

VERMILLION COUNTY, INDIANA
ORDINANCE NO. 2026-_____

**AN ORDINANCE AMENDING THE VERMILLION COUNTY UNIFIED DEVELOPMENT
ORDINANCE TO ESTABLISH STANDARDS FOR CARBON CAPTURE AND
SEQUESTRATION**

WHEREAS, IC 36-7-4 authorizes the County to adopt and amend zoning regulations, and the Vermillion County Commissioners have adopted the Vermillion County Unified Development Ordinance; and

WHEREAS, the underground injection and storage of carbon dioxide is regulated by the U.S. Environmental Protection Agency under 40 CFR Part 146 and by the Indiana Department of Natural Resources under IC 14-39-2 and 312 IAC 30, while the location and surface impacts of carbon capture and sequestration facilities, their effect on County roads, drainage, water supplies, and neighboring land uses, and the preparedness of County emergency services remain matters of local land use regulation; and

WHEREAS, carbon dioxide is colorless, cannot be reliably detected by smell, is heavier than air, collects in low-lying and enclosed spaces, displaces oxygen, and can stall vehicle engines, and large releases have caused mass evacuations and loss of life, including the 2020 pipeline rupture near Satartia, Mississippi and the 1986 release at Lake Nyos, Cameroon; and

WHEREAS, carbon dioxide that escapes a storage formation most often travels along wells, borings, and faults, and in Vermillion County may also travel through extensive historic mine workings, so that it may reach the surface at locations distant from the injection wells and years after injection ends; and

WHEREAS, the region is subject to natural seismicity from the Wabash Valley and New Madrid seismic zones, and the injection of fluids can induce seismicity; and

WHEREAS, routine compliance testing of drinking water is not designed to detect the early chemical indicators of carbon dioxide or brine migration; and

WHEREAS, this ordinance does not prohibit carbon capture and sequestration but establishes the district, submittal requirements, and development standards under which it may occur; and

WHEREAS, the Vermillion County Area Plan Commission held a public hearing on _____, 2026, and certified a _____ recommendation to the Vermillion County Commissioners; and

WHEREAS, the Vermillion County Commissioners have paid reasonable regard to the matters set out in IC 36-7-4-603;

NOW, THEREFORE, BE IT ORDAINED by the Vermillion County Commissioners that the Vermillion County Unified Development Ordinance is amended as follows:

SECTION 1. AMENDMENTS TO ARTICLE 11: DEFINITIONS

- A. *Amend the following definitions to read as follows. Added text is underlined; deleted text is struck through.*

Non-participating Property: When referring to a wind power plant, ~~or~~ solar power plant, or CCS Facility, a property whose owner has not signed a lease agreement, solar access agreement, wind access agreement, pore space agreement, easement, or similar with the owner or operator of a solar power plant, wind power plant, CCS Facility, or other entity related to a solar power plant, ~~or~~ wind power plant, or CCS Facility.

Participating Property: When referring to a utility wind turbine system, wind power plant, ~~or~~ solar power plant, or CCS Facility, a property whose owner has signed a lease agreement, solar access agreement, wind access agreement, pore space agreement, easement, or similar with the owner or operator of a solar power plant, wind power plant, CCS Facility, or other entity related to a solar power plant, ~~or~~ wind power plant, or CCS Facility. Participating property may include a property whose owner has signed an agreement to not remonstrate against a wind power plant, ~~or~~ solar power plant, or CCS Facility project; and may or may not be receiving a one-time or ongoing payments for potential negative impact to their property value or quality-of-life.

B. Add the following definitions in alphabetical order:

Area of Review (AOR): The region surrounding a geologic sequestration project, as delineated in the Class VI Permit or permit application, where underground sources of drinking water may be endangered by injection activity, as defined in 40 CFR 146.81.

Capture Facility: Equipment and structures used to separate, capture, purify, dehydrate, compress, liquefy, or temporarily store carbon dioxide for the purpose of geologic sequestration.

Carbon Capture and Sequestration (CCS) Facility: Any Capture Facility, Sequestration Facility, or Surface Facility, individually or in combination.

CCS Project: All CCS Facilities, wells, and pore space operated under one or more Class VI Permits or other permits authorizing the injection of carbon dioxide, by the same Operator or its affiliates.

Class VI Permit: A permit issued by the U.S. Environmental Protection Agency, or by the State upon its assumption of primary enforcement authority, for the construction or operation of a Class VI injection well under 40 CFR Part 146. Where a CCS Project injects carbon dioxide under another class of underground injection control permit, references in the Unified Development Ordinance to a Class VI Permit include that permit.

Confining Zone: The geologic formation or formations above an injection zone that act as a barrier to fluid movement, as defined in 40 CFR 146.81.

Critical Facility: Any of the following: a School; a School, Trade, Business or Commercial; a Child Care Center or Child Care Institution; a Place of Worship; a Hospital, Clinic, Nursing Home, Assisted Living Facility, or Retirement Community; a building owned or leased by a unit of government and used for public business; or a fire station, emergency medical services station, law enforcement facility, 911 center, or emergency operations center.

Hazard Zone: The area within which the Release Consequence Analysis predicts a carbon dioxide concentration of 40,000 parts per million (ppm) or greater under any required release scenario.

Haul Route: Every public street within Vermillion County that vehicles delivering carbon dioxide to, or removing carbon dioxide from, a CCS Facility are expected to use.

Injection Well: A well used or intended to be used to inject carbon dioxide into a geologic formation for storage, enhanced oil or gas recovery, or testing, regardless of the class of underground injection control permit under which it is authorized.

Leakage Monitoring Area: The combination of: (1) the land overlying the maximum modeled Plume, plus a buffer of one (1) mile; (2) the land within one-half (1/2) mile of every Potential Leakage Pathway within the AOR that penetrates the Confining Zone; and (3) for any underground mine workings any part of which lies within area (1), the land overlying those workings and the land within one-half (1/2) mile of every shaft, portal, air shaft, drift opening, or mapped subsidence feature connected to them.

