

ORDINANCE #243___

AN ORDINANCE ENTITLED, AN ORDINANCE TO AMEND PORTIONS OF TITLE 4 ZONING: CHAPTER 4.01, “DEFINITIONS”; CHAPTER 4.06, “AGRICULTURE PRESERVATION DISTRICT (AG-P)”; CHAPTER 4.07 “MINI AGRICULTURE DISTRICT (M-AG)”; CHAPTER 4.15, “LIGHT INDUSTRIAL DISTRICT (LI)”; CHAPTER 4.16, “HEAVY INDUSTRIAL DISTRICT (HI)”; ALL ADOPTED BY ORDINANCE #243, AS AMENDED OF TITLE 4 ZONING ORDINANCE OF BROWN COUNTY, SOUTH DAKOTA.

Purpose and intent:

The Brown County Planning/Zoning Department and the Brown County Planning/Zoning Commission, recommend approval for the following Title 4 Zoning Ordinance changes within the jurisdictional areas of Brown County Planning/Zoning Department to the Board of County Commissioner’s.

BE IT ORDAINED by the Board of County Commissioners of Brown County, South Dakota: that CHAPTER 4.01, “DEFINITIONS” adopted by Ordinance #243 on _____, 2023 for Title 4 Zoning Ordinance of Brown County to be amended by the following Section:

CHAPTER 4.01 DEFINITIONS

4.0101 General. For the purpose of this Title, unless otherwise stated, words used in the present tense include the future; the singular number includes the plural and the plural the singular; the word shall is mandatory, not discretionary; the word may is permissive; the word person includes a firm, association, organization, partnership, trust, company or corporation, as well as, an individual; the word lot includes the word plat or parcel; and the words used or occupied include the words intended, designed, or arranged to be used or occupied.

4.0102 For the purpose of this Title, certain terms or words used herein shall be interpreted as follows:

Hazardous liquids: petroleum or a petroleum product; nonpetroleum fuel, including biofuel, that is flammable, toxic, or corrosive; or would be harmful to the environment if released in significant quantities; carbon dioxide transported by a hazardous liquid pipeline facility; and any substance the Secretary of Transportation decides may pose an unreasonable risk to life or property when transported by a hazardous liquid pipeline facility in a liquid state; and not subject to the Natural Gas Act (15 U.S.C. 717 et seq.)

Gas: any flammable, toxic, or corrosive gas not subject to the Natural Gas Act (15 U.S.C. 717 et seq.).

Pipeline Facility: pipeline, facility, or building used in transporting or treating hazardous liquid, gas, or carbon dioxide not subject to the Natural Gas Act (15 U.S.C. 717 et seq.).



BE IT ORDAINED by the Board of County Commissioners of Brown County, South Dakota: that CHAPTER 4.06, “AGRICULTURE PRESERVATION DISTRICT (AG-P)” adopted by Ordinance #243 on _____, 2023 for Title 4 Zoning Ordinance of Brown County to be amended by the following Section:

CHAPTER 4.06 AGRICULTURE PRESERVATION DISTRICT (AG-P)

4.0604 Conditional Uses. After notice and appropriate safeguards, the Zoning Board of Adjustment (BOA) may permit the following as Conditional Uses in the Agriculture Preservation District (AG-P).

23. Pipeline Facility.
24. Cannabis Dispensary (subject to Section 4.20).

4.0606 Minimum Setback Requirements.

1. All structures shall be built on parcels adjacent to regular maintenance roads, improved roads, or if the Township and Emergency Management approve site as an accessible road location.
2. Front Yard: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines.
3. Side Street on Corner Lot: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines.
4. Side Yard: All structures shall be set back not less than twenty (20) feet measured from side yard property lines.
5. Rear Yard: All structures shall be set back not less than twenty (20) feet measured from rear yard property lines.
6. A Pipeline Facility shall be setback a minimum of 1500 feet from the following “cautionary uses” (*when used in this section*) of schools, daycares, churches, residential dwelling, or any structure that has residential living quarters within.
 - A. The setback distance shall be measured from the center line of the proposed pipeline to the closest measurement of a parcel property line of the “cautionary uses” above.
 - i. A property owner may decide to sign a *setback waiver* to the minimum setback distance required from the piping to their property line and submit a proposed *setback waiver* to the Zoning BOA.
 - ii. The Zoning BOA may approve or deny each individual submittal of a *setback waiver* based on project location, area, size, and the properties use.
 - iii. If an overall pipeline facility project is approved, any *setback waiver* submitted through Zoning BOA must be filed at the Register of Deeds Office by the owner, towards each individual parcel’s legal description for a *setback waiver* to be approved, final and permanent.
 - B. The Zoning BOA may reduce minimum setbacks of a pipeline facility after a review of setback waivers and submission of project plans to the Zoning BOA ***in conjunction with an application for*** a conditional use permit.

BE IT ORDAINED by the Board of County Commissioners of Brown County, South Dakota: that CHAPTER 4.07, “MINI AGRICULTURE DISTRICT (M-AG)” adopted by Ordinance #243 on _____, 2023 for Title 4, Zoning Ordinance of Brown County to be amended by the following Section:

CHAPTER 4.07 MINI-AG DISTRICT (M-AG)

4.0704 Conditional Uses. After notice and appropriate safeguards, the Zoning Board of Adjustment (BOA) may permit the following as Conditional Uses in the Mini-Agriculture District (M-AG).

16. Pipeline Facility
17. Cannabis Dispensary (subject to Section 4.20).

4.0706 Minimum Setback Requirements.

1. All structures shall be built on parcels adjacent to regular maintenance roads, improved roads, or if the Township and Emergency Management approve site as an accessible road location.
2. Front Yard: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines.
3. Side Street on Corner Lot: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines.
4. Side Yard: All structures shall be set back not less than twenty (20) feet measured from side yard property lines.
5. Rear Yard: All structures shall be set back not less than twenty (20) feet measured from rear yard property lines.
6. A Pipeline Facility shall be setback a minimum of 1500 feet from the following “cautionary uses” (when used in this section) of schools, daycares, churches, residential dwelling, or any structure that has residential living quarters within.
 - A. The setback distance shall be measured from the center line of the proposed pipeline facility project to the closest measurement of a parcel property line of the “cautionary uses” above.
 - i. A property owner may decide to sign a *setback waiver* to the minimum setback distance required from the piping to their property line and submit a proposed *setback waiver* to the Zoning BOA.
 - ii. The Zoning BOA may approve or deny each individual submittal of a *setback waiver* based on project location, area, size, and the properties use.
 - iii. If an overall pipeline facility project is approved, any *setback waiver* submitted through Zoning BOA must be filed at the Register of Deeds Office by the owner, towards each individual parcel’s legal description for a *setback waiver* to be approved, final and permanent.
 - B. The Zoning BOA may reduce minimum setbacks of a pipeline facility after a review of setback waivers and submission of project plans to the Zoning BOA **in conjunction with an application for** a conditional use permit.

BE IT ORDAINED by the Board of County Commissioners of Brown County, South Dakota: that
CHAPTER 4.15, "LIGHT INDUSTRIAL DISTRICT (L-I)" adopted by Ordinance #243 on
_____, 2023 for Title 4 Zoning Ordinance of Brown County to be amended by the
following Section:

CHAPTER 4.15 LIGHT INDUSTRIAL DISTRICT (L-I)

- 4.1502 Permitted Principal Uses and Structures. The Zoning Board of Adjustment (BOA) shall review plans for the use, site, open storage on site and multiple uses on one site. The following principal uses, and structures shall be permitted in the Light Industrial District (LI)
- 4.1504 Conditional Uses. After the provisions of this Title relating to conditional uses have been fulfilled, the Zoning Board of Adjustment (BOA) may permit as conditional uses in Light Industrial Districts (L-I) any use, which is consistent with the intent of this district.
1. Pipeline Facility
 2. Cannabis Establishment
- 4.1507 Minimum Yard Requirements.
1. All structures shall be built on parcels adjacent to regular maintenance roads, improved roads, or if the Township and Emergency Management approve site as an accessible road location.
 2. Front Yard: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines as measured from the outermost edge of structures.
 3. Side Street on Corner Lot: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines as measured from the outermost edge of structures.
 4. Side Yard: All structures shall be set back not less than twenty (25) feet measured from side yard property lines as measured from the outermost edge of structures.
 5. Rear Yard: All structures shall be set back not less than twenty (25) feet measured from rear yard property lines as measured from the outermost edge of structures.
 6. A Pipeline Facility shall be setback a minimum of 1500 feet from the following "cautionary uses" (*when used in this section*) of schools, daycares, churches, residential dwelling, or any structure that has residential living quarters within.
 - A. The setback distance shall be measured from the center line of the proposed pipeline facility project to the closest measurement of a parcel property line of the "cautionary uses" above.
 - i. A property owner may decide to sign a *setback waiver* to the minimum setback distance required from the piping to their property line and submit a proposed *setback waiver* to the Zoning BOA.
 - ii. The Zoning BOA may approve or deny each individual submittal of a *setback waiver* based on project location, area, size, and the properties use.
 - iii. If an overall hazardous liquid pipeline project is approved, any *setback waiver* submitted through Zoning BOA must be filed at the Register of Deeds Office by the owner, towards each individual parcel's legal description for a *setback waiver* to be approved, final and permanent.
 - B. The Zoning BOA may reduce minimum setbacks of a pipeline facility after a review of setback waivers and submission of project plans to the Zoning BOA **in conjunction with an application for** a conditional use permit.

BE IT ORDAINED by the Board of County Commissioners of Brown County, South Dakota: that CHAPTER 4.16, "HEAVY INDUSTRIAL DISTRICT (H-I)" adopted by Ordinance #243 on _____, 2023 for Title 4 Zoning Ordinance of Brown County to be amended by adding the following Section.

CHAPTER 4.16 HEAVY INDUSTRIAL DISTRICT (H-I)

4.1604 Conditional Uses. After the provisions of this Title have been fulfilled, the Zoning Board of Adjustment (BOA) may permit as conditional uses in the Heavy Industrial District (H-I), the manufacturing, assembling, compounding, packaging, processing, or treatment of products or raw materials conducted within a structure or enclosed within a metal container, except those industries which are injurious, noxious, or hazardous by reasons of emission of odors, dust, fumes, smoke, noise, or vibrations, including but not limited to the following:

28. Pipeline Facility
29. Cannabis Establishment (subject to Section 4.20).

4.1607 Minimum Yard Requirements.

1. All structures shall be built on parcels adjacent to regular maintenance roads, improved roads, or if the Township and Emergency Management approve site as an accessible road location.
2. Front Yard: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines as measured from the outermost edge of structures.
3. Side Street on Corner Lot: All structures shall be set back not less than one hundred (100) feet measured from road right-of-way line or property lines as measured from the outermost edge of structures.
4. Side Yard: All structures shall be set back not less than twenty (25) feet measured from side yard property lines as measured from the outermost edge of structures.
5. Rear Yard: All structures shall be set back not less than twenty (25) feet measured from rear yard property lines as measured from the outermost edge of structures.
6. A Pipeline Facility shall be setback a minimum of 1500 feet from the following "cautionary uses" (when used in this section) of schools, daycares, churches, residential dwelling, or any structure that has residential living quarters within.
 - A. The setback distance shall be measured from the center line of the proposed pipeline facility project to the closest measurement of a parcel property line of the "cautionary uses" above.
 - i. A property owner may decide to sign a *setback waiver* to the minimum setback distance required from the piping to their property line and submit a proposed *setback waiver* to the Zoning BOA.
 - ii. The Zoning BOA may approve or deny each individual submittal of a *setback waiver* based on project location, area, size, and the properties use.
 - iii. If an overall pipeline facility project is approved, any *setback waiver* submitted through Zoning BOA must be filed at the Register of Deeds Office by the owner, towards each individual parcel's legal description for a *setback waiver* to be approved, final and permanent.
 - B. The Zoning BOA may reduce minimum setbacks of a pipeline facility after a review of setback waivers and submission of project plans to the Zoning BOA **in conjunction with an application for** a conditional use permit.

Passed and adopted on _____, 2023.

County Commission Chairperson
Brown County, SD

County Auditor
Brown County, SD

ORDINANCE MC16-179-23

AN ORDINANCE OF MINNEHAHA COUNTY, SD, AMENDING THE 1990 REVISED ZONING ORDINANCE FOR MINNEHAHA COUNTY BY AMENDING ARTICLE 3.00, A-1 AGRICULTURE DISTRICT, ARTICLE 4.00, RR RURAL RESIDENTIAL DISTRICT, ARTICLE 5.00, R-1 RESIDENTIAL DISTRICT, ARTICLE 6.00, C COMMERCIAL DISTRICT, ARTICLE 7.00, I-1 LIGHT INDUSTRIAL DISTRICT, ARTICLE 8.00, I-2 GENERAL INDUSTRIAL DISTRICT, ARTICLE 9.00, RC RECREATION/CONSERVATION DISTRICT, ARTICLE 12.00, ADDITIONAL USE REGULATIONS, ARTICLE 24, FEES; AND ARTICLE 26.00, DEFINITIONS.

