CARBON CAPTURE SOLUTIONS LLC

OPERATIONS & COMPLIANCE DIVISION

CO₂ OPERATIONS & COMPLIANCE REPORT

Reporting Period: Fourth Quarter 2025 (October)

Document ID: CCS-OPS-2025-Q4-001 | Classification: CONFIDENTIAL - INTERNAL USE ONLY

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EXECUTIVE SUMMARY

This comprehensive report provides an overview of carbon capture, storage, and utilization operations across all facilities for the current reporting period. The report encompasses real-time performance metrics, predictive analytics, compliance status, and incident management activities covering ten (10) major facilities with a total operational capacity of 5.1 million metric tons per annum. Operations are conducted in accordance with 40 CFR Part 146 (Underground Injection Control), IRS Section 45Q (Carbon Sequestration Tax Credit), and LAC 33:III (Louisiana Environmental Quality Standards).

KEY FINDINGS: Monthly capture performance exceeds baseline targets by 8.4%. Compliance rating maintains excellent status at 94.7%. Three (3) high-priority operational issues require immediate attention, including critical storage capacity constraints at Site-B facility.

TOTAL CAPTURED (MTD)

24,956

TCO₂ (+8.4%)

TOTAL INJECTED (MTD)

23,782

 $\mathsf{TCO}_{2}\ (+7.9\%)$

TOTAL UTILIZED (MTD)

6,250

TCO₂ (+15.2%)