Monitoring Period: The period ending on the later of: (1) site closure authorization under the Class VI Permit; or (2) twenty (20) years after injection permanently ceases.

Monitoring Well: A well used solely to observe, sample, or measure subsurface conditions associated with a CCS Project.

Notification Zone: The area within which the Release Consequence Analysis predicts a carbon dioxide concentration of 5,000 ppm or greater under any required release scenario, but not less than two (2) miles from any Surface Facility component containing carbon dioxide.

Occupied Building: A building used at any time during the preceding twelve (12) months for residential, commercial, industrial, institutional, educational, religious, or agricultural purposes where people are regularly present, including a dwelling under construction with an active Zoning Compliance Permit.

Place of Public Assembly: A Park, Public; Campground; Golf Course; Conservation Club; fairground; athletic field; public beach; or other outdoor venue where fifty (50) or more people regularly gather.

Plume: The underground extent, in three dimensions, of an injected carbon dioxide stream. Unless otherwise stated, the Plume is its maximum modeled extent at the end of the post-injection site care period under the Class VI Permit.

Potential Leakage Pathway: Any well or boring, whether active, plugged, abandoned, or undocumented; any mapped or inferred fault, fracture zone, or lineament; or any underground mine working, shaft, portal, air shaft, drift opening, or subsidence feature.

Pressure Front: The zone of elevated subsurface pressure created by injection, as defined in 40 CFR 146.81.

Protective Action Zone: The area within which the Release Consequence Analysis predicts a carbon dioxide concentration of 15,000 ppm or greater under any required release scenario, but not less than one (1) mile from any Surface Facility component containing carbon dioxide.

Public Water System: A public water system as defined in 42 U.S.C. 300f and 327 IAC 8.

Qualified Independent Professional: A Registered Professional Engineer, licensed professional geologist, or other expert selected by the County who has demonstrated expertise

in the applicable discipline and has had no financial relationship with the Operator or its affiliates during the preceding three (3) years.

Release Consequence Analysis: The analysis required by Section 5.xx(F).

Seismic Survey: A geophysical survey using vibroseis equipment, explosives, or other energy sources to image subsurface geology for the purpose of evaluating or developing a CCS Project.

Sentinel Well: A groundwater monitoring well screened in a drinking-water aquifer and located between a CCS Project and a Public Water System supply well or wellfield.

Sequestration Facility: The Injection Wells, Monitoring Wells, pressure-management wells, brine extraction wells, brine disposal wells, wellhead equipment, and surface piping used to inject and store carbon dioxide or to manage the pressure or fluids of the storage formation.

Stratigraphic Test Well: A well drilled to gather geologic data for evaluating a site for sequestration, into which carbon dioxide is not injected, including a carbon dioxide investigatory well under IC 14-39.

Surface Facility: All above-ground structures and equipment of a CCS Facility, including compressors, pumps, storage vessels, truck or rail receiving and unloading areas, wellheads, piping, control buildings, and electrical equipment; and any facility for the transfer, transloading, or temporary storage of carbon dioxide for sequestration, whether or not located at the injection site.

Transport Protective Corridor: The area within one-half (1/2) mile of the centerline of each Haul Route, or within the distance to 15,000 ppm modeled for the transport release scenario in the Release Consequence Analysis, whichever is greater.

SECTION 2. PERMITTED AND SPECIAL EXCEPTION USES

Amend the use tables of Article 2: Zoning Districts to add the following uses. These uses are not permitted in any district not listed.

- CCS Facility (including Capture Facility, Sequestration Facility, and Surface Facility): Special Exception in the HI district.
- Monitoring Well: Permitted in the A1, A2, and HI districts, subject to Section 5.xx(K).
- Stratigraphic Test Well: Permitted in the A1, A2, and HI districts, subject to Section 5.xx(K).

A Seismic Survey is not a use of land but is subject to Section 5.xx(R) in all districts.

SECTION 3. AMENDMENTS TO ARTICLE 5: DEVELOPMENT STANDARDS

Add the following section to Article 5 in alphabetical order:

5.xx CARBON CAPTURE AND SEQUESTRATION STANDARDS

A. Applicability

1. This section applies to every CCS Facility, Monitoring Well, Stratigraphic Test Well, and Seismic Survey within the planning jurisdiction.

2. This section does not apply to a CCS Project for which a Class VI construction permit was issued before the effective date of this section, as that project is described in that permit. This section does apply to any Injection Well not authorized by such a permit; to any Surface Facility not shown in the documents for such a permit; and to any modification of such a permit that increases the permitted injection rate or the extent of the AOR.
3. All obligations of this section run with the land and bind the Owner and the Operator, and their successors and assigns.

B. Relationship to State and Federal Regulation

1. This section regulates the use and location of structures on the land surface, the protection of County roads, drainage, and water supplies, and local emergency preparedness. It does not regulate the construction or operation of injection wells, injection pressures or rates, the composition of the injected stream except as provided in Subsection O, or the design and operation of pipelines. Those matters are regulated by the U.S. Environmental Protection Agency, the Pipeline and Hazardous Materials Safety Administration, the Indiana Department of Natural Resources, and the Indiana Utility Regulatory Commission.
2. The monitoring required by this section concerns air at the surface and in and around buildings, ground motion, and water in drinking-water aquifers and water supplies. It supplements and does not replace or modify any monitoring required under the Class VI Permit.
3. If any requirement of this section is found by a court of competent jurisdiction to be preempted as applied to a particular facility, that requirement shall not apply to that facility, and all other requirements remain in effect.

C. Submittal Requirements

The following materials shall be submitted with a petition to rezone land to the HI district for a CCS Facility and with the application for special exception. All mapped information shall be provided in print and in GIS format.