WHEREAS, pursuant to SDCL Chpt 11-2, the Minnehaha County Board of County Commissioners has the authority to adopt for Minnehaha County a comprehensive county plan and zoning ordinance: to protect and guide the physical, social, economic, and environmental development of the county; to protect the tax base; to encourage a distribution of population or mode of land utilization that will facilitate the economical and adequate provisions of transportation, roads, water supply, drainage, sanitation, education, recreation, or other public requirements; to lessen governmental expenditure; and to conserve and develop natural resources; and

WHEREAS, pursuant to SDCL Chpt 11-2, the Minnehaha County Board of County Commissioners has the authority to amend, supplement, change, modify, or repeal the comprehensive plan and existing zoning ordinances to further the comprehensive plan's goals and objectives and in furtherance of the best interests of the County; and

WHEREAS, the traditional and predominant land uses within the unincorporated portions of Minnehaha County have been agricultural, residential, recreational, and above ground light and general industrial uses; and

WHEREAS, the proposed establishment of the bulk transportation of toxic, hazardous and regulated substances and gases by Transmission Pipeline (as defined below) through the County would constitute a new land use, which has never been a traditional land use within the County, and which will significantly impact future development of the County's land-use planning vision; and

WHEREAS, new and expanded land use and facilities for the bulk transportation of toxic, hazardous and regulated substance and gases through Minnehaha County would adversely impact the traditional and predominant mixed-uses throughout Minnehaha County; and

WHEREAS, the establishment, development and expansion of Transmission Pipelines for the bulk transportation of toxic, hazardous and regulated substances and gases in Minnehaha County would be inconsistent with the 1990 Revised Zoning Ordinance for Minnehaha County ("Comprehensive Plan") which provisions are a vital part of the County's policies and goals for future economic development; and

WHEREAS, the purpose of this ordinance is to implement Article 12.18 in a manner that (a) is not inconsistent with federal or state law, (b) treats all Transmission Pipelines in a similar manner, to the extent they are similarly situated, and (c) utilizes to the greatest extent feasible the land use and zoning regulations and processes already utilized in Minnehaha County.

NOW THEREFORE, BE IT ORDAINED BY MINNEHAHA COUNTY, SOUTH DAKOTA:

That Ordinance MC16-09, the 1990 Revised Zoning Ordinance for Minnehaha County is hereby amended as follows:

Section 1. That Article 3.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(O) Transmission Pipeline in accordance with Article 12.18.

Section 2: That Article 4.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(E) Transmission Pipeline in accordance with Article 12.18.

Section 3: That Article 5.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(E) Transmission Pipeline in accordance with Article 12.18.

Section 4: That Article 6.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(I) Transmission Pipeline in accordance with Article 12.18.

Section 5: That Article 7.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(G) Transmission Pipeline in accordance with Article 12.18.

Section 6: That Article 8.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(D) Transmission Pipeline in accordance with Article 12.18.

Section 7: That Article 9.03 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new use as follows:

(G) Transmission Pipeline in accordance with Article 12.18.

Section 8: That Article 12 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by adding a new subsection (12.18) as follows:

12.18 TRANSMISSION PIPELINES. Transmission Pipelines in accordance with the following:

- (A). Application Required.
 - (1). Any person who has filed an application (“Applicant”) with the South Dakota Public Utilities Commission (PUC) for a permit to construct, maintain, and operate a new Transmission Pipeline along, over, or across land in the jurisdiction of Minnehaha County shall apply to the Office of Planning and Zoning to permit the Planning Director to verify Applicant’s conformance with the conditions prescribed in this Article. The Applicant shall submit a written notice of such application to the Office of Planning and Zoning within thirty (30) days of filing the application with the PUC, unless the application was filed with the PUC prior to the effective date of this Article in which case the Applicant shall submit written notice under this Article within thirty (30) days of the effective date of this Article.
 - (2). Upon receiving a written notice set forth in Article 12.18(A)(1), the Planning Director shall and request sufficient documentation to evaluate the project according to requirements set forth in this Article 12.18.
- (B). Application Requirements for Pipeline Companies. Every Transmission Pipeline application pursuant to this Article shall submit the following documents and information to the Office of Planning and Zoning at the request of the Planning Director:
 - (1). All required forms prescribed by the Planning Director, in addition to all proposed surveyed route information prepared by a professional land surveyor licensed in South Dakota clearly indicating the center line of the Transmission Pipeline.
 - (2). A complete copy of the application for a permit filed with the PUC pursuant to or within applicable statutory provisions, and as the application for the PUC permit is amended or changed, the Applicant shall simultaneously provide updated information and documents to the County.
 - (3). A map identifying each entry into the County’s right-of-way, and each proposed crossing of a County road or other County property.
 - (4). A map and a list containing the names and addresses of all Affected Property Owners in the County.
 - (5). A set of plans and specifications showing the dimensions and locations of the Transmission Pipeline, including plans and specifications for all related facilities, and above-ground structures, including without limitation: pumps, valve sites and shutoff valves.
 - (6). A copy of Applicant’s emergency response and hazard mitigation plan as may be required pursuant regulations adopted by PHMSA emergency preparedness, emergency response, and hazard mitigation.
 - (7). A statement identifying any confidential information in the application and a request, if any, to withhold such information from public examination or disclosure. Any request to withhold such information

- from public examination or disclosure shall include the statutory basis for such claimed exemption. A failure to identify confidential information in the application may result in the County treating such information as a public record.
- (8). Applicant will be notified of a determination of its project as a special permitted use or the need to apply for a conditional use permit as soon as practicable but in no event more than 30 days after receiving approval of its permit by the PUC.
 - (9). Should Applicant’s application to the PUC for a permit to construct, maintain, and operate a new Transmission Pipeline along, over, or across land in the jurisdiction of Minnehaha County be denied, Applicant’s application pursuant to this Article will be denied as moot.
- (C). Separation Criteria. The minimum separation criteria in Table 1 shall be used in the routing and siting of a Transmission Pipeline. For the purposes of Article 12.18, a “dwelling” shall include any structure that includes residential living quarters within it.

TABLE 1: TRANSMISSION PIPELINE MINIMUM SEPARATION CRITERIA	
Dwellings, Churches, and Businesses	330 ft
Public Parks and Schools	1,000 ft
Municipal Boundaries By the Following Municipal Classifications as of the most recent Census Data	
First Class (Population of 5,000 and over)	5,280 ft (1 mile)
Second Class (Population between 500 and 5,000)	3,960 ft (3/4 mile)
Third Class (Population of less than 500)	2,640 ft (1/2 mile)

- (D). Measurement of separation. The separation distance set forth in Table 1 is to be measured from the center line of the proposed pipeline to the closest parcel boundary of a use or municipal boundary set forth in Table 1.
- (E). Reduction of Separation Criteria for Dwellings and Businesses.
 - (1). A property owner may grant a waiver of the minimum setback distance from the Transmission Pipeline in the same manner and with the same effect as a conveyance of an interest in real property.
 - (2). A waiver under this section shall be created in writing, and the waiver or a memorandum thereof shall be filed, duly recorded, and indexed in the office of the Minnehaha County Register of Deeds. Any such waiver runs with the land or lands benefited and burdened and terminates upon the conditions stated in the waiver.
 - (3). Any such waiver is void if the Transmission Pipeline fails to obtain the necessary permit(s) and authorization from the South Dakota Public Utilities Commission or other applicable federal agency for the construction of such Transmission Pipeline within five years after the effective date of the waiver.
- (F). Setback Reduction for Municipalities. In accordance with municipal extraterritorial jurisdiction (e.g. SDCL 9-29-1), a waiver from the minimum setback requirements may be obtained in the form of a signed resolution from the affected municipality’s elected body.

- (G). Contact Information. Applicant shall provide to the Minnehaha County Office of Emergency Management:
- (1). The exact content and all known dangers of the Regulated Substance, the flammable, toxic or corrosive gas or substance being transported in the Transmission Pipeline; and
 - (2). A copy of Applicant's emergency response and hazard mitigation plan as may be required pursuant regulations adopted by PHMSA emergency preparedness, emergency response, and hazard mitigation.
 - (3). The names, phone numbers, and contact information of the Applicant's emergency response personnel and personnel authorized by the Applicant to receive service and respond to all notices, demands, complaints, concerns or other requests; and
 - (4). Applicant shall notify the Minnehaha County Office of Emergency Management within ten (10) days if any of the information required under this Section changes.
- The requirements of this Section shall be binding upon Applicant's heirs, successors, assigns and agents.
- (H). Any term used in Article 12 which is not defined in Article 26.02 shall have the same meaning and definition as set forth in SDCL 49-41B-2, as in effect on July 1, 2023, and ARSD 20:10:22:01 as in effect on July 1, 2023.

Section 9: That Article 24 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by amending and adding the following terms as follows:

24.05 CONDITIONAL USE.

- (A). Except as required in Section 24.05(b) below, Aa fee of \$250.00 shall be charged for filing an application for a conditional use permit in any district.
- (B). Transmission Pipeline:
- (1). A fee of \$25,000.00 shall be charged for filing an application for a conditional use permit for a Transmission Pipeline.
 - (2). If a conditional use is granted for a Transmission Pipeline, the Applicant or actual operator or their successors, assigns and agents shall pay to the County an annual fee of \$300 per linear mile of pipeline within the County. The fee shall be used to defray the direct and indirect costs associated with general administration and enforcement of this section. The fee shall be payable by January 20th of each year and deposited in the general fund of the County.
- (C). If any use, for which a conditional use permit is required, is commenced prior to the application for a conditional use permit, the application fee shall be double the regular fee.

Section 10: That Article 26.02 of the 1990 Revised Zoning Ordinance for Minnehaha County, is hereby amended by amending and adding the following terms and definitions in alphabetical order:

306. GAS PIPELINE FACILITY. A pipeline, a right of way, a facility, a building, or equipment used in transporting gas or a Regulated Substance or for treating such gas or Regulated Substance during its transportation. This term does not include gas pipeline facilities used to transport “natural gas” as defined by the Natural Gas Act, 15 U.S.C. §717 et seq, as in effect on July 1, 2023.
327. HAZARDOUS LIQUID PIPELINE FACILITY. A pipeline, a right of way, a facility, a building or equipment used or intended to be used in transporting a hazardous liquid or a Regulated Substance.
575. REGULATED SUBSTANCE. A regulated substance shall include:
- a. ~~pesticides and fertilizers, All toxic and hazardous and toxic substances as defined designated by the United States Environmental Agency (EPA) pursuant to thru~~ any of the following: Clean Water Act (CWA), Toxic Substances Control Act (TSCA), Resource Conservation and Recovery Act (RCRA), Clean Air Act (CAA) or Comprehensive Environmental Response Compensation and Liability Act (CERCLA);
 - b. All petroleum and petroleum substances, kerosene, fuel oil, oil sludge, oil refuse, oil mixed with other wastes, crude oils, additives used in refining oils and gasoline;
 - c. Hazardous materials as defined by the United States Department of Transportation (DOT) and/or the Pipeline and Hazardous Materials Safety Administration (PHMSA) pursuant to the Pipeline Safety Act, 49 U.S.C. §60101 et seq, and as defined by 49 C.F.R. Subtitle B, et seq, as in effect on July 1, 2023;
 - d. This term does not include sewage and sewage sludge or “natural gas” as defined by the Natural Gas Act, 15 U.S.C. §717a(5), as in effect on July1, 2023.
672. TRANSMISSION PIPELINE. A transmission pipeline shall include:
- a. A Hazardous Liquid Pipeline Facility;
 - b. A Gas Pipeline Facility;
 - c. A “transmission facility” as defined by SDCL 49-41B-2.1, as in effect on July 1, 2023, used exclusively for the distribution, transportation or gathering of a hazardous liquid or a Regulated Substance;
 - d. A “modified facility” as defined by SDCL 49-41B-2.2, used exclusively for the distribution, transportation or gathering of a hazardous liquid or a Regulated Substance; and,
 - e. This term also includes a pipeline that transports hazardous liquid or Regulated Substance within a storage field or transports hazardous liquid or Regulated Substance from an interstate pipeline or storage facility to a distribution main.

Section 11: Severability Clause.

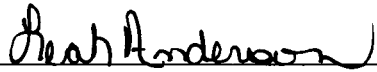
The provisions of this Ordinance are severable. If any provision of this Ordinance or the application thereof to any person or circumstance is held to be invalid, such invalidity shall not affect other provisions or applications of this Ordinance that can be given effect without the invalid provision or application.

Adopted this 6 day of June, 2023.
Effective: July 13, 2023

MINNEHAHA COUNTY

By: Jean Bender
Chair, Board of County Commissioners

ATTEST:



County Auditor

1 st Reading	May 2, 2023
Legal Ad. – Argus Leader, Brandon Valley Journal, Garretson Gazette, Minnehaha Messenger	May 9, 2023 May 10, 2023 May 11, 2023 May 12, 2023
2 nd Reading & Final Adoption	June 6, 2023
Fact of Adoption – Argus Leader, Brandon Valley Journal, Garretson Gazette, and Minnehaha Messenger	June 13+20, 2023 June 14+21, 2023 June 15+22, 2023 June 16+23, 2023
Effective Date	July 13, 2023

Proposed Lincoln County Transmission Pipeline Ordinance

AN ORDINANCE OF LINCOLN COUNTY, SD, AMENDING CHAPTER 154, ZONING, TO PROVIDE FOR REGULATION OF CARBON DIOXIDE PIPELINES

WHEREAS, pursuant to South Dakota Codified Laws Chapter 11-2, the Lincoln County Board of County Commissioners has the authority to adopt for Lincoln County a comprehensive county plan and zoning ordinance: to protect and guide the physical, social, economic, and environmental development of the county; to protect the tax base; to encourage a distribution of population or mode of land utilization that will facilitate the economical and adequate provisions of transportation, roads, water supply, drainage, sanitation, education, recreation, or other public requirements; to lessen governmental expenditure; and to conserve and develop natural resources; and

WHEREAS, pursuant to South Dakota Codified Laws Chapter 11-2, the Lincoln County Board of County Commissioners has the authority to amend, supplement, change, modify, or repeal the comprehensive plan and existing zoning ordinances to further the comprehensive plan's goals and objectives and in furtherance of the best interests of the County; and

WHEREAS, the traditional and predominant land uses within the unincorporated portions of Lincoln County have been agricultural, residential, recreational, and above ground light and general industrial uses; and

WHEREAS, the proposed establishment of the bulk transportation of toxic, hazardous and regulated substances and gases by Transmission Pipeline (as defined below) through the County would constitute a new land use, which has never been a traditional land use within the County, and which will significantly impact future development of the County's land-use planning vision; and

WHEREAS, new and expanded land use and facilities for the bulk transportation of toxic, hazardous and regulated substance and gases through Lincoln County would adversely impact the traditional and predominant mixed-uses throughout Lincoln County; and

WHEREAS, the establishment, development and expansion of Transmission Pipelines for the bulk transportation of toxic, hazardous and regulated substances and gases in Lincoln County would be inconsistent with the 2009 Revised Zoning Ordinance for Lincoln County ("Comprehensive Plan") which provisions are a vital part of the County's policies and goals for future economic development; and

WHEREAS, the purpose of this ordinance is to implement Section 154.254 in a manner that (a) is not inconsistent with federal or state law, (b) treats all Transmission Pipelines in a similar manner, to the extent they are similarly situated, and (c) utilizes to the greatest extent feasible the land use and zoning regulations and processes already utilized in Lincoln County.