COMPLIANCE RATING

94.7%

EXCELLENT STATUS

SECTION 1: DAILY OPERATIONS PERFORMANCE

1.1 Current Day Operational Metrics

CO₂ Capture Performance

Total CO₂ Captured: 1,247.8 tCO₂

Performance +5.2% vs

Change: previous

Capture Efficiency: 96.8%

Operating Hours: 23.5 hrs

CO₂ Injection Activities

Total CO₂ Injected: 1,189.3 tCO₂

Performance +4.8% vs

Change: previous

Injection Efficiency: 95.3%

Active Wells: 12 wells

CO₂ Utilization

Total CO₂ Utilized: 312.5 tCO₂

Performance +12.3% vs

Change: previous

Revenue Generated: \$156,250.00

Utilization Rate: 25.0%

 $\underline{CO_2\ Transportation}$

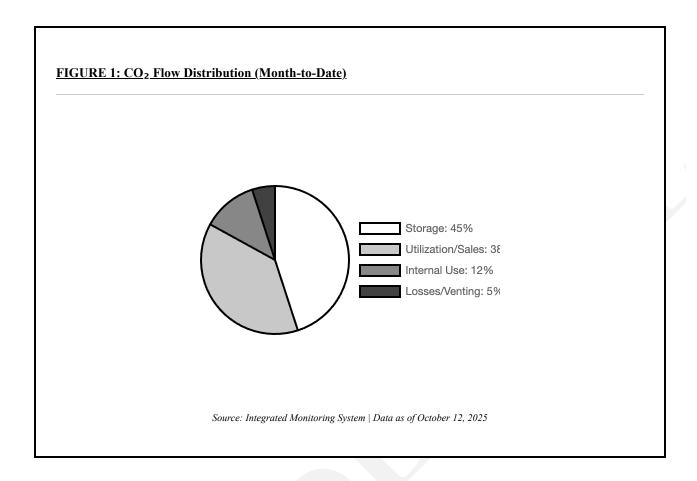
Total CO₂ Shipped: 156.7 tCO₂

Performance -2.1% vs

Change: previous

Pipeline Volume: 142.3 tCO2

Truck Transport: 14.4 tCO₂

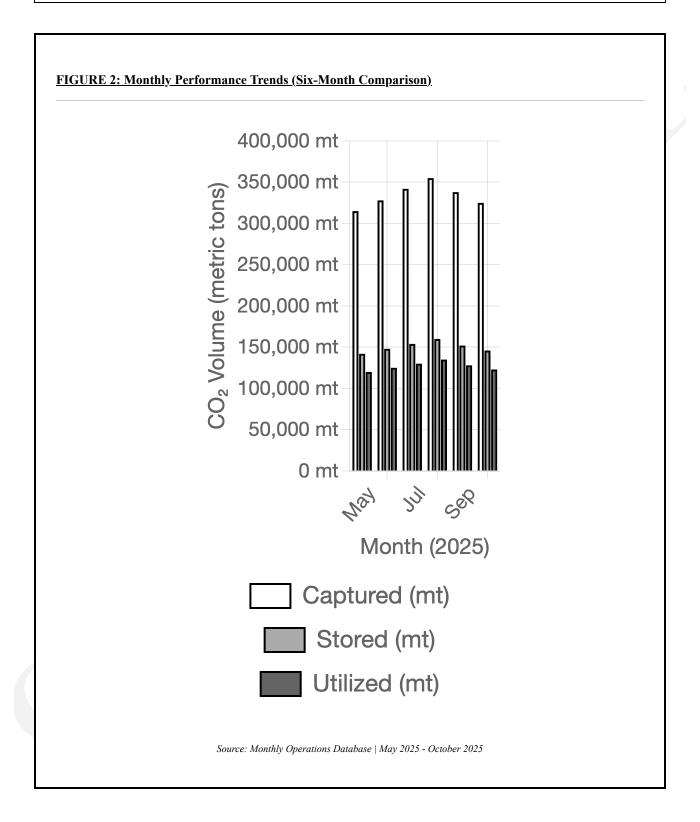


1.2 Month-to-Date Performance Summary

SUMMARY: Month-to-date operations demonstrate strong positive trends across all primary metrics with total throughput of 58,122 metric tons CO₂. All facilities report operational status within acceptable parameters. Performance improvements attributed to enhanced monitoring systems and optimized injection protocols implemented Q3 2025.

Total Captured:	24,956 tCO ₂ (+8.4% MTD)
Total Injected:	23,782 tCO ₂ (+7.9% MTD)
Total Utilized:	6,250 tCO2 (+15.2% MTD)
Total Shipped:	3,134 tCO ₂ (+3.4% MTD)
Total Revenue (MTD):	\$3,125,000.00
Operating Days:	12 days





Mass Balance Analysis

Input Volume (Captured):	24,956.0 tCO ₂
Output Volume (Total):	24,897.5 tCO ₂
Variance:	58.5 tCO ₂
Variance Percentage:	0.23%
Acceptable Range:	±2.00%
Status:	WITHIN TOLERANCE
Measurement Accuracy:	99.77%
Calibration Status:	CURRENT

1.3 Facility Performance Breakdown

Facility ID	Facility Name	Captured (tCO ₂)	Injected (tCO ₂)	Efficiency (%)	Status
FAC-001	Geismar Ammonia	4,891	4,756	97.2%	OPTIMAL
FAC-002	Lake Charles CCS Hub	6,234	5,945	95.4%	OPTIMAL
FAC-003	Port Allen Ethanol	3,567	3,421	95.9%	OPTIMAL
FAC-004	St. James Industrial	2,998	2,834	94.5%	MONITOR
FAC-005	Bayou Energy Site	2,145	2,067	96.4%	OPTIMAL
FAC-006	Baton Rouge Refinery	1,876	1,789	95.4%	OPTIMAL
FAC-007	Plaquemine CO ₂ Center	1,456	1,398	96.0%	OPTIMAL
FAC-008	Gulf South Terminal	987	945	95.7%	OPTIMAL
FAC-009	Denbury Onshore LLC	534	512	95.9%	OPTIMAL
FAC-010	Riverfront Gathering	268	115	42.9%	CRITICAL
TOTAL ALL FACILITIES		24,956	23,782	95.3%	-

SECTION 2: COMPLIANCE & REGULATORY STATUS

2.1 Overall Compliance Rating

Current Status:	EXCELLENT (94.7%)
Total Compliance Checks:	342 checks
Passed Checks:	324 (94.7%)
Non-Compliance Issues:	18 (5.3%)
Issues Resolved:	15 of 18 (83.3%)
Issues Open:	3 (16.7%)
Average Resolution Time:	4.2 days

ASSESSMENT: The organization maintains strong regulatory compliance across all monitored parameters. All major regulatory requirements are currently met or exceeded. Three (3) open issues are classified as low-priority administrative matters with no operational impact.