1. Project description:
 - a. Identity, business structure, and contacts of the Applicant, Owner, Operator, and parent companies, including a 24-hour emergency telephone number answered by a live person;
 - b. Source or sources of carbon dioxide, and the process and feedstock that produce it;
 - c. Projected annual and daily injection volumes and years of injection;
 - d. Number and locations of Injection Wells and Monitoring Wells;
 - e. Each Surface Facility component, with the maximum quantity of carbon dioxide on site and its phase and pressure;
 - f. Method of delivery of carbon dioxide and the expected number of deliveries per day; and
 - g. The commercial purpose of the project and any claimed public benefits.
2. Permits: copies of the Class VI Permit application or permit with all attachments, the Department of Natural Resources permit application or permit under IC 14-39-2, and a list of all other required permits with their status.

3. Maps showing:
 - a. The AOR, the Plume at five-year intervals and at its maximum extent, and the Pressure Front;
 - b. All parcels within the Plume, with owner names and whether each is a Participating Property;
 - c. The Leakage Monitoring Area, with every Potential Leakage Pathway, Occupied Building, and Public Water System well and Wellhead Protection Overlay District within it;
 - d. Every existing or permitted Injection Well of another CCS Project within ten (10) miles, with its Plume as publicly available;
 - e. The Hazard Zone, Protective Action Zone, Notification Zone, and Transport Protective Corridor on aerial photography with topography, identifying every Occupied Building, Critical Facility, Place of Public Assembly, Confined Feeding Facility, and public street within each;
 - f. The Haul Routes; and
 - g. Every county and municipality, in Indiana or Illinois, any part of which lies within any area shown under this paragraph.
4. Site Plan showing all Surface Facility components with dimensions and heights, lot lines, dimensioned separation distances, access drives, truck staging areas, fencing, lighting, signage, screening, stormwater facilities, legal drains, known private drain tile, and flood hazard areas.
5. Geologic information: the seismic history of the AOR; mapped faults and folds; a description of the Confining Zone, including its thickness and continuity and areas where data are limited; and all seismic survey reports relied upon.
6. Release Consequence Analysis (Subsection F).
7. Transportation Risk Assessment (Subsection J), where carbon dioxide will be delivered by vehicle.
8. Emergency Response Plan and draft Emergency Preparedness Agreement (Subsection I).
9. Leakage Pathway Survey and Near-Surface Monitoring Plan (Subsection L).
10. Seismic Hazard Assessment (Subsection M).
11. Groundwater and Water Supply Protection Plan, including the Water Replacement Plan (Subsection N).
12. Source Identification Plan (Subsection O).
13. Draft Road Use Agreement and Traffic Impact Analysis (Subsection Q).
14. Noise study (Subsection G).
15. Pore space documentation: evidence of pore space rights or an integration order under IC 14-39-2, each form of pore space agreement offered to owners, and a list of owners contacted.

16. Financial and operating capacity: audited financial statements; experience operating similar facilities; and any releases, violations, or enforcement actions involving the Applicant, Operator, or affiliates in the past ten (10) years.
17. Estimates of the Bond amounts required by Subsection S, and the decommissioning plan (Subsection T).
18. Any Emergency Planning and Community Right-to-Know Act Tier II inventory the facility will be required to file.

Updated copies of any submitted permit or plan shall be provided to the Zoning Administrator within thirty (30) days after any submittal to, or decision by, the issuing agency.

D. Independent Review

1. The Applicant shall deposit \$100,000 with the County Auditor at the time of submittal to pay for Qualified Independent Professionals, legal counsel, and other costs of reviewing the submittals required by this section. The Applicant shall restore the balance to \$100,000 within thirty (30) days after written notice that it has fallen below \$25,000. Any unused balance shall be refunded after final action and the start of injection, or after withdrawal or denial.
2. Qualified Independent Professionals selected by the County shall review, at a minimum, the Release Consequence Analysis, Transportation Risk Assessment, Emergency Response Plan, Leakage Pathway Survey and Near-Surface Monitoring Plan, Seismic Hazard Assessment, Groundwater and Water Supply Protection Plan, Source Identification Plan, and Bond estimates, and shall report in writing to the Area Plan Commission and Board of Zoning Appeals.

E. Siting and Separation

1. Separation from other CCS Projects. Each Injection Well shall be:
 - a. At least three (3) miles from every Injection Well of another CCS Project for which a Class VI Permit has been issued or a complete application is pending, measured horizontally between the points where the wells enter the injection zone; and
 - b. Located so that its Plume, plus a buffer of one (1) mile, does not intersect the Plume of any other CCS Project.

The more restrictive requirement controls.

2. Minimum separations. Each Surface Facility component containing carbon dioxide shall be separated from the following by at least the distance shown, or by the distance required by Paragraph 3, whichever is greater:
 - a. Lot line of the site: 400 feet;
 - b. Public street right-of-way: 500 feet;
 - c. Occupied Building on a Non-participating Property: 2,640 feet;
 - d. Occupied Building on a Participating Property: 1,320 feet;
 - e. Critical Facility or Place of Public Assembly: one (1) mile;
 - f. Corporate limits of any city or town, or any subdivision of five (5) or more lots: one (1) mile;

- g. Public Water System well: one (1) mile, and outside any Wellhead Protection Overlay District;
- h. Confined Feeding Facility not on a Participating Property: 1,000 feet;
- i. Legal drain: 75 feet from the centerline of a tiled legal drain or the top of bank of an open legal drain, unless the Drainage Board approves a lesser distance; and
- j. Airport: one (1) mile.

No Surface Facility component shall be located within a regulatory floodplain.