NOW THEREFORE, BE IT ORDAINED BY LINCOLN COUNTY, SOUTH DAKOTA:

That Chapter 154, the Zoning Ordinance for Lincoln County, is hereby amended as follows:

Section 1. That § 154.057, permitted special uses in the A-1 Agricultural District, is hereby amended by adding a new use as follows:

(9) Transmission Pipeline in accordance with § 154.254.

Section 2. That § 154.077, permitted special uses in the RR Rural Residential District, is hereby amended by adding a new use as follows:

(D) Transmission Pipeline in accordance with § 154.254.

Section 3. That § 154.097, permitted special uses in the R-1 Residential District, is hereby amended by adding a new use as follows:

(C) Transmission Pipeline in accordance with § 154.254.

Section 4. That § 154.117, permitted special uses in the C Commercial District, is hereby amended by adding a new use as follows:

(F) Transmission Pipeline in accordance with § 154.254.

Section 5. That § 154.137, permitted special uses in the I-1 Light Industrial District, is hereby amended by adding a new use as follows:

(J) Transmission Pipeline in accordance with § 154.254.

Section 6. That § 154.157, permitted special uses in the I-2 General Industrial District, is hereby amended by adding a new use as follows:

(E) Transmission Pipeline in accordance with § 154.254.

Section ~~2~~7: That § 154.177 permitted special uses in the RC Recreation/Conservation District, is hereby amended by adding a new use as follows:

(G) Transmission Pipeline in accordance with § 154.254.

Section 38: That Chapter 154 of the Zoning Ordinance for Lincoln County, is hereby amended by adding a new § 154.254 as follows:

§ 154.254 TRANSMISSION PIPELINES. Transmission Pipelines in accordance with the following:

A. Application Required.

1. Any person who has filed an application (“Applicant”) with the South Dakota Public Utilities Commission (PUC) for a permit to construct, maintain, and operate a new Transmission Pipeline along, over, or across land in the jurisdiction of Lincoln County shall apply to the Office of Planning and Zoning to permit the Planning Director to verify Applicant’s conformance with the conditions prescribed in this Article. The Applicant shall submit the application to the Office within seven (7) days of filing the petition with the PUC, unless the application was filed with the PUC prior to the effective date of this Article in which case the Applicant shall apply and submit its application under this Article within seven (7) days of the effective date of this Article.
2. Upon receiving an application, the Planning Director shall review the application according to requirements set forth in this section.

B. Application Requirements for Pipeline Companies. Every Transmission Pipeline application pursuant to this Article shall submit the following documents and information to the Office of Planning and Zoning.

1. All required forms prescribed by the Planning Director, in addition to all proposed surveyed route information prepared by a professional land surveyor licensed in South Dakota clearly indicating the center line of the Transmission Pipeline.
2. A complete copy of the application for a permit filed with the PUC pursuant to or within applicable statutory provisions, and as the application for the PUC permit is amended or changed, the Applicant shall simultaneously provide updated information and documents to the County.
3. A map identifying each entry into the County’s right-of-way, and each proposed crossing of a County road or other County property.
4. A map and a list containing the names and addresses of all Affected Property Owners in the County.
5. A set of plans and specifications showing the dimensions and locations of the Transmission Pipeline, including plans and specifications for all related facilities, and above-ground structures, including without limitation: pumps, valve sites and shutoff valves.
6. A draft or final version of Applicant’s emergency response and hazard mitigation plan as may be required pursuant regulations adopted by PHMSA emergency preparedness, emergency response, and hazard mitigation.
7. A statement identifying any confidential information in the application and a request, if any, to withhold such information from public examination or disclosure. Any request to withhold such information from public examination or disclosure shall include the statutory basis for such claimed exemption. A failure

to identify confidential information in the application may result in the County treating such information as a public record.

- C. Separation Criteria.** The minimum separation criteria in Table 1 shall be used in the routing and siting of a Transmission Pipeline. For the purposes of this section, a “dwelling” shall include any structure that includes residential living quarters within it.

TABLE 1: TRANSMISSION PIPELINE MINIMUM SEPARATION CRITERIA	
Dwellings, Churches, and Businesses and Eligible Building Sites	2,000 750 ft
Public Parks, Schools and Healthcare Facilities	2,640 ft (1/2 mile)
Municipal Boundaries By the Following Municipal Classifications as of the most recent Census Data	
First Class (Population of 5,000 and over)	5,280 ft (1 mile)
Second Class (Population between 500 and 5,000)	3,960 ft (3/4 mile)
Third Class (Population of less than 500)	2,640 ft (1/2 mile)

- D. Measurement of separation.** The separation distance set forth in Table 1 is to be measured from the center line of the proposed pipeline to the closest parcel boundary of a use or municipal boundary set forth in Table 1.

E. Reduction of Separation Criteria for Dwellings and Businesses.

1. A property owner may grant a waiver of the minimum setback distance from the Transmission Pipeline in the same manner and with the same effect as a conveyance of an interest in real property.
2. A waiver under this section shall be created in writing, and the waiver or a memorandum thereof shall be filed, duly recorded, and indexed in the office of the Lincoln County Register of Deeds. Any such waiver runs with the land or lands benefited and burdened and terminates upon the conditions stated in the waiver.
3. Any such waiver is void if the Transmission Pipeline fails to obtain the necessary permit(s) and authorization from the South Dakota Public Utilities Commission or other applicable federal agency for the construction of such Transmission Pipeline within five years after the effective date of the waiver.

- F. Setback Reduction for Municipalities.** In accordance with municipal extraterritorial jurisdiction (e.g. SDCL 9-29-1), a waiver from the minimum setback requirements may be obtained in the form of a signed resolution from the affected municipality’s elected body.

G. Contact Information. Applicant shall provide to the Lincoln County Office of Emergency Management:

1. The exact content and all known dangers of the Regulated Substance, the flammable, toxic or corrosive gas or substance being transported in the Transmission Pipeline;
2. A copy of Applicant’s emergency response and hazard mitigation plan as may be required pursuant regulations adopted by PHMSA emergency preparedness, emergency response, and hazard mitigation;

3. Other information that may be reasonably requested by the Lincoln County Office of Emergency Management;
4. The names, phone numbers, and contact information of the Applicant's emergency response personnel and personnel authorized by the Applicant to receive service and respond to all notices, demands, complaints, concerns or other requests; and
5. Applicant shall notify the Lincoln County Office of Emergency Management within ten (10) days if any of the information required under this Section changes.

H. Assignment and Transfer. The requirements of this Section shall be binding upon Applicant's heirs, successors, assigns and agents. The County permit shall not be transferable without the approval of the County.

I. Definitions. Any term used in this section which is not defined in § 154.021 shall have the same meaning and definition as set forth in SDCL 49-41B-2, as in effect on July 1, 2023, and ARSD 20:10:22:01 as in effect on July 1, 2023.

J. Schedule of Fees, Charges, and Expenses. Sections 154.470 to 154.478 notwithstanding, at the time of filing an application an applicant shall deposit with the County an initial amount of funds expected to be sufficient to pay for the estimated cost of investigating, reviewing, processing, and serving notice of an application. The amount shall be deposited with the County treasurer and credited to a sub-fund within the designated revenue fund and shall be disbursed on vouchers approved by the County for the actual cost of investigating, reviewing, processing, and serving notice of the application. The initial fee shall be \$25,000. In the event the initial fee is not adequate to pay for the County's permit review and any necessary studies, County may require that applicant deposit a supplemental fee to pay for the cost of investigating, studying, reviewing, processing, serving notice of the application, and other County costs.

Section 49: That § 154.021 of the Zoning Ordinance for Lincoln County, is hereby amended by amending and adding the following terms and definitions in alphabetical order:

GAS PIPELINE FACILITY. A pipeline, a right of way, a facility, a building, or equipment used in transporting gas or a Regulated Substance or for treating such gas or Regulated Substance during its transportation. This term does not include gas pipeline facilities used to transport "natural gas" and subject to the Natural Gas Act, 15 U.S.C. §717 et seq, as in effect on July 1, 2023.

HAZARDOUS LIQUID PIPELINE FACILITY. A pipeline, a right of way, a facility, a building or equipment used or intended to be used in transporting a hazardous liquid or a Regulated Substance.

REGULATED SUBSTANCE. A regulated substance shall include: pesticides and fertilizers; hazardous and toxic substances designated by the EPA through any of the following: Clean Water Act, being 33 U.S.C. §§ 1251 et seq., Toxic Substances Control

Act, being 15 U.S.C. §§ 2601 et seq., Resource Conservation and Recovery Act, being 42 U.S.C. §§ 6901 et seq., or Comprehensive Environmental Response Compensation and Liability Act, being 42 U.S.C. §§ 9601; a hazardous liquid as defined by the Pipeline and Hazardous Materials Safety Administration (PHMSA) pursuant to the Pipeline Safety Act, 49 U.S.C. §60101 et seq.; petroleum and petroleum substances; kerosene; fuel oil; oil sludge; oil refuse; oil mixed with other wastes; crude oils; additives used in refining oils; and gasoline. This term does not include sewage and sewage sludge or “natural gas” as defined by the Natural Gas Act, 15 U.S.C. §717a(5).

TRANSMISSION PIPELINE. A Hazardous Liquid Pipeline Facility or a Gas Pipeline Facility. This term also includes: a “transmission facility” as defined by SDCL 49-41B-2.1, as in effect on July 1, 2023; a “modified facility” as defined by SDCL 49-41B-2.2. This term also includes a pipeline that transports hazardous liquid or gas within a storage field or transports hazardous liquid or gas from an interstate pipeline or storage facility to a distribution main.

Section 510: Severability Clause.

The provisions of this Ordinance are severable. If any provision of this Ordinance or the application thereof to any person or circumstance is held to be invalid, such invalidity shall not affect other provisions or applications of this Ordinance that can be given effect without the invalid provision or application.

Adopted this ____ day of _____, 2023.

Effective: _____

LINCOLN COUNTY

By: _____
Chair, Board of County Commissioners

ATTEST:

County Auditor

TITLE 17.29 HAZARDOUS LIQUID PIPELINE (HLP)

Chapter 17.29 Hazardous Liquid Pipeline (HLP)

- 17.2901 Intent. The intent of this Ordinance is to set forth guidelines for routing or location of HLP as allowed by 49 U.S.C. 60104€.
- 17.2902 Applicability. The requirements of this Ordinance shall apply to all HLPs proposed after the effective date of this Ordinance. HLPs for which a permit has been issued prior to the effective date of this ordinance by the South Dakota Public Utilities Commission under South Dakota Codified Law Chapter 49-41B shall not be required to meet the requirements of this Ordinance; provided, that any such pre-existing HLP, which does not provide transportation services for a continuous period of twelve (12) months, shall meet the requirements of this Ordinance prior to recommencing transportation services.
- 17.2903 More Stringent Standards Required. In the event that a permit granted by the South Dakota Public Utilities Commission imposes a similar standard to a County standard, a HLP owner or operator shall comply with the more stringent standard, unless the Public Utilities Commission expressly finds under South Dakota Codified Law Section 49-41B-28 that the County standard is unreasonably restrictive.
- 17.2904 Conditional Use Permit Required. A Pipeline Company that has filed a verified petition with the PUC, Public Utility Commission, asking for a permit to construct, maintain, and operate a new HLP along, over, or across land in Spink County shall submit an Application to the County Zoning Administrator for a Conditional Use Permit.
- 17.2905 Conditional Uses. After notice, the Zoning Board of Adjustment (BOA) and County Commission may permit a Hazardous Liquid Pipeline as Conditional Uses in the following Districts:
1. Ag District
 2. Commercial District
 3. Highway Commercial District
 4. Industrial District
- 17.2906 Minimum Setback Requirements.
1. An HLP shall be setback a minimum of half a mile or 2,640 feet from the following: schools, daycares, churches, residential dwelling, livestock facilities, or any structure that has residential living quarters within.

- a) The setback distance shall be measured from the center line of the proposed HLP to the closest measurement of a parcel's property line.
2. The setback distance for High Consequences Areas shall be a minimum of two (2) miles measured from the center line of the proposed HLP to the parcel property line of the High Consequence Area.

