than modeled.
5.2	Post injection decision (e.g. due to new technology or changed economic conditions) to store gas in adjacent pore space.
5.3	Acts of God affecting storage capacity of pore space.
5.4	Formation fluid impact due to CO ₂ injection.
5.5	Will also require primary contributing causes 3.1, 3.2, 3.3, 3.5, 4.3, and 4.4
6	Modified Surface Topography (subsidence or uplift) Resulting in Property/Infrastructure Damage
6.1	Induced Seismicity – Pressure from geochemistry induced reactivation of historic fault or dissolution of material caused by subsidence.
6.2	Formation fluid impact due to CO ₂ injection.
7	Entrained Contaminant (Non-CO₂) Releases
7.1	Change in CO ₂ composition/properties (e.g. concentration of contaminate in CO ₂ supply increases).
7.2	Microbial activity initiated by injection process or composition.
	Will also require primary contributing causes 3.1, 3.2, 3.3, 3.5, 4.3, and 4.4
8	Accidents/Unplanned Events (Typical Insurable Events)
8.1	Surface infrastructure damage
8.2	Saline water releases from surface storage impoundment.