

UIC CLASS VI GEOLOGIC STORAGE OF CO₂ PERMIT APPLICATION

Dusek CCS #2 Well

Upton County, Texas

Section 6: Injection Well Plugging Plan

[40 CFR §146.92]

Prepared for:

EPA Region 6

Underground Injection Control Section

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Glossary of Acronyms, Abbreviations and Terms

Glossary of Acronyms, Abbreviations and Terms for All Permit Sections: 1-12	
Acronym / Abbreviation / Term	Definition / Meaning
1-D	one-dimensional
2-D	two-dimensional
3-D	three-dimensional
4-D	four-dimensional
ACS	American Community Survey
AES	atomic emission spectrometry
AMA	active monitoring area
AMPP	Association for Materials Protection and Performance
AMS	accelerator mass spectrometry
AoR	area of review
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
AVO	amplitude variation with offset
AZMI	above-zone monitoring interval
bbl(s)	barrel(s)
Bcf	billion cubic feet – standard unit of measurement for natural gas
BEG	Bureau of Economic Geology
BET	Brunauer-Emmett-Teller analysis
BHA	bottomhole assembly
BHP	bottomhole pressure
BHIP	bottomhole injection pressure
BHT	borehole temperature
BNI	BNI Coal, Inc.
BOP	blowout preventer
BOPE	blowout preventer equipment
bpm	barrels per minute
BTC	buttress-thread and coupled
CBL	cement bond log
CBP	Central Basin Platform
CCP	corrosion control program
CCS	carbon capture and storage
CCUS	carbon capture utilization and storage
CFR	Code of Federal Regulations

Glossary of Acronyms, Abbreviations and Terms for All Permit Sections: 1-12

Acronym / Abbreviation / Term	Definition / Meaning
cm	centimeter
CMG	Computer Modelling Group Ltd.
CO ₂	carbon dioxide
CRA	corrosion resistant alloys
DAS	distributed acoustic sensing
DIC	dissolved inorganic carbon
DOT	U.S. Department of Transportation
°	degree symbol/glyph used to represent degrees of an arc (i.e., geographic coordinate systems), and degrees of temperature
DST	drill stem test
DTS	distributed temperature sensing
EC	electric conductivity
EJ	environmental justice
EM	electromagnetic
EOR	enhanced oil recovery
EOS	equation of state
EPA	U.S. Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
ERR	emergency or remedial response
ERRP	emergency and remedial response plan
ESD	Emergency Shutdown
°F	degree Fahrenheit
F/ft	Fahrenheit per foot
FADP	financial assurance demonstration plan
FM	farm-to-market
FMI	formation microimaging
FOC	fiber optic cable
FS	field superintendent
FSP	fault slippage potential
ft	foot
GAU	Groundwater Advisory Unit
GC	gas chromatography
g/cm ³	gram per cubic centimeter
GEM	generalized equation-of-state model
GFCI	ground fault circuit interrupter
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reporting Program
GR	gamma ray
GSDDT	Geologic Sequestration Data Tool – EPA’s centralized, web-based system
h	hour
H ₂ S	hydrogen sulfide
HI	health index
HSE	health and safety and the environment
ICP	inductively coupled plasma
ID	inside diameter
in.	inch
Injection Unit	[REDACTED]
Injection Interval	[REDACTED] Interchangeable with “Injection Zone”
km	kilometer
KNN	k-nearest neighbor algorithm (also known as k-NN)
Kv	vertical permeability
L	liter
lb	pound
LUST	leaking underground storage tank