17.2907 Setback Waiver or Variance.

1. With the exception of setbacks from High Consequence areas, the developer of a HLP may apply for a reduction of the minimum setback, in the form of a setback waiver or setback variance, which is set forth in Section 17.2906.
2. Variance from Setback Distance. The developer of an HLP may apply for a setback variance as part of its application for a conditional use permit. The setback variance must be submitted as part of the developer's application for a conditional use permit. The procedure for requesting a setback variance as part of an HLP is as follows:
 - a) After a review of all project plans, and the presentation to the Zoning Board of Adjustment, the Zoning Board of Adjustment will make a recommendation to the Spink County Commission regarding each setback variance.
 - b) The County Commission may approve or deny each submittal of a setback variance based on the project location, area, size, and the property use.
 - c) If the HLP project is approved, any setback variance submitted and approved as part of the conditional use permit application must be filed at the Spink County Register of Deeds Office by the developer towards each individual parcel's legal description for a setback variance to be approved, final and permanent.
3. Setback Waiver. The developer of an HLP may obtain a setback waiver from an individual property owner. The setback waiver must be submitted as part of the developer's application for a conditional use permit. The procedure for submitting a setback waiver is as follows:
 - a) After a review of all project plans and the presentation to the Zoning Board of Adjustment, the Zoning Board of Adjustment will make a recommendation to the Spink County Commission regarding each setback waiver.

- b) The County Commission may approve or deny each individual submittal of a setback waiver based on the project location, area, size, and the property use.
- c) If the HLP project is approved, any setback waiver submitted and approved as part of the conditional use permit application must be filed at the Spink County Register of Deeds Office by the owner towards each individual parcel's legal description for a setback waiver to be approved, final and permanent.

17.2908

Permit Application Requirements for HLP

1. A n HLP Company applying for a Conditional Use Permit for a Hazardous Liquid Pipeline pursuant to this Article shall submit the following documents and information to the Planning & Zoning Administrator:
 - a) The information required for a Conditional Use Permit as described in APPLICATION FOR CONDITIONAL USE form, including all required forms listed in 17.2907.
 - b) A complete copy of the application for a permit filed with the PUC. This requirement is an ongoing requirement, and as the application for the PUC permit is amended or changed, the Pipeline Company shall provide updated information and documents to Spink County.
 - c) A map identifying each proposed crossing of any road or property located in Spink County.
 - d) A map and a list containing the names and addresses identifying each landowner of proposed HLP crossing in Spink County. The map and list shall include and identify all Property Owners who have executed an Easement, Waiver from Setback or who have been or will be contacted about the execution of a Waiver from Setback.
 - e) A map showing locations for all related facilities and above-ground structures, such as pumps, lift-stations, or substations.
 - f) All application fees for the Conditional Use Permit, Building Permit, or any other fees associated with HLP permit, must be paid at time of filing.
2. Complete Application Required. Upon receipt of an application, the Spink County Planning & Zoning Director will review the information provided and follow the guidelines set forth in the PROCEDURE FOR FILING CONDITIONAL USE PERMIT. In the event the application is deficient, the Planning and Zoning Director will reject the application and provide applicant with a list of deficiencies. Applicant may submit a revised application including the omitted information within 10 days of notification.

- a) No HLP may be constructed in Spink County until the County has approved a Conditional Use Permit for the HLP.
- b) A Conditional Use Permit granted to a HLP Company pursuant to this Article is not transferrable to any Person. A Pipeline Company, or its successors in interest, shall apply for a new Conditional Use Permit whenever the Hazardous Liquid Pipeline is transferred, or its use is materially or substantially changed or altered.

TITLE 17.02 DEFINITIONS

Chapter 17.02 Definitions

17.0201 General. For the purpose of this Ordinance, unless otherwise stated, words used in the present tense include the future; the singular number includes the plural and the plural the singular; the word *shall* is mandatory, not discretionary; the word *may* is permissive; the word *person* includes a firm, association, organization, partnership, trust, company or corporation, as well as, an individual; the word *lot* includes the word *plat* or *parcel*; and the words *used* or *occupied* include the words *intended*, *designed*, or *arranged to be used or occupied*.

17.0202 For the purpose of this Ordinance, certain terms or words used herein shall be interpreted as follows:

Abandoned or Existing Farm Site. Must be a site that includes at least three of the following four criteria:

1. Contains an existing shelterbelt on at least two (2) sides;
2. Contains a usable well;
3. Presently contains outbuildings; and
4. Has an existing approach onto a public road or highway.

Accessory Use or Structure. A use or structure on the same lot with and of a nature customarily incidental and subordinate to the principle use or structure. Examples are:

1. Is customary and clearly incidental to the principal building or principal use;
2. Serves exclusively the principal building or principal use;
3. Is subordinate in area, extent or purpose to the principal building or principal use served;
4. Contributes to the comfort, convenience or necessity of occupants of the principal building or principal use served; and
5. Is located on the same zoning lot as the principal building or principal use served, with the single exception of such accessory off-street

parking facilities as are permitted to locate elsewhere than on the same zoning lot as the building or use served.

Acre(s), Gross, the Total Acreage of. (1) A sub-division; (2) a contiguous zoning district; or (3) a planned development. Computations shall include all public right-of-ways except: (1) boundary streets of which only one-half of the right-of-way shall be used in any computation; and (2) publicly-owned land used for community facilities such as parks, schools, libraries, etc.

Acre(s) Net. Same as Gross Acres but excluding all public right-of-ways and publicly-owned land utilized for community facilities.

Approach. A public or private roadway or driveway connection between the outside edge of the shoulder or curb line and the right-of-way line of a public or county road, intended to provide vehicular access to, from, or across said public or county road and the adjacent or adjoining property.

Automobile, Abandoned. Any motor vehicle, or portion thereof, which when operated on a public roadway is required to be registered by the State of South Dakota, whose registration has been expired for a period of one (1) month or more. Notwithstanding the foregoing definition, a motor vehicle or portion thereof stored within a permitted building or structure shall not be considered to be an abandoned automobile.

Automobile Service Station. Building and premises where gasoline, oil, grease, batteries, tires and automobile accessories may be supplied and dispensed at retail, and where, in addition, the following services may be rendered and sales made, and no other:

1. Sale and servicing of spark plugs, batteries, and distributors and distributor parts;
2. Tire servicing and repair, but not recapping or re-grooving;
3. Replacement of mufflers and tail pipes, water hoses, fan belts, brake fluid, light bulbs, fuses, floor mats, seat covers, windshield wipers and wiper blades, grease retainers, wheel bearing, mirrors, and the like;
4. Radiator cleaning and flushing; washing and polishing, sale of automotive washing and polishing materials;
5. Greasing and lubrication;
6. Providing and repairing fuel pumps, oil pumps, and lines;

7. Minor servicing and repair of carburetors;
8. Adjusting and repairing brakes;
9. Emergency wiring repairs;
10. Minor motor adjustments not involving removal of the head or crankcase or racing the motor:
11. Sales of cold drinks, packaged foods, tobacco, and similar convenience goods for automobile service station customers, as accessory and incidental to principle operation;
12. Provision of road maps and other informational material to customers; and
13. Provision of restroom facilities.

Uses permissible at an automobile service station do not include major mechanical and body work, straightening of body parts, painting, welding, storage of automobiles not in operating condition, or other work involving noise, glare, fumes, smoke or other characteristics to an extent greater than formally found in automobile service stations. An automobile service station is neither a repair garage nor a body shop.

Basement. Any floor below the first story of a building unless construed to be a story as defined therein.

Billboard. See Sign, Off-Site.

Building. The word *building* includes the word *structure* and is a structure, which is entirely separate from any other structure by space or by walls in which there are no communicating doors or windows or similar openings. A principle building, including covered porches and paved patios, is a building in which is conducted the principle use of the lot on which it is situated. In any residential district, any dwelling shall be deemed to be the principle building on the lot on which the same is situated.

Commission. The Spink County Planning and Zoning Board.

Concentrated Animal Feeding Operation (CAFO). A lot or facility that stables or confines and feeds or maintains animals for a total of 45 days or more in any 12-month period and where crops, vegetation, forage growth, or post harvest residues are not sustained over any portion of the lot or facility. and meets the criteria for class sizes as found in Table 1.1.1 (See Appendix D).

Conditional use. Use of property in a zone for a particular purpose that is allowed under conditions set forth in the zoning ordinance.

County Board. The Spink County Board of Commissioners.

Development. Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, paving, excavation, or drilling operations located within the area of special flood hazard.

Drive-in Restaurants or Refreshment Stands. Any place or premises used for sale, dispensing, or serving of food, refreshments, or beverages in automobiles, including those establishments where customers may serve themselves and may eat or drink the food, refreshments, or beverages on the premises.

Dwelling, Mobile Home. See Mobile Home.

Dwelling, Multiple Family. A residential building designed for or occupied by two (2) or more families living independently of each other and doing their own cooking in said building. The number of families in residence shall not exceed the number of dwelling units provided.

Dwelling, Single Family. A detached residential dwelling unit other than a mobile home designed for and occupied by one (1) family.

Family. An individual or two or more persons, related by blood or marriage, living together as a single-housekeeping unit in a dwelling unit, in each instance with no more than two non-related people being housed in the same dwelling unit, but provided further that domestic servants employed on the premises may be housed on the premises without being counted as a family or families. The word *family* shall not include groups occupying nursing homes, group houses, fraternity houses, sorority houses, dormitories, and barracks; however, a portion of a building in this category may consist of one or more dwelling units occupied by a family or families.

Farm. A tract of land together with fields, buildings, farm implements, animals, and personnel for the intended purpose of producing crops of which livestock feeding may be a part of.

Fence. A structure used as a boundary, screen, separation, means of privacy, protection or confinement, and is constructed of wood, plastic, metal, wire mesh, masonry or other similar materials and is used as a barrier of some sort.

Farm Unit. All buildings and structures needed in agricultural operation, including dwellings for owners, operators, farm laborers employed on the farm and other family members.

Flood or Flooding. A general and temporary condition of partial or complete inundation of normally dry land areas from:

1. The overflow of inland or tidal waters; and/or
2. The unusual and rapid accumulation or runoff of surface waters from any source.

Flood Hazard Boundary Map (FHBM). The official map issued by the Federal Insurance Administration where the areas of special flood hazard have been designated Zone A.

Floodway. The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface.

Floor Area. The sum of all gross horizontal area of the several floors of a building and its accessory buildings on the same lot excluding basement floor areas and non-enclosed portions of the structure. All dimensions shall be measured between exterior faces of walls.

Habitable Floor. Any floor usable for living purposes, which includes working, sleeping, eating, cooking or recreation, or a combination thereof. A floor used only for storage purposes is not a "habitable floor".

Hazardous liquids. Hazardous liquids includes petroleum or a petroleum product, nonpetroleum fuel, including biofuel, that is flammable, toxic, or corrosive; or would be harmful to the environment if released in significant quantities; carbon dioxide transported by a hazardous liquid pipeline facility; and any substance the Secretary of Transportation decides may pose an unreasonable risk to life or property when transported by a hazardous liquid pipeline facility in a liquid state and not subject to the Natural Gas Act (15 U.S.C. 717 et seq.)

Hazardous liquid pipelines: Hazardous liquid pipelines are defined per U.S. 49 CFR 195 as all parts of a pipeline facility through which a hazardous liquid moves in transportation, or transports hazardous liquid from an interstate pipeline or storage facility to a distribution main or a large volume hazardous liquid or gas user, but not limited to, line pipe, valves and other appurtenances connected to line pipe, pumping units, fabricated assemblies associated with pumping units, metering and delivery stations and fabricated assemblies therein, and breakout tanks.

High Consequence Areas. Structures containing 10 or more persons with limited mobility, such as nursing homes and hospitals, and for structures with permitted occupancies of 100 or more persons, such as schools, churches, shopping, and entertainment facilities.

Greenhouse. A building whose roof and sides are made largely of glass or other transparent or translucent material and in which the temperature and humidity can be regulated for the cultivation of delicate or out-of-season plants for subsequent sale or for personal enjoyment.

High Water Mark. Point one (1) foot above where permanent vegetation begins.

Home Occupation. An occupation conducted on the premises provided that:

1. The use of the dwelling unit for home occupation shall be clearly incidental and subordinate to its use for residential purposes by its occupants and not more than thirty (30%) percent of the floor area of the dwelling shall be used in the conduct of the home occupation.
2. Any need for parking generated by the conduct of such home occupation shall be met off the street and other than in a required front yard.
3. No equipment or process shall be used in such home occupation which creates noise, vibration, glare, fumes, odor, or electrical interference detectable to the normal senses of the lot, if the occupation is conducted in a single-family residence. In the case of electrical interference, no equipment or process shall be used which creates visual or audible interference in any radio or television receiver off the premises, or causes fluctuations in line voltage off the premises.
4. No more than one other person, in addition to members of the family residing on the premises shall be engaged in such occupation.
5. There shall be no change in the outside appearance of the building or premises, or other visible evidence of the conduct of such home occupation other than one sign, not exceeding one (1) square foot in area, non-illuminated and mounted flat against the wall of the principle building.
6. Any accessory buildings located on the same legal description as the home may be used as a home occupation provided the above apply. (6-25-08 effective)

Kennels. Any lot, structure, or premise where four (4) or more dogs and/or ten (10) or more cats four (4) months of age are kept.

Livestock Facilities: Agricultural Facility that contains 100 or more animal units.