- 3. Hazard Zone. The Hazard Zone shall not contain:
 - a. Any Occupied Building, Critical Facility, Place of Public Assembly, or Confined Feeding Facility;
 - b. Any Non-participating Property, unless its owner has granted a recorded easement acknowledging its inclusion and no Occupied Building is located on it within the Hazard Zone; or
 - c. Any public street, unless the County Commissioners approve a road closure plan providing automatic gates activated by the fenceline monitoring system, warning signs, and an alternate route, all installed and maintained by the Operator.
- 4. Height. Sequestration Facility structures shall not exceed thirty-five (35) feet, except drilling and workover rigs while in use. Capture Facility structures are subject to the height standards of the HI district.

F. Release Consequence Analysis

- 1. The Applicant shall submit a Release Consequence Analysis prepared by a qualified professional. The analysis establishes the Hazard Zone, Protective Action Zone, Notification Zone, and Transport Protective Corridor.
- 2. The analysis shall use an atmospheric dispersion model designed for gases heavier than air that accounts for ground-hugging flow and terrain. It shall use terrain data of at least one-meter resolution and account for river valleys, ravines, strip mine pits, and other depressions where carbon dioxide may channel or collect. Where the County's reviewer determines that terrain effects are significant, three-dimensional computational fluid dynamics modeling is required.
- 3. The analysis shall model at least the following release scenarios:
 - a. An uncontrolled full-bore release from each Injection Well at maximum permitted pressure and rate, sustained for fourteen (14) days or for the well-control response time in the Class VI emergency and remedial response plan, whichever is longer;
 - b. Instantaneous failure of the largest carbon dioxide storage vessel or group of connected vessels on site;
 - c. Full-bore rupture of the largest on-site carbon dioxide pipe or compressor discharge;
 - d. Complete release of one delivery vehicle at the unloading area; and
 - e. Where carbon dioxide will be delivered by vehicle, complete release of one delivery vehicle at no fewer than three (3) locations along the Haul Routes selected by the County's reviewer.

4. Each scenario shall be modeled for calm nighttime conditions (stability class F, wind speed 1.5 meters per second), neutral conditions (stability class D, wind speed 5 meters per second), and all sixteen (16) compass wind directions, using the worst result.
5. For each scenario the analysis shall report the distances to 40,000 ppm, 15,000 ppm, and 5,000 ppm; the arrival time and duration of each concentration at each Critical Facility and at representative Occupied Buildings; areas where carbon dioxide is predicted to collect, and for how long; and maps of the combined outer envelope of all scenarios.
6. The analysis shall be updated before any increase in injection rate, storage volume, number of wells, or delivery volume; after any release reported under Subsection P; and at least every five (5) years. If an update enlarges any zone, the programs of Subsections H and I shall be extended to the enlarged zone within one hundred eighty (180) days.

G. Facility Design and Operation

1. Emergency shutdown. The facility shall have automatic and manual emergency shutdown systems capable of isolating carbon dioxide inventory, operable from the control room and from at least one off-site location.
2. Fenceline and area monitoring. Continuous carbon dioxide monitors shall be installed at intervals of no more than 500 feet along the facility perimeter, at each wellhead, at each unloading position, and at each topographic low point within the Protective Action Zone. Monitors shall report in real time to the Operator's control room, the County 911 center, and the County Emergency Management Agency (EMA). A reading of 10,000 ppm or greater sustained for sixty (60) seconds at any monitor shall automatically notify the 911 center. The notification link shall be tested monthly.
3. Weather station. An on-site station shall continuously report wind speed, wind direction, and temperature to the 911 center and EMA. A wind sock shall be visible from each facility entrance.
4. Vehicle receiving. Where carbon dioxide is delivered by vehicle, all queuing, staging, and unloading shall occur on site, with staging space for the greater of ten (10) vehicles or four (4) hours of peak deliveries. No delivery vehicle shall stage or queue on a public street. Unloading positions shall be located so that the Hazard Zone for the unloading release scenario lies entirely on the site.
5. Security. All Surface Facility components shall be enclosed by a fence at least seven (7) feet in height with locked gates and emergency access boxes at each gate.
6. Signs. Warning signs identifying the carbon dioxide hazard, the 911 address, and a 24-hour emergency telephone number shall be posted at each gate and at intervals of no more than 300 feet along the perimeter, with letters at least three (3) inches high.
7. Noise. Noise shall not exceed 60 dBA at the lot line or 45 dBA at any Occupied Building on a Non-participating Property, whichever is more restrictive, excluding construction and drilling during the hours allowed by Subsection Q. The Applicant shall submit a noise study with ambient measurements and modeled contours. A post-construction study by a consultant selected by the County, at the Operator's expense, shall be completed before injection begins and after any change in major equipment.

8. Lighting and screening. Exterior lighting shall comply with the lighting standards of this Article. Surface Facility components visible from an Occupied Building on a Non-participating Property or from a public street shall be screened by evergreen plantings at least six (6) feet tall at planting in staggered double rows, a berm, or an opaque fence.

H. Community Warning and Detection

The Operator shall fund, install, maintain, test, and replace the following before receiving carbon dioxide on site, in coordination with the EMA Director and as provided in the Emergency Preparedness Agreement. Where installation requires the consent of an owner, the Operator shall offer the installation at no cost and complete it upon consent.