Glossary of Acronyms, Abbreviations and Terms for All Permit Sections: 1-12

Acronym / Abbreviation / Term	Definition / Meaning
M	magnitude
m	meter
<i>m</i>	cementation exponent
MASP	maximum anticipated surface pressure
Mcf	unit of volume equal to one thousand cubic feet
MICP	mercury injection capillary pressure
mD	millidarcy
MD	measured depth
MES	Milestone Environmental Services, LLC
mg	milligram
mg/L	milligram per liter
MICP	mercury injection capillary pressure
Midstream companies	operate the pipeline and gathering or transmission facilities that move the gas from the well (upstream) to our homes and businesses (downstream).
Milestone	Milestone Carbon Midland CCS Hub, LLC
mi	mile(s)
MIT	mechanical integrity test
mm	millimeter
MMscf/d	million standard cubic foot per day
MMt	million metric tonne
MMta	million metric tonne per annum (year)
MMT/yr	million tonne per year
mol%	mole percent
MPa	megapascal
MPSI	million pounds per square inch
MRV	monitoring, reporting, and verification
MS	mass spectrometry
MSIP	maximum surface injection pressure
MVA	monitoring, verification, and accounting
MWD	measurement while drilling
Mya	millions of years ago
<i>n</i>	exponent in the relation to water saturation
nD	nanodarcy
nm	nanometer
NMR	nuclear magnetic resonance
NPL	EPA's Superfund NPL: National Priorities List of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories
NU	nipple up
NW	northwest
O ₂	oxygen
P&A	plug and abandon
PBR	polished borehole receptacle
PEF	photoelectric factor
PISC	post-injection site care
PNL	pulsed neutron log
POD	points of diversion
ppb	parts per billion
ppf	pound per foot
ppg	pound per gallon
ppm	part per million
ppmv	part per million volume
PSD	prevention of significant deterioration
psi	pound per square inch
Psi/ft.	pound per square inch per foot
P/T	pressure/temperature
QA	quality assurance

Glossary of Acronyms, Abbreviations and Terms for All Permit Sections: 1-12

Acronym / Abbreviation / Term	Definition / Meaning
QASP	quality assurance and surveillance plan
QC	quality control
QCSP	quality control and surveillance plan
RCRA	Resource Conservation and Recovery Act
RST	reservoir saturation tool
RRC	Railroad Commission of Texas
RU	rig up
R _w	resistivity of water
RWP	rated working pressure
§	typographical character for referencing individually numbered sections
sc-CO ₂	supercritical CO ₂
SAU	storage assessment unit, a USGS term related to CO ₂ storage resources
SCADA	supervisory control and data acquisition
sDAS	seismic distributed acoustic sensing
SDRDB	Submitted Drillers Reports Database (a TWDB database on water wells)
SGS	sequential gaussian simulation
SIS	sequential indicator simulation
SMEs	subject matter experts
[REDACTED]	[REDACTED]
SP	spontaneous potential
Sq. mi	square mile
SWC	sidewall coring
TCEQ	Texas Commission on Environmental Quality
TCEQ Central Registry	provides a centralized location for core information about those TCEQ regulates, such as company names, addresses, and telephone numbers
TD	total depth
TDS	total dissolved solids
TEC	tubing encapsulated conductor
TF	task force
TIC	total inorganic carbon
TIH	trip in hole
TOC	total organic carbon
Top Seal	[REDACTED], interchangeable with Upper Confining Layer
TRI	toxic release inventory
TSDF	treatment, storage, and disposal facility
TVD	true vertical depth
TVDSS	true vertical depth subsea
TWDB	Texas Water Development Board
uD	microdarcy
UIC	underground injection control
ug/m ³	micrograms per meters cubed
Upper Confining Layer	[REDACTED] interchangeable with Top Seal or Upper Confining Unit or Upper Confining Zone
UCL	Upper Confining Layer
Upper Confining Unit	[REDACTED]
USD	U.S. Dollar
USDW	underground source of drinking water
USGS	U.S. Geological Survey
USIT	ultrasonic imaging tool
UST	underground storage tank
VCP	vertical proportion concentration
VSP	vertical seismic profile
VTI	vertically transverse isotropy
XRD	x-ray diffraction