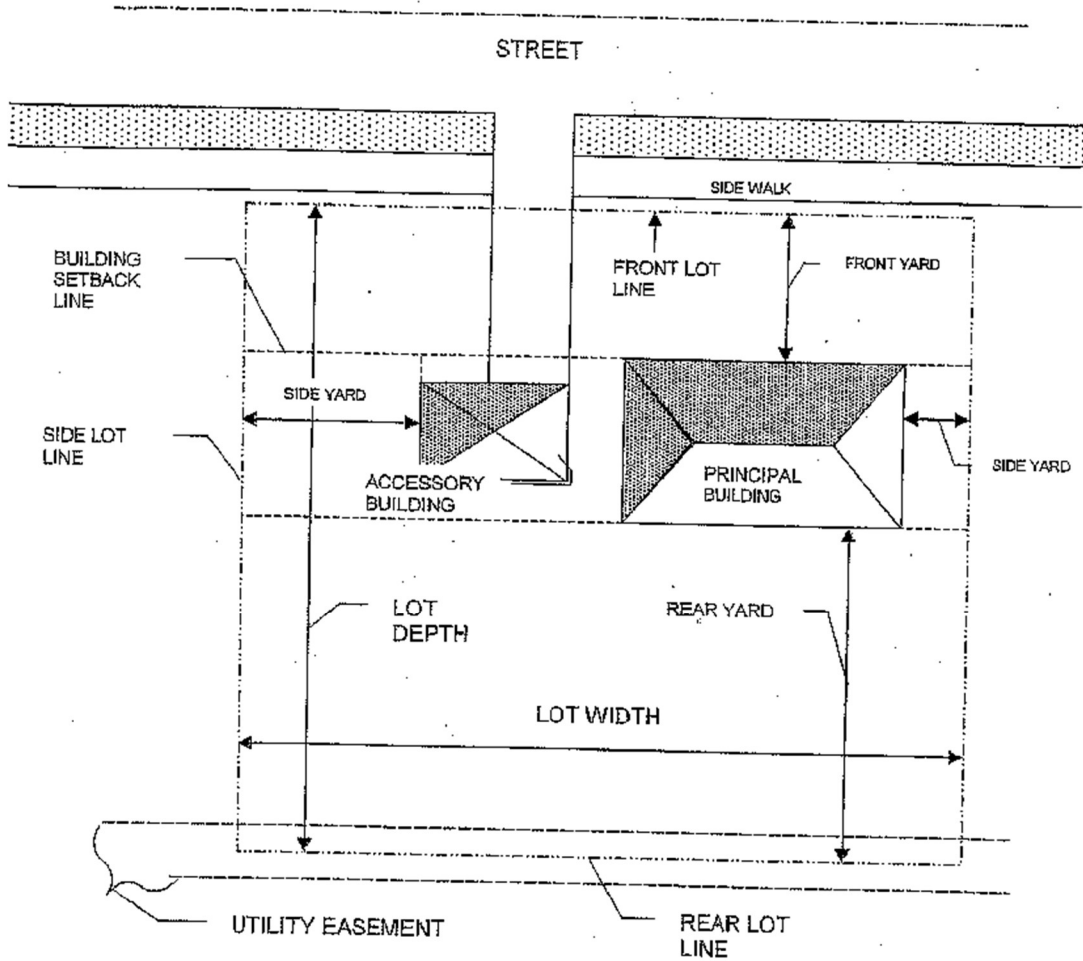
Loading Space, Off-Street. Adequate space, logically and conveniently located for bulk pickups and deliveries, scaled to delivery vehicles expected to be used such as trucks, tractors, trailers, etc., and accessible to such vehicles at all times. Required off-street loading space is not to be included as off-street parking space in computation of required off-street parking space.

Lot. A parcel of land occupied or intended for occupancy by a use permitted in this Ordinance, including one main building together with its accessory buildings and open spaces and parking spaces required by this Ordinance, an having its principle frontage upon a street.

Lot Depth. The mean horizontal distance between the front lot line and rear lot line of a zoning lot. In the case of a corner lot, the lot depth is the greater of the mean horizontal distances between the front lot lines and respective side lot opposite each.

Lot Frontage. The front of a lot shall be construed to be the portion nearest the street. For the purpose of determining yard requirements on corner lots and through lots, all sides of a lot adjacent to streets shall be considered frontage, and yards shall be provided as indicated under as defined herein.

Lot of Record. A lot or parcel of land that has access to a street, the deed of which has been recorded in the Office of the County Register of Deeds prior to the adoption of this revised Ordinance and may be used for the uses in the district in which it is located except as hereinafter specified.



LOT AREA = TOTAL HORIZONTAL AREA

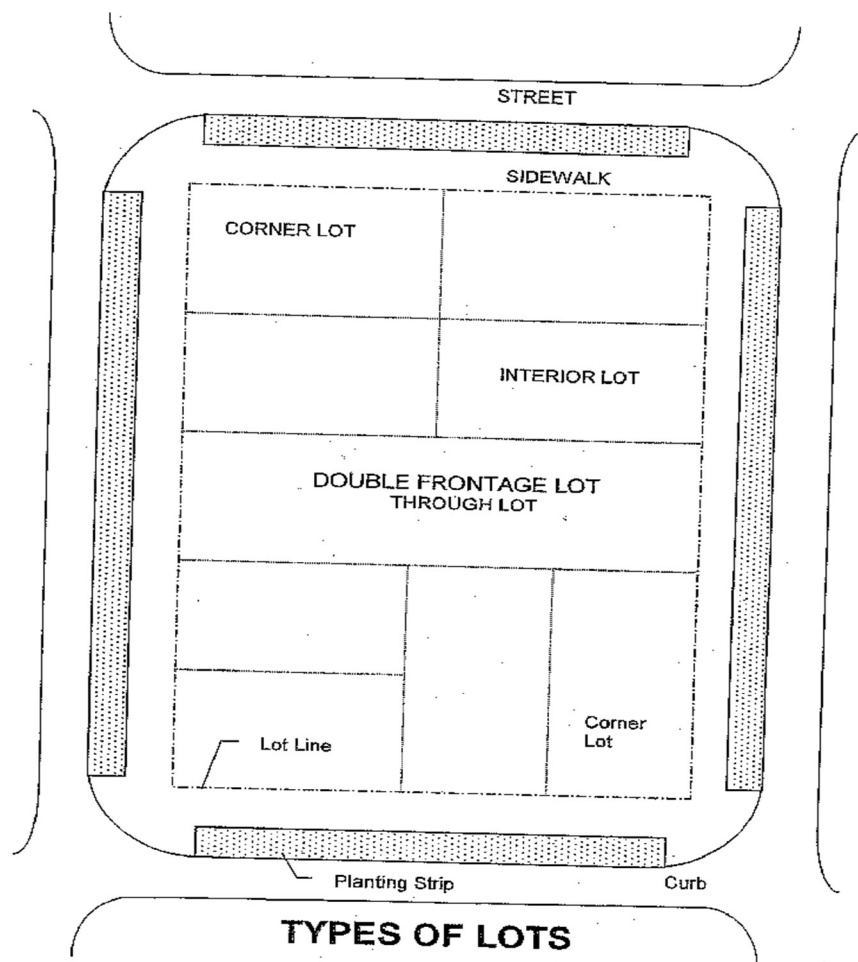
LOT COVERAGE = PERCENT OF LOT
OCCUPIED BY BUILDING

LOT TERMS

Lot Types. Any lot within the jurisdiction of this Ordinance shall be one of the following types:

1. Corner Lot. A corner lot is defined as a lot located at the intersection of two or more streets. A lot abutting on a curved street or streets shall be considered a corner lot if straight lines drawn from the foremost points of the side lot lines to the foremost point of the lot meet at an interior angle of less than one hundred thirty-five (135) degrees.
2. Interior Lot. An interior lot is defined as a lot other than a corner lot with only one frontage on a street.
3. Through Lot/Double Frontage Lot. A through lot is defined as a lot other than a corner lot with frontage on more than one street. Through lots abutting two streets may be referred to as double frontage lots.

Lot width. The mean horizontal distance between side lot lines measured at right angles to the lot depth.



Mobile Home. Any occupied vehicle used or so considered as to permit it being used as a conveyance on the public streets or highways and duly licensed as such, and shall include self-propelled or non-self-propelled vehicles so designed, constructed, reconstructed or added to by means of an enclosed addition or room in such a manner as will permit the occupancy thereof as a dwelling or sleeping place for one or more persons. Nothing in this definition shall be construed so as to include prefabricated, precut residences or those manufactured in sections or parts away from the site and transported thereto for erection, provided that when completely erected, said prefabricated, precut, or manufactured residences shall be on a permanent foundation and in all respects comply with the International Building Code.

Mobile Home Park. Any premises where two or more mobile homes are parked for living or sleeping purposes, or any premises used or set apart for

supplying to the public parking space for two or more mobile homes for living or sleeping purposes, and which include any buildings, structures, vehicles or enclosures used or intended wholly or in part for the accommodation of automobile transients.

Nonconforming Use. Any building or land lawfully occupied by use at the time of passage of this Ordinance, which does not conform after passage of this Ordinance.

Parking Space, Off-Street. For the purposes of this Ordinance, an off-street parking space should consist of a space adequate for parking an automobile with room for opening doors on both sides, together with properly related access to a public street or alley and maneuvering room.

Required off-street parking areas for three (3) or more automobiles shall have individual spaces marked, and shall be so designed, maintained, and regulated that no parking or maneuvering incidental to parking shall be on any public street, walk, or alley, so that any automobile may be parked and un-parked without moving another.

For purposes of rough computation, off-street parking space and necessary access and maneuvering room may be estimated at three hundred (300) square feet, but off-street parking requirements will be considered to be met only when actual spaces meeting the requirements above are provided and maintained, improved in a manner appropriate to the circumstances of the case, and in accordance with all ordinances and regulations of the city.

Pasture. A field providing continuous forage to animals and where the concentration of animals is such that a vegetative cover is maintained during the growing season.

Performance Standards. It is a criterion established for the purposes of:

1. Assigning proposed industrial uses to proper districts; and
2. Making judgments in the control of noise, odor, smoke, toxic matter, vibration, fire and explosive hazards, or glare generated by, or inherent in, uses of land or buildings.

Permit. A permit required by these regulations unless stated otherwise.

Permitted Use. Any use allowed in a zoning district and subject to the restrictions applicable to that zoning district.

Planned Development. A means of developing or redeveloping existing larger parcels or combinations of smaller parcels of land within the

jurisdiction of this Ordinance, by allowing more flexibility in design to produce a more aesthetic and/or efficient environment, and which through safeguards incorporated elsewhere in this Ordinance will assure that any such planned development will be in harmony and compatible with the intent of this Ordinance and the appropriate zoning district of this Ordinance.

More specifically, a planned development is land which is under:

1. Single ownership; or
2. Unified control, and wherein such land is to be utilized for ultimate use by:
 - a. Single ownership, or
 - b. Unified control, or
 - c. Separate ownership and unified control, or
 - d. Separate ownership without unified control and whereon such land is designed for use as one building or a group of buildings, and whereon such land there may or may not be provisions for multiple purpose uses.

Any such planned development shall be compatible to the Comprehensive Plan for Spink County, South Dakota. Provided further, if the proposed development is only for a portion of the contiguous landholdings of the applicant(s), then a simple, schematic plan showing anticipated uses and densities shall be submitted with application for any planned development.

Plat. The map, drawing or chart on which the subdivider's plan of subdivision is legally recorded.

Principal Use. The primary or predominant use of any lot.

Public Utility Substation. An area where facilities are provided for the distribution of telephone, radio, communications, water, gas, and electricity. These facilities shall be permitted as a conditional use in the various zoning districts subject to conditions, which will assure their harmony, especially aesthetically, with the nature of the respective district.

Recreational Vehicles (RV). A vehicular, portable structure built on a chassis, self-propelled or non-self-propelled, designed to be used as a temporary dwelling for travel and/or recreational purposes having a body width not exceeding eight (8) feet.

Right-of-Way. Right-of-way shall be defined as the area that intersects a road that extends into a piece of property, whether residential, commercial, or industrial, owned by a private resident, city, county, state, business, or corporation, that can be accessed by individuals, businesses, city, county, and state personnel to conduct road or utility work.

The setback on roads shall be measured from the center of the road extending out directly on one side of the road. A building or other structure shall not be placed or constructed within the setback area. Refer to county road maps for appropriate road setbacks.

A building or other structure may only be placed or constructed after seventy-five (75) feet from where the road right-of-way ends.

Setback/Setback Line. That line that is the required minimum distance from any lot line that establishes the area within which the principal structure must be erected or placed. Unless otherwise noted differently under each district, the setback shall be the following:

Small Towns	Front:	20 ft from lot line
(Included:	Side:	7 ft
Rural Platted	Rear:	20 ft
Additions)		
Agricultural	Front:	75 ft from road right-of-way
	Side:	20 ft
	Rear:	20 ft

Lake: Front/Road: 15 ft
Side: 7 ft
Back/Lake: 30 feet or average setback in alignment with the adjoining property main structure from the normal high watermark. Boathouses, piers, & docks are exempted.

Commercial: Buildings located on lots adjacent to a Residential District shall conform on the adjacent side with the Residential side yard requirement.

Highway
Commercial: Front: 75 ft from lot line
Side: 25 ft
Rear: 25 ft

Industrial: Front: 75 ft

Side: 25 ft
Rear: 25 ft

Setback Waiver. An agreement signed by the landowner to waive the required setback distance to their property for an application of a Hazardous Liquid Pipeline.

Shall. Shall means that the condition is an enforceable requirement of this regulation.

Shelterbelts/Field belts. A strip or belt of trees or shrubs established to reduce soil erosion and to protect yards, lots, buildings, livestock, residences, recreation areas, and wildlife. Shade and ornamental trees are not considered as shelterbelts.

Should. Means that the condition is a recommendation. If violations of this regulation occur, the County will evaluate whether the party implemented the recommendations contained in this regulation that may have helped the party to avoid the violation.

Sign. Any device designed to inform or attract the attention of persons not on the premises on which the sign is located, provided, however, that the following shall not be included in the application of the regulations herein:

1. Signs not exceeding one (1) square foot in area bearing only property numbers, post office box numbers, names of occupants of premises, or other identification or premise not having commercial connotations;
2. Flags and insignias of any government. Except when displayed in connection with commercial promotion;
3. Legal notices, identification, informational, or directional signs erected or required by governmental bodies;
4. Integral decorative or architectural feature of buildings, except letters, trademarks, moving parts, or moving lights; and
5. Signs directing and guiding traffic and parking on private property, but bearing no advertising matter.