1. Outdoor warning. Outdoor warning sirens or equivalent devices providing audible coverage of the entire Protective Action Zone and Transport Protective Corridor, controlled by the 911 center and EMA. Where existing County sirens serve these areas, the Operator may meet this requirement by funding their upgrade, integration, and maintenance.
2. Indoor warning. An indoor tone-alert radio or equivalent device for every Occupied Building and Critical Facility in the Notification Zone and Transport Protective Corridor, with strobe or bed-shaker accessories for hearing-impaired occupants; and funding for the County's use of the Integrated Public Alert and Warning System and a subscriber notification service serving the Notification Zone and Transport Protective Corridor.
3. Residential detectors. A carbon dioxide detector with local alarm on the lowest occupied level and near sleeping areas of every Occupied Building in the Protective Action Zone.
4. Critical Facility detectors. Continuous carbon dioxide detection with audible and visual alarms on the lowest occupied level, in any basement, and at each ventilation air intake of every Critical Facility in the Notification Zone or Transport Protective Corridor.
5. Vehicle detectors. Carbon dioxide detectors for every school bus of each school corporation whose attendance area includes any part of the Notification Zone or Transport Protective Corridor; every fire apparatus, ambulance, and law enforcement vehicle of each agency whose service area includes any part of those areas; and every County Highway Department vehicle. Vehicle detectors shall sample air at or near the fresh-air intake, operate whenever the ignition is on, sound an alarm audible in the driver compartment, and alarm at 5,000 ppm (caution) and 15,000 ppm (leave the area), with instruction cards for each alarm level.
6. Public guidance. Annual distribution, under EMA direction, of protective action guidance to every address in the Notification Zone and Transport Protective Corridor, including every Critical Facility in those areas, addressing sheltering on upper floors for short releases and evacuation crosswind and to higher ground for sustained releases.
7. Exercises and testing. An annual tabletop exercise and, at least every two (2) years, a full-scale exercise involving the Operator, EMA, fire, emergency medical services, law enforcement, schools, and receiving hospitals; and monthly testing of sirens and alert radios.
8. Maintenance records. Annual verification of the function of every detector, with written records provided to EMA.

These obligations continue until all Injection Wells are plugged and all Surface Facility components containing carbon dioxide are removed. Monitoring at topographic low points in the Protective Action Zone continues through the Monitoring Period.

I. Emergency Response Plan and Emergency Preparedness Agreement

1. The Operator shall prepare an Emergency Response Plan in coordination with EMA and local emergency responders, including:
 - a. The emergency and remedial response plan submitted for the Class VI Permit;
 - b. The health effects of carbon dioxide exposure on people and animals by concentration and duration;
 - c. Protective actions (shelter or evacuation) for each release scenario in the Release Consequence Analysis;
 - d. Evacuation routes that avoid travel toward the release and through low areas, and a plan for evacuating persons with limited mobility;
 - e. Road closure and traffic control points;
 - f. Notification of the 911 center within five (5) minutes of detecting any uncontrolled release;
 - g. Operator emergency personnel, contacts, and response times;
 - h. Coordination with receiving hospitals;
 - i. Response to a release occurring during a regional earthquake that damages roads and communications and strains local responders, including how the Operator will independently staff, equip, and supply its response;
 - j. Response to carbon dioxide detected in a building, well pit, mine opening, or low area within the Leakage Monitoring Area; and
 - k. Annual updates filed with EMA and the Zoning Administrator by January 31 of each year.
2. The Operator shall fund the equipment, training, and personnel that County emergency services need to carry out the Emergency Response Plan, in amounts established by an EMA needs assessment, including self-contained breathing apparatus, portable carbon dioxide and oxygen meters, vehicles able to operate in oxygen-deficient atmospheres, barricades, communications equipment, and initial and annual training for fire, emergency medical services, law enforcement, highway, 911, school transportation, and hospital emergency personnel.
3. Before a Zoning Compliance Permit is issued, the Operator and the County Commissioners shall execute an Emergency Preparedness Agreement implementing Subsection H and this Subsection. The Agreement shall include installation and replacement schedules; annual funding adjusted for inflation; reimbursement of the County, townships, and emergency service providers for the reasonable cost of responding to any release or emergency at or originating from the CCS Facility or deliveries to it; and a Bond securing no less than three (3) years of program costs.

J. Delivery of Carbon Dioxide by Vehicle

1. Where carbon dioxide will be delivered by truck or rail, the Applicant shall submit a Transportation Risk Assessment identifying the Haul Routes; the number, type, capacity, and schedule of deliveries; the five-year crash history of each Haul Route segment in the County; the estimated annual frequency of crashes and releases involving delivery vehicles in the County; and every Critical Facility and Occupied Building within the Transport Protective Corridor.

2. The Operator shall require, by contract with each carrier, that any crash, breakdown, or release involving a delivery vehicle within the County be reported immediately to 911, and shall report it to EMA within fifteen (15) minutes after learning of it.
3. The Operator shall keep a log of all deliveries and provide it to EMA monthly.
4. Nothing in this section regulates the routing, packaging, or operation of vehicles transporting hazardous materials, which are governed by 49 U.S.C. 5101 et seq. and applicable State law.

K. Monitoring Wells and Stratigraphic Test Wells

1. A Monitoring Well or Stratigraphic Test Well requires a Zoning Compliance Permit. The application shall include the written consent of the surface owner, the State and federal permits or authorizations for the well, if any, and a Site Plan.
2. The wellhead shall be at least 200 feet from the lot line of any Non-participating Property, 500 feet from any Occupied Building on a Non-participating Property, and 75 feet from any legal drain unless the Drainage Board approves a lesser distance. The distances to a Non-participating Property or Occupied Building may be reduced with the written consent of its owner, or to the extent the Class VI Permit requires the well at a specific location.
3. The wellhead shall be secured, fenced, and signed with a 24-hour emergency telephone number, and served by an approved drive.
4. A Stratigraphic Test Well shall not be converted to an Injection Well unless the site has been rezoned to the HI district and a special exception has been approved.

L. Leakage Pathways and Near-Surface Monitoring

1. Leakage Pathway Survey. The Applicant shall identify every Potential Leakage Pathway within the AOR and the Leakage Monitoring Area through:
 - a. Review of State well, boring, water well, mine, and abandoned mine land records; historic mine maps; historic aerial photography and topographic maps; and County and landowner records;
 - b. A high-resolution magnetic survey of the Leakage Monitoring Area designed to detect undocumented steel-cased wells, with field verification of anomalies;
 - c. Analysis of LiDAR terrain data for subsidence features, mine openings, abandoned well sites, and lineaments; and
 - d. Written inquiry to every owner of land in the Leakage Monitoring Area regarding known wells, shafts, sinkholes, and subsidence.