6.0 INJECTION WELL PLUGGING PLAN [40 CFR 146.82(a)(16), 146.92(b) 146.92]

Injection well plugging and abandonment will be conducted according to the procedures herein. Upon completion of the Project, or at the end of the life of the Well, the Well will be plugged and abandoned to meet the requirements of 40 CFR 146.92 and all state and local regulations. The plugging procedure and materials will be designed to prevent any unwanted fluid movement, to resist the corrosive aspects of carbon dioxide/water mixtures, and to protect USDWs. Prior to plugging the injection well, any necessary procedural revisions to address new information will be submitted to the UIC Program Director for review and approval. The final plugging plan will be submitted to the UIC Program Director no later than 60 days prior to plugging of the Well.

Following receipt of the approved plugging plan, the Well will be flushed with a kill weight buffer fluid. [REDACTED]. Bottomhole pressure measurements will be recorded and the well will be logged and pressure tested to ensure mechanical integrity prior to plugging. If a loss of mechanical integrity is discovered, it will be repaired prior to proceeding with plugging operations. The plugging procedure is presented herein. [REDACTED]

[REDACTED]

[REDACTED]

6.1 Planned Tests / Measures to Determine Bottomhole Reservoir Pressure [146.92 (b)(1)]

Milestone will record bottomhole pressure from a downhole pressure gauge and calculate kill fluid density.

6.2 Planned External Mechanical Integrity Test(s) [146.92 (b) (2)]

Milestone will conduct at least one of the tests listed in **Table 59** to verify external mechanical integrity prior to plugging the injection well as required in 40 CFR 146.92(a).

[REDACTED]

6.3 Plugging Procedures

Notification, regulatory and plugging procedures will include:

6.3.1 Pre-Plugging Activities

- 1) In compliance with 40 CFR 146.92(c) and 16 TAC §5.203(k), notify the regulatory agency at least 60 days before plugging the well and provide updated plugging plan, if applicable.

[REDACTED]

- 9) In compliance with 16 TAC §5.203(k), file a notice of intention to plug and abandon (Form W-3A) a well with the TCEQ at least five (5) days prior to the beginning of plugging operations.

6.3.2 Plugging Activities

1) [REDACTED]

A certified plugging report will be submitted to the UIC Program Director within 60 days after plugging pursuant to 40 CFR §146.91(e). The plugging report will be retained for 10 years following site closure.