Sign, Off-Site. A sign other than an exterior or interior on-site sign. Off-site signs are more conventionally known as billboards, regardless of size.

Sign, On-Site, Exterior. An exterior sign relating to its subject to the premises on which it is located, or to products, accommodations, services, or activities on the premises. Exterior, on-site signs do not include signs

erected by outdoor advertising industry in the conduct of the outdoor advertising business, such as billboards, which are off-site signs.

Sign, On-Site, Interior. A sign on the interior of a structure relating its subject matter to the premises on which it is located, or to products, accommodations, services or activities on the premises. As long as any such sign is not normally viewable from the exterior of the premises, it shall not be regulated by this Ordinance.

Street Line. The lot line abutting right-of-way structure. Anything constructed or erected with a fixed location on the ground, or attached to something having a fixed location on the ground; among other things, structures including buildings, mobile homes, walls, signs, and billboards.

Structure. Anything constructed or erected the use of which requires permanent location on the ground or attached to something having a permanent location on or below the ground. Among other things, structures include, but are not limited to, buildings, manufactured homes, walls, fences, billboards, and poster panels.

Tree, Ornamental. A deciduous tree which is typically grown because of its shape, flowering characteristics, or other attractive features, and which grows to a mature height of about twenty-five (25) feet or less.

Truck or Equipment Terminal. Any lot, structure or premises used for the parking or storage of capital equipment such as trucks, trailers, or other like equipment, over 3/4 ton capacity.

Utility Substation. *See Public Utility Substation.*

Variance. A variance is a relaxation of the terms of the zoning ordinance where such variance will not be contrary to the public interest and where, owing to conditions peculiar to the property and not the result of the actions of the applicant, a literal enforcement of this Ordinance would result in unnecessary and undue hardship. As used in this Ordinance, a variance is authorized only for height, area, and size of structure or size of yards and open spaces; establishment or expansion of a use otherwise prohibited shall not be allowed by variance, nor shall a variance be granted because of the presence of non-conformities in the zoning district. This is NOT to be confused with a conditional use.

Violation. The failure of a structure/use or other development to be fully compliant with this ordinance.

Yard. A required open space other than a court unoccupied and unobstructed by any structure or portion of a structure from thirty (30)

inches above the grade of the lot upward, provided, however, that fences, walls, poles, posts, and other customary yard accessories, ornaments, and furniture may be permitted in any yard subject to height limitations and requirements limiting obstruction of visibility.

Yard Front. In any required front yard, no fence or wall shall be permitted which materially impedes vision across such yard above the height of thirty (30) inches and no hedge or other vegetation shall be permitted which materially impedes vision across such yard up to ten (10) feet. In the case of through lots, unless the prevailing front yard pattern on adjoining lots indicates otherwise, front yards that would normally be required on a through lot is not in keeping with the prevailing yard pattern, the administrative official may waive the requirement for the normal front yard and substitute, therefore, a special yard requirement which shall not exceed the average of the yards provided on adjacent lots.

Yard, Corner Lots. In the case of corner lots which do not have reversed frontage, a front yard of the required depth shall be provided in accordance with the prevailing yard pattern and a second front yard of half the depth required generally for front yards in the district shall be provided on the other frontage.

In the case of reversed frontage corner lots, a front yard of required depth shall be provided on either frontage, and a second front yard of half the depth required generally for front yards in the district shall be provided on the other frontage.

In the case of corner lots with more than two (2) frontages, the administrative official shall determine the front yard requirements, subject to the following limitations:

1. At least one front yard shall be provided having the full depth required generally in the district; and
2. No other front yard on such lot shall have less than half the full depth required generally.

Depth of required front yards shall be measured at right angles to a straight line joining the fore most points of the side lot lines. The foremost point of the side lot line, in the case of rounded property corners at street intersections, shall be assumed to be the point at which the side and front lot lines would have met without such rounding. Front and rear yard lines shall be parallel.

Yard, Side. A yard extending from the rear line of the required front yard to the rear lot line, or, in the absence of any clearly defined rear lot line, to the point on the lot farthest from the intersection of the lot line involved with the public street.

In the case of through lots, side yards shall extend from the rear lines of front yards required. In the case of corner lots, yard remaining after full and half depth front yards have been established shall be considered side yards.

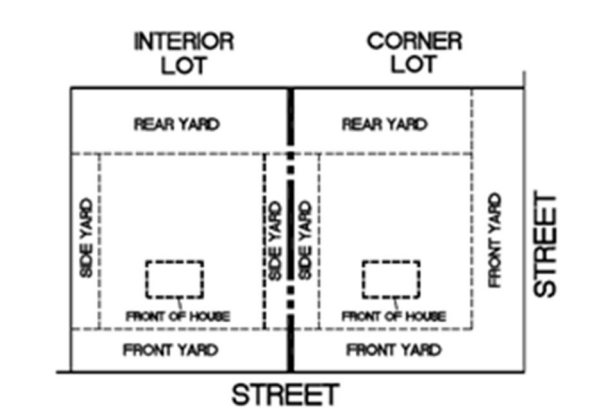
Width of a required side yard shall be measured in such a manner that the yard established is a strip of the minimum width required by the district regulations with its inner edge parallel with the side lot line.

Yard, Rear. A yard extending across the rear of the lot between inner side yard lines. In the case of through lots and corner lots, there will be no rear yards, but only front and side yards.

Depth of a required rear yard shall be measured in such a manner that the yard established is a strip of the minimum width required by the district regulations with its inner edge parallel with the rear lot line.

Yard, Special. A yard behind any required yard adjacent to a public street, required to perform the same functions as a side or rear yard, but adjacent to a lot line so placed to perform like functions as a side yard, but next to a lot line so located or oriented that neither the term side yard nor the term rear yard clearly applies. In such cases, the administrative official shall require a yard with minimum dimensions as generally required for a side yard or a rear yard in the district, determining which shall apply by the relation of the portion of the lot on which the yard is to be placed to the adjoining lot(s), with due consideration to the orientation and placement of structures and buildable areas thereon.

Front, Rear and Side Yard Illustration



Zoning Administrator. The individual(s) appointed by the Board of County Commissioners and designated to administer and enforce the zoning ordinance.

Jon Schmidt

From: Gary Settle
Sent: Thursday, July 20, 2023 9:42 AM
To: Jon Schmidt; Ryan Clarke
Subject: FW: SD Water Related GIS Data Request

Fyi – please see below, don’t think we are going to be getting WHPA anytime soon from DANR. I am going to ask if he can at least provide the latest well point GIS data.

Gary Settle

EXP | GIS Specialist
t : +1.850.692.0366 | e : gary.settle@exp.com

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From: Mathiowetz, Adam (DENR) <Adam.Mathiowetz@state.sd.us>
Sent: Thursday, July 20, 2023 10:39 AM
To: Gary Settle <gary.settle@exp.com>
Cc: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: SD Water Related GIS Data Request



CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Gary,

With how the data is set up, each unique system has to be verified in each county. There is someone looking into it, but it is going to be very slow and tedious. Furthermore, there is no real meta data, just shapefiles on a map that line up with where municipalities have their water intakes from both ground and surface water. That is when the shapefiles project into the correct location. Hopefully, we can provide this data to you, but it is not really looking favorable at this time.



Adam Mathiowetz, PE
Engineer, Water Rights Program
Department of Agriculture and Natural Resources
523 E. Capitol Ave. Pierre SD, 57501
605.773.3352
danr.sd.gov

From: Gary Settle <gary.settle@exp.com>
Sent: Thursday, July 20, 2023 9:12 AM
To: Mathiowetz, Adam (DENR) <Adam.Mathiowetz@state.sd.us>
Cc: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: [EXT] SD Water Related GIS Data Request

Good morning Adam,

If it helps narrow things down, I have attached a corridor shapefile to use.

Thanks,

Gary Settle

EXP | GIS Specialist

t : +1.850.692.0366 | e : gary.settle@exp.com

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From: Gary Settle
Sent: Wednesday, July 19, 2023 4:35 PM
To: Mathiowetz, Adam (DENR) <Adam.Mathiowetz@state.sd.us>
Cc: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: SD Water Related GIS Data Request

I would need WHPA data for the following counties if possible:

County Name
Beadle
Brown
Clark
Codington
Edmunds
Hamlin
Hand
Hyde
Kingsbury
Lake
Lincoln
McCook
McPherson
Miner
Minnehaha
Spink
Sully
Turner

Gary Settle

EXP | GIS Specialist

From: Mathiowetz, Adam (DENR) <Adam.Mathiowetz@state.sd.us>
Sent: Wednesday, July 19, 2023 4:30 PM
To: Gary Settle <gary.settle@exp.com>
Cc: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: SD Water Related GIS Data Request

You don't often get email from adam.mathiowetz@state.sd.us. [Learn why this is important](#)

Gary,

It does appear that the well head protection area data does exist. However, it seems the geospatial reference data for much of it is either missing or not connecting to the shapefiles properly. Much of the data is projecting in the wrong locations. I am not sure we can provide that to you in its current state unless you give us a specific location you are looking at to determine if the data or at least some of it is useable.



Adam Mathiowetz, PE
Engineer, Water Rights Program
Department of Agriculture and Natural Resources
523 E. Capitol Ave. Pierre SD, 57501
605.773.3352
danr.sd.gov

From: Gary Settle <gary.settle@exp.com>
Sent: Wednesday, July 19, 2023 2:14 PM
To: Mathiowetz, Adam (DENR) <Adam.Mathiowetz@state.sd.us>
Cc: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: [EXT] SD Water Related GIS Data Request

Hi Adam,

Thanks for getting back with me. I have attached an email conversation I had with Ron back in 2017 that should shed some light as to what I was looking regarding the well data.

Not too sure myself on the groundwater flows for surficial aquifers, I was just listing items requested from an SD PUC data request.

Appreciate the contact info for the other items, I will be looking into that shortly.

Is it possible that GIS data for wellhead protection areas doesn't exist in SD? I was checking out the DANR info page for that subject matter (link below) but didn't see any mapping featured or mentioned.

<https://danr.sd.gov/OfficeOfWater/DrinkingWater/WellheadProtection/default.aspx>

Gary Settle
EXP | GIS Specialist

From: Mathiowetz, Adam (DENR) <Adam.Mathiowetz@state.sd.us>
Sent: Wednesday, July 19, 2023 2:45 PM
To: Gary Settle <gary.settle@exp.com>

Cc: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: RE: SD Water Related GIS Data Request

You don't often get email from adam.mathiowetz@state.sd.us. [Learn why this is important](#)

Gary,

Below in text are the best contacts/information that I can find to assist you.



Adam Mathiowetz, PE
Engineer, Water Rights Program
Department of Agriculture and Natural Resources
523 E. Capitol Ave. Pierre SD, 57501
605.773.3352
danr.sd.gov

From: Gary Settle <gary.settle@exp.com>
Sent: Tuesday, July 18, 2023 9:31 AM
To: Duvall, Ron <Ron.Duvall@state.sd.us>
Subject: [EXT] SD Water Related GIS Data Request

Good morning Ron,

A few years ago you helped me out with a GIS request regarding well data and I was looking to see if you could help me out again (or at least point me in the right direction/contact persons). I have been asked to map out some areas in South Dakota and show the following data:

- Springs & seeps **US Geological Survey, Rapid City**
- Latest well data **Adam Mathiowetz, what do you specifically need**
- Wellhead protection areas **?**
- Surficial aquifers **Corp of Engineer's reports** <http://www.sdgs.usd.edu/pubs/other/coe/>
- Groundwater flows for surficial aquifers **not sure what this means, please provide clarification**

Thanks for any assistance you can provide and please let me know if you have any questions.

Gary Settle
EXP | GIS Specialist

Pipeline risk assessment: a measurement tool

by W. Kent Muhlbauer, WKM Consultancy, LLC



In the March edition of *Pipelines International*, I introduced the concept of essential elements for pipeline risk assessment. These are the ‘let’s all get on the same page’ aspects that every risk assessment should have in common.

An important essential element calls for the use of measurements instead of any other kind of rating scheme (for example indexes, points, scores, descriptors, etc.). To see why this is an essential element, we can first examine difficulties associated with the alternatives. For ease of discussion, let’s refer to all non-measurement based systems as scoring-type systems and use ‘scores’ to refer to any of these pseudo-measurements.

Scoring-type systems commonly appear when a standardised measurement ‘tool’ is unavailable and a great deal of subjectivity is required in an assessment. Examples can be found in sports (boxing matches, figure skating, platform diving), finance (indexes, credit ratings), and many other areas. In the early days of pipeline risk assessment, scoring-type systems were widely used as short cuts to get to relative risk. We really weren’t trying for full measurement of risk, but rather only an understanding of relative risks – ‘pipeline

segment A needs attention before segment B’. So, scoring-type systems emerged to avoid what was believed to be an unwieldy and impractical application of more formal (quantitative risk assessment type) analyses to long, linear assets such as a pipeline. We also lacked algorithms to efficiently utilise the hard numbers – it was easier to process the pseudo-measurement scores rather than real measurements. More about the algorithms later.

With today’s increased emphasis on pipeline risk assessment, scoring and the use of any other kind of pseudo-measurement are now problematic. Not only do they cause difficulties, since one must become familiar with a custom scoring-type system, but even the inventor is inconvenienced since he must set up and maintain ‘overhead’ that ensures the intended use of his custom scoring-type system. A de-coder is required to understand how the scores work.