The survey shall be updated within thirty (30) days after any new Potential Leakage Pathway is discovered.

2. Near-Surface Monitoring Plan. The Operator shall implement an approved Near-Surface Monitoring Plan providing for:
 - a. A continuous carbon dioxide monitor at each Injection Well and Monitoring Well; each other well or boring that penetrates the Confining Zone; and each mine shaft, portal, air shaft, or drift opening within the Leakage Monitoring Area;

- b. Continuous ambient carbon dioxide monitors at the topographic low points, ravines, drainage ways, and strip-mine pits in the Leakage Monitoring Area where carbon dioxide would be expected to collect, at a density approved by the County's reviewer; and
 - c. At least twelve (12) months of baseline data from these monitors before injection.
 3. Building and enclosed-space detectors. The Operator shall offer, install upon consent, maintain, and replace a carbon dioxide detector with local alarm in the basement, cellar, crawlspace, or lowest level of every Occupied Building in the Leakage Monitoring Area, and in every enclosed well pit, pump house, and similar below-grade space in that area, and shall offer detectors to new Occupied Buildings within sixty (60) days after learning of their construction. Detectors installed under Subsection H satisfy this requirement if so located.
 4. Action levels.
 - a. The Operator shall notify the Zoning Administrator and EMA Director within twenty-four (24) hours, and begin an investigation within forty-eight (48) hours, when any monitor or detector reads 5,000 ppm or greater not explained by weather, occupancy, combustion appliances, or other ordinary sources.
 - b. The Operator shall immediately notify the 911 center and implement the Emergency Response Plan when any monitor or detector reads 15,000 ppm or greater, or when an investigation confirms that carbon dioxide from the CCS Project is reaching the land surface, a building, or a drinking-water aquifer.
 5. Response. When an investigation confirms, or the County's reviewer cannot rule out, that carbon dioxide from the CCS Project is reaching the land surface, a building, or a drinking-water aquifer, the Operator shall, at its expense:
 - a. Provide the County with copies of all related notices to and from State and federal agencies;
 - b. Install additional monitors sufficient to define the affected area;
 - c. Install ventilation or sub-slab depressurization systems in affected buildings upon the owner's consent;
 - d. Temporarily relocate occupants when required by the Emergency Response Plan or the EMA Director, and pay reasonable lodging and living costs;
 - e. Seal or re-plug the surface expression of the pathway where authorized by the agency with jurisdiction; and
 - f. Report to the Zoning Administrator within thirty (30) days and every thirty (30) days thereafter until the County's reviewer confirms the condition is resolved.
 6. Adjustment. After ten (10) years of injection, the Board of Zoning Appeals may approve a reduction in the density or frequency of monitoring under Paragraph 2 upon the written recommendation of the County's reviewer that the data show no leakage and the Plume is behaving as modeled. Detectors required by Paragraph 3 shall not be reduced.
 7. The obligations of this Subsection continue through the Monitoring Period.

M. Seismic Hazard

1. Seismic Hazard Assessment. The Applicant shall submit an assessment prepared by a qualified professional of: historical and recorded seismicity within one hundred (100) miles; ground motions at the site from scenario earthquakes in the Wabash Valley and New Madrid

seismic zones and from the current U.S. Geological Survey National Seismic Hazard Model; the potential for injection-induced seismicity; any seismic monitoring and response protocol submitted to the U.S. Environmental Protection Agency; and whether Surface Facility components, wellheads, and emergency shutdown systems can withstand the identified ground motions.

2. Design certification. A Registered Professional Engineer shall certify that Surface Facility components containing carbon dioxide, the control building, and the emergency shutdown system comply with the seismic provisions of the Building Code for facilities containing hazardous materials, and that emergency shutdown valves close automatically on loss of power or control signal and remain operable after the design earthquake.
3. Seismic monitoring. Before injection, the Operator shall fund the installation, operation, and maintenance of a network of at least four (4) seismic stations in or near the AOR capable of detecting and locating earthquakes of magnitude 1.0 or smaller within the AOR, with at least twelve (12) months of baseline data before injection, data shared with the Indiana Geological and Water Survey and published in near real time, and a strong-motion accelerometer at the Surface Facility. A network required by the Class VI Permit satisfies this requirement if it meets these standards and its data are provided to the County. The network shall operate through the Monitoring Period.
4. Post-earthquake inspection. After an earthquake of magnitude 2.0 or greater within the AOR, an earthquake of magnitude 4.0 or greater within fifty (50) miles, or ground shaking at the site of 0.05 g peak ground acceleration or more, the Operator shall:
 - a. Notify the EMA Director within one (1) hour;
 - b. Suspend receipt of carbon dioxide deliveries and surface transfers at the Surface Facility until the inspection is complete;
 - c. Inspect all Surface Facility components, wellheads, and emergency shutdown systems and file a written report on their condition with the EMA Director within seventy-two (72) hours; and
 - d. Provide the County with copies of all related notices and reports to State and federal agencies.