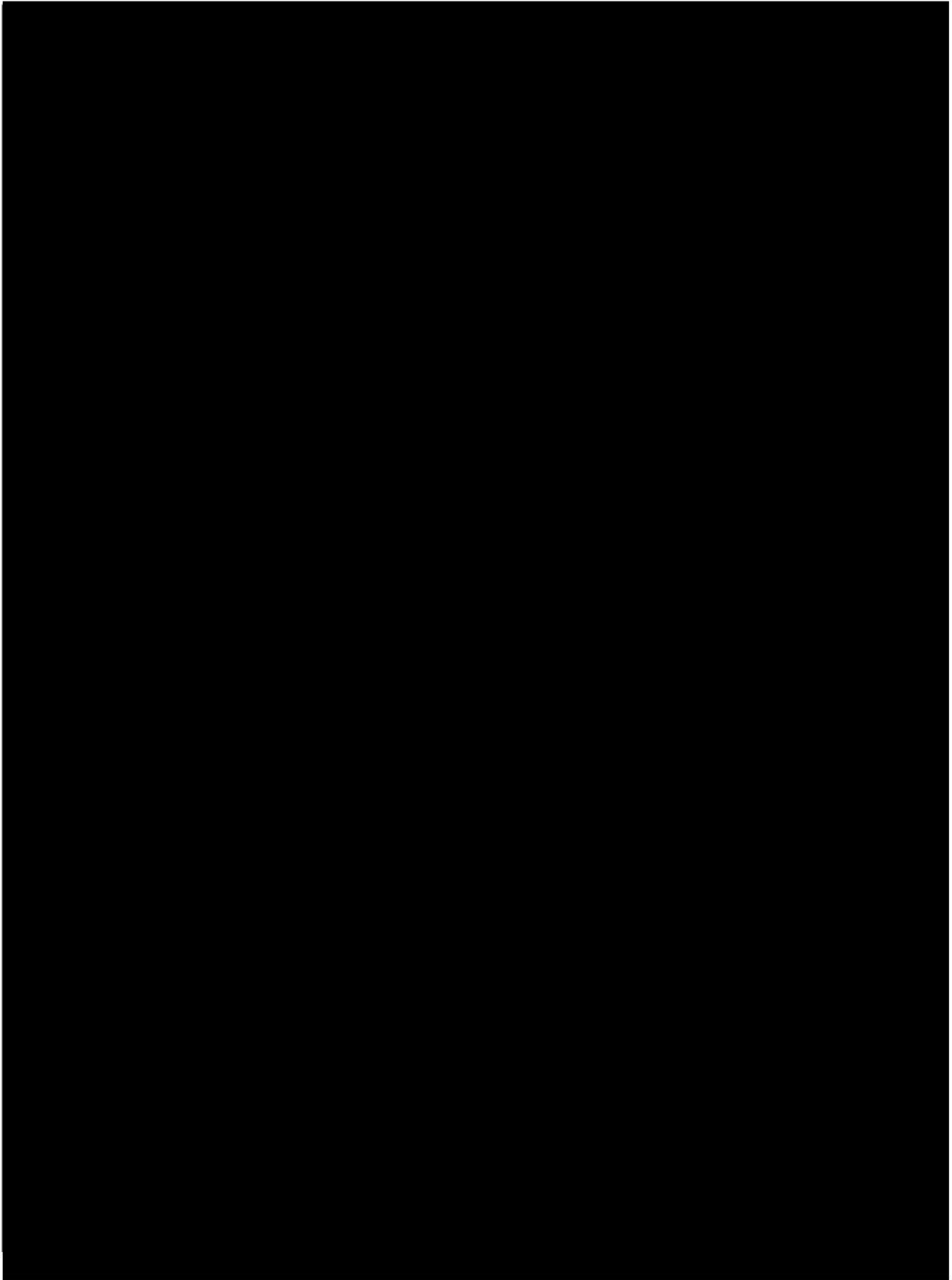
6.4 Plug Information

[REDACTED]

The corrosion resistant cement blend, and required certification documents, will be submitted with the final plugging procedure. The operator will report cement densities and retain samples of the cement used for each plug. [REDACTED]

[REDACTED]

[REDACTED]



6.5 Professional Engineer Certification Letter

I have reviewed the engineering and analysis work for the specified sections in the UIC CLASS VI GEOLOGIC STORAGE OF CO₂ PERMIT APPLICATION, [REDACTED]

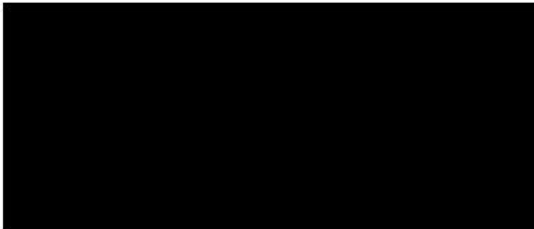
[REDACTED] The work demonstrates sound engineering judgement, ensuring design safety and effectiveness.

Section 5.0 TESTING AND MONITORING PLAN [40 CFR 146.90]

Section 6.0 INJECTION WELL PLUGGING PLAN [40 CFR 146.82(a)(16), 146.92(b)]

Section 7.0 POST-INJECTION SITE CARE & SITE CLOSURE PLAN [40 CFR 146.93(a)]

Section 8.0 EMERGENCY AND REMEDIAL RESPONSE PLAN (ERRP) [40 CFR 146.94(a)]



[Handwritten Signature] 4/15/2023

wood.