CONTINUED ON PAGE 46 »



ECOBAG
PIPE WEIGHTS

- EASY TO FILL AT REMOTE LOCATIONS
- EASY HANDLING/INSTALL
- SAFETY FIRST OPTION #1
- ECO-COST ECO-FRIENDLY
- CATHODIC PROTECTION IS NOT RESTRICTED
- PROVEN BEST DESIGN - SUPERIOR FORM/STYLE

**WORLDWIDE SHIPPING
WORLDWIDE SERVICES**

United States Contacts:
Allan Edwards Inc.
Indianhead Pipeline Services

All Other Inquiries Contact Keymay at:
780-417-1955 inquiries@keymay.com

« CONTINUED FROM PAGE 45

Even more procedures and processes are then required to link the scoring-type system to the real world. And be assured that, despite protests from inventors that their scoring-type system is intended only for making relative comparisons, there will be frequent requests/demands to place scores in context of real world risks. United States style integrity management plan (IMP) regulations all but insist upon risk assessment in measurement terms. So, ironically, the short cut solution of using scoring-type scales has instead added complications, now that more is demanded of risk assessment.

Fortunately for those who have well-established scoring-type systems, the conversion to measurements is quite painless. If the scores were consistently obtained, a simple translation between the scores and the underlying measurement is all that is required. For instance, if third-party activity level was assigned a seven out of ten, one need only build a corresponding scale showing that a seven means, perhaps, 'activity once every year for a kilometre of pipeline'. Having built the translator, it can now be applied across all the previously assigned scores to instantly update the old style model into a much more powerful and useful assessment model. This is, of course, a bit of an over-simplification, but only a bit.

In case the word measurement conjures up more than is intended, remember that measurements can be estimated: "it's about 2 km away"; "it happens about once every other year"; "it's between 0.5 and 1 m deep". So, the measurement does not always mean the use of a physical measurement device held against the asset to be measured. In our application here, it is important that a measurement is expressed in units that are verifiable. While an estimate might be used, that estimate can be verified someday with a measurement tool (even if that measurement tool is simply a counter of occurrences). Everyone recognises the measurement units and can reproduce the measurement with some degree of accuracy. When the measurement involves a dimension of time and is used as a predictor, then it too can be verified, once an appropriate amount of time has passed: if two events/km-year are estimated, then, after a couple of years, 2 km of pipeline should have experienced about eight events.

As a further incentive, modern risk assessment algorithms are now hungry for actual measurements, not scores. We'll dive deep into risk assessment algorithms in a later column, but, for now, recognise how neatly and efficiently measurements (not scores) fit into the production of robust risk estimates. All of the calculations required to produce probability of failure (PoF) estimates fall into one of two basic forms, depending on the role of time. When things do not get worse over time,

we say the failure mechanism is time independent. We produce a PoF estimate for time-independent failure as:

PoF (failures per km-year) = [events/km-year] x [fraction of events blocked by mitigation] x [fraction of unmitigated events resulting in failure] x [km] x [years]

When time plays a role, making failure more likely as time passes, we estimate a time-dependent PoF as:

PoF (failures per km-year) = f ([remaining life, years])

where

[remaining life] = [resistance] / ([degradation rate] x [fraction of degradation unmitigated])

for instance,

years-to-failure = [mm pipe wall] / ([mm per year corrosion rate] x [% unmitigated corrosion])

Both of these algorithm forms are very simple and intuitive. They efficiently use measurements and, in turn, also produce a measurement of PoF. The same applies to consequences of failure. We'll detail these calculations in future columns.

So, that is the partial argument for using real measurements in today's more demanding risk assessment environment. As we abandon the use of scoring-type approaches, there will be just a twinge of discomfort. This twinge will be quickly replaced by an 'ah-ha' moment, when real risk numbers materialise and decision-making can be directly linked to a real understanding of risks. ☺

KENT MUHLBAUER'S FUTURE COLUMN TOPICS

The troubles with weightings

Threat interaction—a case of confusing terminology

Damage vs failure—an important distinction

Measuring damage potential—what is attacking?

How effective are defenses?

Consequences of failure—id the scenarios

"The perfect storm" chain of events

What if I don't have much data?

How do I handle non-pipe assets?

Measuring failure potential – exposure, mitigation and resistance

by W. Kent Muhlbauer, WKM Consultancy, LLC, Houston, TX, USA

In several previous columns we have noted the need for a very specific approach to measuring failure probability (PoF). Three factors must be independently measured in order to fully understand PoF. Let's explore those factors a bit deeper here.

Regardless of the definition of 'failure' being used, failure only occurs when there is a failure mechanism, preventive measures are insufficient, and there is insufficient resistance to the failure mechanism. All three must occur before failure occurs. This is the genesis of the proper way to measure PoF.

Failure measurement aspects

We also recognise that there is more than one potential failure mechanism that can lead to failure. These two basic concepts lead to one of the most important elements of pipeline risk assessment¹.

All plausible failure mechanisms must be included in the assessment of PoF. Each failure mechanism must have each of the following three aspects measured or estimated in verifiable and commonly used measurement units:

- Exposure (attack)—the type and unmitigated aggressiveness of every force or process that may precipitate failure
- Mitigation (defense)—the type and effectiveness of every mitigation measure designed to block or reduce an exposure
- Resistance—a measure or estimate of the ability to absorb damage without failure, once damage is occurring.

For each time-dependent failure mechanism, a theoretical remaining life estimate must be produced and expressed in a time unit.

Measuring exposure independently generates knowledge of the 'area of opportunity' or the aggressiveness of the attacking mechanism. The separate estimate of mitigation effectiveness then shows how much of that exposure should be prevented from reaching the component being assessed. Finally, the resistance estimate shows how often the component will fail, if contact with the exposure occurs. In risk management, where decision-makers contemplate possible additional mitigation measures, additional resistance, or even a relocation of the component (often the only way to change the exposure), this knowledge of the three key factors will be critical.

Exposure and estimation

Units of measurement are transparent and intuitive. In one common application of the exposure, mitigation, and resistance triad, units are as follows. Each exposure is measured in one of two ways—either in units of 'events per time and distance', i.e. events/mile-year, events/km-year, or in units of degradation – metal loss or crack growth rates, i.e. mpy, mm per year, etc. An 'event' is an occurrence that, in the absence of mitigation and resistance, will result in a failure. To estimate exposure, we envision the component completely unprotected and highly vulnerable to failure (think 'tin can' wall thickness). So, an excavator working over a buried pipeline is an event. This is counted as an event regardless of type of excavator, excavator reach, depth of burial, use of one-call, signs/markers, etc.



W. Kent Muhlbauer.

Mitigation and resistance are each measured in units of per cent representing 'fraction of damage or failure scenarios avoided'. A mitigation effectiveness of 90 per cent means that 9 out of the next 10 exposures will not result in damage. Resistance of 60 per cent means that 40 per cent of the next damage scenarios will result in failure, 60 per cent will not.

For assessing PoF from time-independent failure mechanisms – those that appear random and do not worsen over time – the top level equation can be as simple as:

$$\text{PoF}_{\text{time-independent}} = \text{exposure} \times (1 - \text{mitigation}) \times (1 - \text{resistance})$$

With the above units of measurement, PoF values emerge in intuitive and common units of 'events per time and distance', i.e. events/mile-year, events/km-year, etc.

As an example of applying this to failure potential from third-party excavations, the following inputs are identified for a hypothetical pipeline segment:

- Exposure (unmitigated) is estimated to be three excavation events per mile-year.
- Using a mitigation effectiveness analysis, it is estimated that one in 50 of these exposures will not be successfully kept away from the pipeline by the existing mitigation measures. This results in an overall mitigation effectiveness estimate of 98 per cent.
- Of the exposures that result in contact with the pipe, despite mitigations, the analysis estimates that one in four will result in failure, not just damage. This estimate includes the possible presence of weaknesses due to threat interaction and/or manufacturing and construction issues. So, the pipeline in this area is judged to be 75 per cent resistive to failure from these excavation events, once contact occurs.

These inputs result in the following assessment:

$$(3 \text{ excavation events per mile-year}) \times (1 - 98 \text{ per cent mitigated}) \times (1 - 75 \text{ per cent resistive}) = 0.015 \text{ failures per mile-year}^2$$

This suggests an excavation-related failure about every 67 years along this mile of pipeline.

This is a very important estimate. It provides context for decision-makers. When subsequently coupled with consequence potential, it paints a valuable picture of this aspect of risk.

Note that a useful intermediate calculation, probability of damage (but not failure) also emerges from this assessment:

$$(3 \text{ excavation events per mile-year}) \times (1 - 98 \text{ per cent mitigated}) = 0.06 \text{ damage events/mile-year}$$

This suggests excavation-related damage occurring about once every 17 years.

This damage estimate can be verified by future inspections. The frequency of new top-side dents or gouges, as detected by an in-line inspection, may yield an actual damage rate from excavation activity. Differences between the actual and the estimate can be explored. For example, if the estimate was too high, was the exposure overestimated, the mitigation underestimated, or both? This is a valuable learning opportunity.

This same approach is used for other time-independent failure mechanisms and for all portions of the pipeline.

For assessment of PoF for time-dependent failure mechanisms – those involving degradation of materials – the previous algorithms are slightly modified to yield a time-to-failure (TTF) value as an intermediate calculation in route to PoF.

$$\text{PoF}_{\text{time-dependent}} = f(\text{TTF}_{\text{time-dependent}})$$

$$\text{TTF}_{\text{time-dependent}} = \text{resistance} / [\text{exposure} \times (1 - \text{mitigation})]$$

As an example, it has been determined that, at certain locations along a pipeline, soil corrosivity creates a 5 mpy external corrosion exposure (unmitigated). Examination of coating and cathodic protection effectiveness leads to assignation of a mitigation effectiveness of 90 per cent (this is not a trivial estimate, and will be detailed in a later column). Recent inspections, adjusted for uncertainty, result in a pipe wall thickness estimate of 0.220 inches (resistance). This includes allowances for possible weaknesses or susceptibilities, modelled as equivalent to a thinning of the pipe wall³ (this also can be a complex calculation, and captures ‘threat interaction’ as noted in a previous column).

Use of these inputs in the PoF assessment is shown below:

$$\text{TTF} = 220 \text{ mils} / [5 \text{ mpy} \times (1 - 90 \text{ per cent})] = 440 \text{ years}$$

Next, a relationship between TTF and PoF for the future period of interest is chosen. For example, a simple and conservative relationship yields the following:


$$\text{PoF} = 1 / \text{TTF} = [5 \text{ mpy} \times (1 - 90 \text{ per cent})] / 220 \text{ mils}$$

$$= 0.11 \text{ per cent PoF}$$

In this example, an estimate for PoF from the two failure mechanisms examined – excavator damage and external corrosion – can be approximated by 1.5 per cent + 0.1 per cent = 1.6 per cent per mile-year. If risk-management processes deem this to be an actionable level of risk, then the exposure-mitigation-resistance details lead the way to risk-reduction opportunities.

A reliable, comprehensive understanding

This exposure-mitigation-resistance analysis is one aspect that differentiates a modern pipeline risk assessment from classical quantitative risk assessment (QRA). Classical QRA uses past failure rates without the exposure-mitigation-resistance breakdown. Without this insight, the past failure rates typically used in such assessments have questionable relevance to future failure potential. Classical QRA also typically produces future failure estimates that likewise do not have the exposure-mitigation-resistance influences identified. That leads to incomplete understanding, which makes risk management problematic. Ideally, historical event rate information will be coupled with the exposure-mitigation-resistance analysis to yield the best PoF estimates.

The exposure-mitigation-resistance analysis is an indispensable step towards a full understanding of PoF. Without it, understanding is incomplete. Full understanding leads to the best risk-management practice – optimised resource allocation – which benefits all stakeholders. 

References:

- 1 http://www.dnvusa.com/industry/oil_gas/segments/Pipelines/Services/RiskSolutions.asp
- 2 $[Exposure \text{ vents/mile-yr}] \times [damage \text{ events/exposure event}] \times [failures/damage \text{ events}] = failures/mile-yr$

FUTURE COLUMN TOPICS

- “The Perfect Storm” chain of events
- How do I handle non-pipe assets?
- Getting info from SMEs – facilitation!
- PL RA – is it helping me?
- Monetisation of risks – a controversial common denominator
- How safe is “safe enough”?
- The troubles with weightings
- Consequences of failure – ID the scenarios

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The economics of acceptable risk

By W. Kent Muhlbauer, WKM Consulting, Austin, TX, USA

While avoiding the many nuances of ‘acceptable’ vs ‘tolerable’ risk and ‘How safe is safe enough?’ issues, let’s scratch the surface of setting, moving towards, or sustaining a target risk level.

We begin with a premise that risk reduction is sought for some asset or collection of assets. We explore the risk reduction opportunities with a view towards efficient use of resources. If the incremental risk reduction potentially achieved – let’s call it ‘loss avoidance’ – by some action is higher than its cost, then it makes sense to do it. The cost of the action is more than offset by the loss avoidance.

Even if an action’s cost is significantly higher than the resulting loss avoidance, it might still be the choice of decision-makers. This is consistent with the decades-old ‘As Low As Reasonably Practicable’ (ALARP) practice of risk management. ALARP dictates that actions are justifiable up to the point where their cost is ‘grossly disproportionate’ to their resulting loss avoidance.

So let’s identify the loss avoidance opportunities. In the common equation of risk, $R = P \times C$, two possibilities to reduce risk are apparent. Of the two, there are usually many more opportunities on the probability side. This makes sense. While some consequence-reduction measures are certainly available – emergency response, leak detection, etc. – it is always preferable to avoid the incident scenario altogether rather than attempt to control its unfolding.

With probability a function of exposure/mitigation/resistance¹, there are normally two² practical risk-reduction opportunities: either (1) bolster the defenses through more mitigation, or (2) increase the ability to absorb damage without failure – i.e. increase resistance. The latter is often only available during design while the former is always available.

Now, with probability-side mitigation identified as our best opportunity to reduce risk, let’s focus on that aspect. While we may

wish to direct our actions to mitigation measures, let’s not lose sight of the big picture – the total risk. Since expected loss (EL)³ is the most complete, objective, and defensible measure of risk, it should be used as the main determinant of action/no-action, i.e. risk management. That is, the amount of ‘loss avoidance’ to be achieved is most efficiently measured by EL.