N. Groundwater and Water Supply Protection

1. Indicator parameters. Water testing under this Subsection shall include at least:
 - a. pH, specific conductance, temperature, dissolved oxygen, and oxidation-reduction potential;
 - b. Alkalinity, dissolved inorganic carbon, and dissolved carbon dioxide;
 - c. Carbon-13 isotope ratio of dissolved inorganic carbon, and other isotopic analyses recommended by the County's reviewer;
 - d. Total dissolved solids, chloride, bromide, sodium, calcium, magnesium, potassium, sulfate, and strontium;
 - e. Arsenic, barium, cadmium, chromium, iron, lead, lithium, manganese, selenium, and uranium;
 - f. Gross alpha, radium-226, and radium-228;

- g. Benzene, toluene, ethylbenzene, xylenes, and dissolved methane; and
 - h. Any tracer registered under Subsection O.
2. Private water wells. The Operator shall offer testing, at no cost to the owner, of every private water well in the Leakage Monitoring Area: two (2) rounds in different seasons before injection; annually during injection; every three (3) years thereafter through the Monitoring Period; and within thirty (30) days after any event reported under Subsection L, Subsection M, or Subsection P that affects that area. Results shall be provided to the owner and, with the owner's consent, to the County Health Department.
 3. Public Water Systems. For each Public Water System with a supply well or Wellhead Protection Overlay District within the AOR, the Leakage Monitoring Area, or two (2) miles of either, the Operator shall offer to fund and, with the system's written consent, install, operate, and maintain:
 - a. At least two (2) Sentinel Wells for each wellfield, at locations approved by the system and the County's reviewer;
 - b. Continuous sensors in each Sentinel Well for pH, specific conductance, temperature, and water level, reporting in real time to the system and the County;
 - c. Sampling of each Sentinel Well and of raw water from each supply well for the indicator parameters, quarterly during injection and semiannually thereafter through the Monitoring Period; and
 - d. At least four (4) quarterly rounds of baseline data before injection.This monitoring is in addition to the system's compliance monitoring under 327 IAC 8.
 4. Laboratory. Samples shall be analyzed by a laboratory certified by the Indiana Department of Environmental Management under documented chain of custody. The County may collect split samples at the Operator's expense. Results shall be provided to the County electronically within thirty (30) days after receipt.
 5. Alert. When an indicator parameter in a Sentinel Well, supply well, or private well moves outside the statistical limits established from baseline data, using the methods of the U.S. Environmental Protection Agency's Unified Guidance for groundwater monitoring statistics, and a resample within fourteen (14) days confirms it, the Operator shall within twenty-four (24) hours notify the well owner or system, the County Health Department, the EMA Director, and the Indiana Department of Environmental Management; increase sampling of affected and nearby wells to monthly; and pay for an investigation of the cause by the County's Qualified Independent Professional.
 6. Water replacement. When a water supply exceeds a primary drinking water standard, or changes so as to be unsuitable for its prior use, and the County's reviewer cannot rule out the CCS Project as a cause, the Operator shall:
 - a. For a private supply, provide a temporary supply within twenty-four (24) hours and a permanent replacement supply or treatment of equal quantity and quality, and pay ongoing operating costs for as long as the condition persists; and
 - b. For a Public Water System, pay the full cost of temporary and permanent replacement or treatment, including ongoing operation, for as long as the condition persists.

The Water Replacement Plan shall identify, for each Public Water System under Paragraph 3, alternate sources such as interconnection, new wells, or treatment, with cost and time estimates prepared by an independent Registered Professional Engineer.

O. Source Identification

1. Baseline characterization. Before injection, the Operator shall characterize the carbon dioxide to be injected, and shall fund characterization of natural carbon dioxide in groundwater in the Leakage Monitoring Area, sufficient to distinguish them. Characterization shall include at least the carbon-13 and carbon-14 (radiocarbon) content, oxygen isotopes, and noble gas composition.
2. Stream sampling. The Operator shall sample the carbon dioxide stream at the Surface Facility quarterly during injection for the parameters in Paragraph 1 and provide results to the Zoning Administrator.
3. Tracer registry. Any tracer compound added to carbon dioxide injected by a CCS Project shall be registered with the Zoning Administrator before use, and shall be chemically distinct from any tracer registered for any other CCS Project within twenty-five (25) miles. The Operator shall provide the County with a reference sample and the analytical method for detecting it.
4. Samples. The Operator shall retain a reference sample of the carbon dioxide stream from each quarterly sampling event through the Monitoring Period and make it available to the County's reviewer upon request.

P. Reporting and Public Information

1. Agency reports. Through the Monitoring Period, the Operator shall provide the Zoning Administrator with copies of all monitoring and reporting submittals made under the Class VI Permit and IC 14-39-2, including Plume and Pressure Front tracking and updated AOR delineations, within thirty (30) days after submittal, and updated GIS data of the Plume and AOR annually.
2. Notice of events. The Operator shall notify the EMA Director and Zoning Administrator within twenty-four (24) hours of: detection of carbon dioxide or injection fluid outside the permitted injection zone; loss of mechanical integrity in any well; any injection shutdown or reduction ordered by any agency; and any earthquake of magnitude 2.0 or greater within the AOR.
3. Recording. The Operator shall record in the office of the Vermillion County Recorder a memorandum of each pore space agreement and any integration order for each parcel within the Plume, and provide recorded copies to the Zoning Administrator within thirty (30) days after recording.
4. Hotline. The Operator shall maintain a public telephone line for complaints and questions, answered by a live person twenty-four (24) hours a day, log each call, provide the log to the Zoning Administrator monthly, and resolve legitimate complaints.
5. Website. The Operator shall maintain a public website posting the maps of the zones and the Leakage Monitoring Area; the protective action guidance; fence line, near-surface, seismic, and groundwater monitoring data; notices under Paragraph 2; and the annual Emergency

Response Plan summary. Data identifying a private residence or private well shall be posted only with the owner's consent.