To illustrate this, a pipeline-operations/maintenance team examines loss avoidance measures for a portion of a pipeline system. For each option contemplated, costs are estimated and changes in risk (EL) level calculated, resulting in benefit/cost ratios, i.e. [loss avoidance]/[project costs]:

- The current seven-year integrity reassessment interval could be changed to five years, with a benefit/cost ratio of 0.23;
- A depth of cover survey is estimated to carry a 2.2 benefit/cost ratio;
- A close interval survey a 1.2 benefit/cost; and
- A protective slab, a 0.9 benefit/cost ratio.

These are based on estimated long-term costs, both capital and ongoing maintenance, compared to EL reduction (avoided loss) as measured by their risk assessment.

EL is the most complete measure of risk and, hence, of any reactions to a risk level. If decision-makers opine that additional considerations are warranted, it probably means that the EL calculation is not yet complete in their minds. For example, a CEO may believe that incident-consequence estimates do not fully include effects on corporate shareholders and company stock valuations. He may be right. Risk assessors should demonstrate that even the most emotional responses to an incident are captured and the CEO’s concerns are indeed reflected in the risk estimates. Otherwise, the



W. Kent Muhlbauer.

bases of decisions are being split into a logical, rational approach (i.e. the risk-assessment results) and an emotional, subjective basis (i.e. someone’s opinion regarding the emotional impact of incidents). While not uncommon, most would agree that this would be improved if all considerations were included in the more rational, defensible part of the decision-making (even if this, too, must include some subjectivity).

Having passed some version of ALARP as partially illustrated here, a facility is theoretically ‘safe enough’. However, some may choose a risk management programme beyond a purely analytical approach. For example, a ‘continuous improvement’ approach to supplement the go/no-go decision-making also has precedent in many industries. This is consistent with the history of risk assessment. Risk tolerance is ultimately a personal choice, even though decision-makers are forced to choose risk levels on behalf of companies and the surrounding public. Nonetheless, most will agree that a robust and objective analysis, based on formal risk assessment, is an essential aspect of any risk-management programme. ☺

¹ See previous articles detailing this analysis of failure potential.

² Exposure is normally not reasonably changeable. Relocation of the facility is not commonly a practical risk-reduction option.

³ Again, see previous articles discussing expected loss.

RISK MANAGEMENT

Analyses of risk estimates: how to begin

by W. Kent Muhlbauer, WKM Consulting,
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As risk assessment methods have progressed, the amount of data available to operators has increased dramatically. This article explores how this information can be best used without becoming overwhelming, with a focus on the current top four analysis techniques.

Modern risk assessment uses and generates huge amounts of data. With today's inspection opportunities, coupled with advanced risk assessment, there are often dozens – if not hundreds – of pieces of information assigned to every millimetre of pipeline.

That data is used to generate risk estimates. Then, even when those risk estimates are summarised, there are often still hundreds of values per kilometre of pipeline. So there is a lot of data going into and coming out of the risk assessment, reflecting the numerous real world risk considerations that accompany every pipeline.

When confronted by large amounts of data, a type of analysis paralysis can set in. This 'inaction reflex' can take either of two forms: we freeze, because we don't know where to start, or we get so caught up in the analyses that we never act. Let's tackle the first here.

First, let's recognise that having lots of data is a good thing. Far from viewing the hundreds of thousands of bits of information accompanying modern risk assessment as leading to burdensome work, it should be viewed as the goldmine that it is. The information brings countless opportunities for increased understanding and more efficient management of risk.

It requires only the application of a few

common analyses tools to begin reaping the benefits. Complex, detailed statistical analyses could be useful, but are certainly not required.

Simple to understand and apply techniques will quickly and painlessly yield knowledge from the information. With this knowledge, we are on a path to efficient risk management.

Here are the current top four analysis techniques, presented in the typical order of application.

HISTOGRAM ANALYSIS

Histogram analysis is a good first choice in understanding any large data set. Beginning with highest level risk estimates – expected loss (EL), frequency of failure (FoF), consequence of failure (CoF) – and moving through to next tier estimates – FoF from third party damages, FoF from external corrosion, etc. – we gain increasing insights into the characteristics of the systems represented by the data.

Unlike some other visual support tools – like matrices and bowties – histograms are truly accurate and efficient representations of risk, communicating information far beyond what the underlying numbers carry. I will address this topic in a future *Pipelines International* column, titled 'Seduced by graphics: the myth of managing risk by images'.

Histograms provide knowledge of the

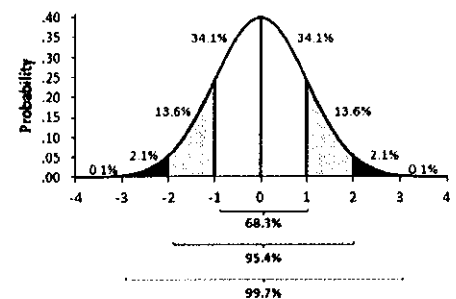


FIGURE 1: A histogram showing a bell distribution.

behaviour of data sets. As an indicator of the underlying distribution of entire populations, the histogram generated from a subset of the population can be used to generate an equation to predict future values.

At the least, the histogram provides understanding and context for measures of central tendency (mean, median and mode) and dispersion (range, standard deviation, etc.). For example, if the histogram suggests a normal distribution (a bell curve, as seen in Figure 1), then much can be immediately inferred, such as the average = median = mode and that 68 per cent of all data will fall ± 1 standard deviation from the mean.

Sometimes data – including risk estimates – groups in distinct subpopulations, as seen in Figure 2. Characteristics such as population

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RISK MANAGEMENT

density, pipe wall thickness, depth of cover, operating pressures and more could be the underlying inputs that generate these subgroups. Overlaying these characteristics with histograms of risk estimates should confirm suspected relationships between such factors and risk levels, or prompt additional investigation when such suspicions are not confirmed.

Much information is conveyed at a glance when histograms are compared. Consider the five pipelines of varying lengths and rates of risk shown in Figure 3. A narrative or table of values would have difficulty in displaying as much information as efficiently.

GROUPINGS

As a good next step, a tabulation of 'buckets' of key risk variables lets us better understand both the combinations of risk discriminators and their impacts. Seeing these characteristics of the pipelines – i.e. what proportions of the system(s) falls into which combinations – sets the stage for better understanding the risk assessment results.

Which combinations lead to higher risk? Is this consistent with the subject matter expert's knowledge of causation? Are the differences consistent with the current understanding of the underlying science and engineering?

As an example of a grouping analyses, consider a natural gas pipeline with a single diameter and maximum allowable operating pressure, but a variety of pipe installation dates, wall thicknesses, and integrity assessment types and dates.

Each of these should logically have an impact on risk and we should be interested in how much variability each characteristic contributes and how risk estimates change with each changing characteristic. For instance, from a simple database query, we may learn that a pipeline section has four different wall thicknesses, two different years of installation, two types of inline inspections (ILIs) used in three different years,

resulting in 48 combinations. Each combination has a different risk implication and the risk for each combination can be quantified.

At a glance, an understanding can be gained of the system characteristics that may have taken the long-term operator's employee years to learn. Additionally, important aspects of risk that are associated with each combination can now be seen.

A simpler example given in Table 1 shows combinations of installation dates, nominal wall thicknesses and integrity assessment ages that help determine the components' wall thicknesses today – termed 'effective available wall thickness'. In general, more recent and more accurate

confirmation of 'no damage' leads to higher effective available wall thickness.

We quickly see how much of this pipeline falls into each combination and what effective wall thickness is associated with that combination, to be used for subsequent risk estimations.

CORRELATIONS

Graphs – as illustrated in Figure 4 – or calculations of how certain risk estimates change in reaction to others is a more advanced analyses opportunity. Correlations or lack of correlations should be explainable – if they are not, then error checking is in order.

Some correlations can be simple: how does

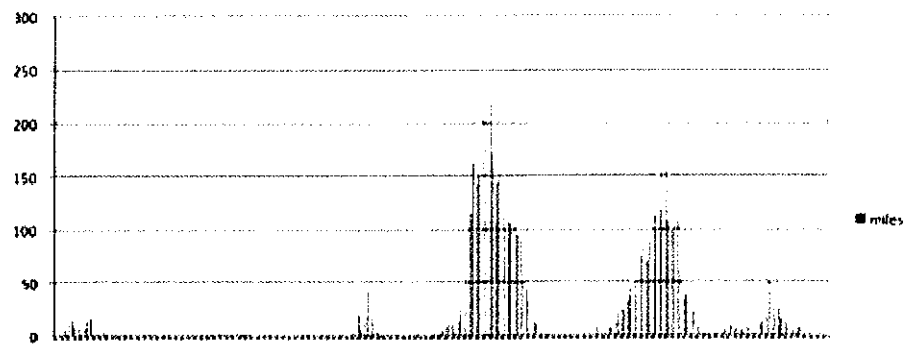


FIGURE 2: A histogram showing data forming two distinct subgroups.

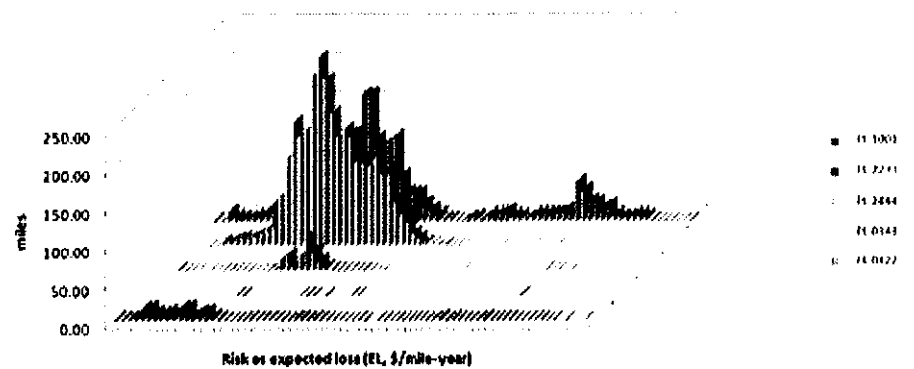


FIGURE 3: A histogram comparing five pipelines and their rates of risk.

INSTALL DATE	SEG COUNT	LENGTH	NOM WALL	INSP AGE NDE	INSP AGE ILI/ML	TEST AGE	EFF AVAILABLE WALL THICKNESS
Year	Count	Miles	Inches	Years	Years	Years	Inches
1940	143,866	27.25	0.199	78	4	1	0.157
1940	116	0.02	0.199	78	4	18	0.122
1940	9	0.002	0.219	78	4	1	0.208
2016	45,377	8.59	0.219	2	NA	2	0.168
2016	4,120	0.78	0.25	2	NA	2	0.194
2016	2,001	0.38	0.322	2	NA	2	0.257

TABLE 1: A tabulation of key risk variables.

RISK MANAGEMENT

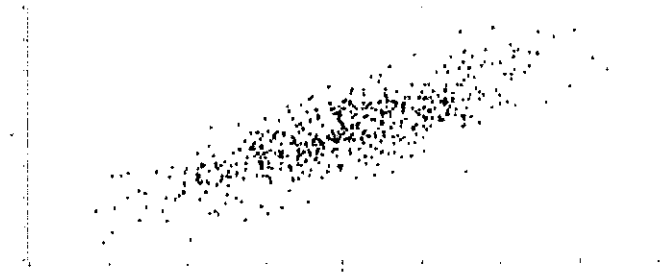


FIGURE 4: A correlation plot.

outside force damage potential react to changes in depth of cover? Others can be more complex: how does effective wall thickness react to ILL date and technology type?

PROFILES

Plotting changes in any risk estimate along a pipeline route is the first step in risk management. We must identify risk peaks/valleys and distinguish systemic risk issues from localised issues, rate-of-risk versus total risk and more, before we can effectively understand, much less manage, the risk.

Let's illustrate this with an example. Say we have two different pipeline segments' risk assessment results. These pipelines carry different types of hydrocarbons, are different lengths, operate at different pressures and are located far from each other.

However, by pure coincidence, these two segments have exactly the same total risk level (EL in \$/year). By that single measure, the pipelines appear equivalent and might be candidates for identical risk management strategies. However, that notion is quickly dispelled once we create profiles of each. We plot




FIGURE 5: Profiles and comparison of two pipelines with the same overall total risk level.

each as EL in \$/km-yr versus length, which can then be compared as show in Figure 5.

This immediately shows that, despite the numerical equivalent of total EL, these two pipelines have dramatically different localised risk levels and variability in risk levels. They clearly would not be effectively managed by the same risk reduction measures, regardless of the underlying drivers of their respective risks.

Until there is a basic understanding of the patterns within the section of interest, we cannot even begin to diagnose risk issues and propose risk reduction measures. **P**

YPP

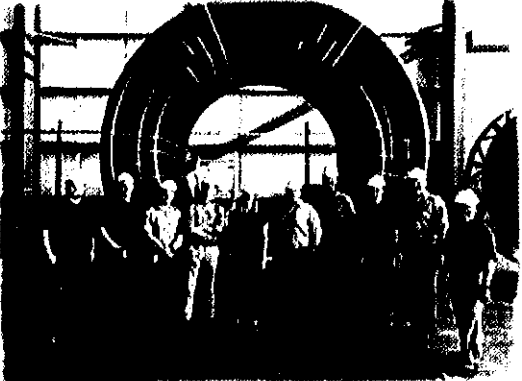


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The following items were marked confidential and have been removed from this public version:

DR 7-6 Response, Appendix 1

DR 7-7 Response, Appendix 1

DR7-7 Response, Appendix 4

DR 7-8 Response, Appendix 4