Q. Construction, Roads, Drainage, and Agricultural Land

1. Hours. Construction other than well drilling and completion shall occur only between 7:00 a.m. and 7:00 p.m., Monday through Saturday.
2. Road Use Agreement. Before a Zoning Compliance Permit is issued, the Operator shall enter into a Road Use Agreement with the County Commissioners, approved by the County Highway Superintendent, providing for designated routes; pre- and post-construction video and photographic surveys; engineering evaluation and any needed strengthening of bridges and culverts at the Operator's expense; repair of all damage to pre-construction condition or better; dust control on unpaved streets; ongoing maintenance obligations for operating traffic; decommissioning traffic; and a Bond in an amount set by the Highway Superintendent.
3. Traffic Impact Analysis. A Traffic Impact Analysis prepared by a Registered Professional Engineer shall address construction and operating traffic, including all delivery vehicles.
4. Drainage. The Operator shall obtain Drainage Board approval for any crossing of or encroachment on a legal drain or its easement; locate private drain tile before construction through owners, tenants, and the Vermillion County Soil and Water Conservation District; repair damaged tile temporarily and immediately if water is flowing, and permanently within fourteen (14) days, weather permitting, so as to function as well as before; and correct any failed repair.
5. Agricultural land. On agricultural land disturbed by construction or decommissioning, topsoil shall be stripped, stored separately from subsoil, and replaced to its original depth; no topsoil shall be removed from the site; compaction and rutting shall be remediated; land shall be restored to its original grade, with a second restoration if settling occurs within one (1) year; and conservation practices shall be restored.

R. Seismic Surveys

Before any Seismic Survey conducted to evaluate or develop a CCS Project, the person conducting it shall:

1. Enter into a Road Use Agreement for the survey with the County Commissioners, including a Bond in an amount set by the Highway Superintendent;
2. Provide written notice at least thirty (30) days before the survey to every owner and occupant of land within one-half (1/2) mile of any survey line or source point;
3. Offer a documented pre-survey inspection, at no cost, of each structure, water well, and septic system within 660 feet of any vibroseis source point or 1,320 feet of any explosive source point;
4. Locate vibroseis source points at least 300 feet, and explosive source points at least 660 feet, from any Occupied Building, water well, or legal drain, unless the owner consents in writing;
5. Conduct operations only between 7:00 a.m. and 7:00 p.m.;

6. Repair or pay for all damage to structures, wells, septic systems, drain tile, crops, and streets caused by the survey; and
7. Provide the Zoning Administrator with a map of the completed survey lines.

S. Insurance, Indemnification, and Financial Security

1. Insurance. From issuance of a Zoning Compliance Permit through completion of decommissioning, the Operator shall maintain commercial general liability insurance of at least \$5,000,000 per occurrence and \$25,000,000 aggregate; pollution liability insurance of at least \$15,000,000 covering sudden and gradual releases, including releases of carbon dioxide; and automobile liability insurance as required by law. The County, its officials and employees, and the townships shall be named as additional insureds on a primary and non-contributory basis. Self-insurance is not permitted. Certificates shall be filed with the Zoning Administrator annually.
2. Indemnification. The Operator shall defend, indemnify, and hold harmless the County and its officials, employees, and agents from all claims, losses, and costs, including reasonable attorney fees, arising from the construction, operation, or decommissioning of the CCS Facility or deliveries to it.
3. Decommissioning Bond. Before a Zoning Compliance Permit is issued, the Operator shall provide a Bond equal to 115% of the estimated cost of decommissioning under Subsection T, without credit for salvage value. The Bond shall be an irrevocable letter of credit from a financial institution rated at least "A" by Standard & Poor's or "A2" by Moody's, or another form approved by the County Attorney. The estimate shall be updated every five (5) years by an independent Registered Professional Engineer and the Bond adjusted accordingly.
4. Long-Term Monitoring and Water Security Bond. Before receiving carbon dioxide on site, the Operator shall provide a separate Bond, in a form meeting Paragraph 3 or as a trust approved by the County Attorney, equal to the sum of the following, plus 15%:
 - a. The present value of the cost of performing the monitoring, detector, testing, and characterization obligations of Subsections H, L, M, N, and O through the Monitoring Period;
 - b. The cost of permanent replacement or treatment for the Public Water System under Subsection N with the highest replacement cost; and
 - c. The cost of permanent replacement for twenty percent (20%) of the private water wells in the Leakage Monitoring Area.

The estimate shall be prepared by an independent Registered Professional Engineer, reviewed by the County's reviewer, and updated every five (5) years, with the Bond adjusted accordingly.

5. Use of Bonds. The County may draw on a Bond under this Subsection if the Operator fails to perform a secured obligation within thirty (30) days after written notice, becomes subject to bankruptcy proceedings, or dissolves or abandons the CCS Project. These Bonds are separate from each other and from any financial responsibility required under the Class VI Permit.

T. Decommissioning

1. The Operator shall notify the Zoning Administrator by certified mail at least ninety (90) days before permanently ceasing injection or deliveries.
2. Within twelve (12) months after the later of the permanent cessation of injection or the plugging of wells as approved by the agency with jurisdiction, the Operator shall remove all Surface Facility components, foundations, and materials to a depth of at least forty-eight (48) inches; restore the site to its pre-construction grade and condition; and repair affected streets under the Road Use Agreement.
3. The Operator shall provide the Zoning Administrator with copies of all well plugging reports, the certificate of project completion under IC 14-39-2, and site closure authorization under the Class VI Permit.
4. Upon Abandonment of a CCS Facility, the County may draw on the Decommissioning Bond to complete decommissioning.

U. Changes and Transfer

1. Any of the following requires a new or amended special exception: an increase in the number of Injection Wells; relocation of an Injection Well; an increase in on-site storage; a change in the method of delivering carbon dioxide; or any change that enlarges any zone established by the Release Consequence Analysis. Like-kind replacement of equipment requires written notice to the Zoning Administrator.
2. The Operator shall notify the Zoning Administrator at least sixty (60) days before any transfer of ownership or operational control. The transferee shall, before the transfer takes effect, agree in writing to all conditions, commitments, and agreements; replace all insurance and Bonds; and provide current contact information.