2.2 Federal and State Regulatory Requirements Status

Requirement	Regulation	Frequency	Last Submission	Next Due	Status
EPA Class VI Well Monitoring	40 CFR Part 146	Quarterly	Sep 28, 2025	Dec 31, 2025	COMPLIANT
45Q Tax Credit Documentation	IRS Section 45Q	Annual	Jan 31, 2025	Jan 31, 2026	COMPLIANT
LDEQ Air Quality Reporting	LAC 33:III.Ch.5	Annual	Nov 1, 2024	Nov 1, 2025	COMPLIANT
EPA GHG Reporting	40 CFR Part 98	Annual	Mar 31, 2025	Mar 31, 2026	COMPLIANT
OSHA Process Safety Management	29 CFR 1910.119	Ongoing	Sep 15, 2025	Continuous	COMPLIANT
DOT Pipeline Safety	49 CFR Part 195	Annual	Aug 12, 2025	Aug 12, 2026	COMPLIANT
EPA Underground Injection Control	40 CFR Part 144- 148	Semi- Annual	Jun 30, 2025	Dec 31, 2025	COMPLIANT

2.3 Quarterly Compliance Report Status

Report ID:	DOE-CCS-Q3-2025-CE			
Status:	DRAFT (87% Complete			
Total Pages:	284 pages			
Data Points Collected:	12,847			
Tables/Figures:	67 tables, 42 figure			
Sections Complete:	14 of 16			
Outstanding Items:	3 sections pending			
Target Completion:	October 15, 2025			
Submission Deadline:	October 31, 2025			

Report ID:	DOE-CCS-Q2-2025-CI
Status:	SUBMITTED (100% Complete)
Submission Date:	July 28, 202
Total CO ₂ Captured:	68,234 tCO:
Total CO ₂ Sequestered:	64,987 tco:
Sequestration Rate:	95.29
Non-Compliance Issues:	0 (Zero)
EPA Approval Date:	August 15, 202

Report ID:	DOE-CCS-Q1-2025-CF
Status:	APPROVED (100% Complete)
Submission Date:	April 25, 2025
Total CO ₂ Captured:	61,456 tCO ₂
Total CO ₂ Sequestered:	58,923 tCO ₂
Sequestration Rate:	95.9%
Non-Compliance Issues:	0 (Zero)
EPA Approval Date:	May 18, 2025

2.4 Pending Compliance Tasks and Action Items

TASK 1: Review Q3 2025 Compliance Report

Priority: HIGH

Due Date: October 15, 2025

Status: In Progress (87% Complete)

Assigned To: Compliance Team (8 members)

Team Lead: Chief Compliance Officer **Estimated Hours Remaining:** 24 hours

Outstanding Sections: Section 14 (Financial Summary), Section 15 (Future Projections)

Action Required: Final technical review, data verification, and executive approval required

before October 15, 2025 deadline.

TASK 2: Validate Port Allen Meter Calibration

Priority: MEDIUM

Due Date: October 18, 2025

Facility: Port Allen Ethanol (FAC-003)

Equipment IDs: Flow Meters FM-301, FM-302, FM-303

Last Calibration: July 15, 2025 (89 days ago)

Calibration Frequency: 120 days

Vendor: Emerson Process Management

Estimated Cost: \$4,500.00

Action Required: Schedule on-site calibration verification. Coordinate with facility

operations to minimize downtime.

TASK 3: Schedule Pipeline Integrity Test

Priority: LOW

Due Date: October 25, 2025

Pipeline Segments: 12 segments

Total Length: 48.7 miles

Test Type: Hydrostatic Pressure Test (per 49 CFR 195.406)

Test Pressure: 1.5x Maximum Allowable Operating Pressure (MAOP)

Last Test Date: October 2024
Estimated Duration: 5 days
Estimated Cost: \$87,000.00

Action Required: Finalize testing schedule with contractor. Obtain necessary permits from PHMSA.

SECTION 3: OPERATIONAL ALERTS & NOTIFICATIONS

3.1 High Priority Operational Alerts

ALERT ID: OPS-2025-1010-001

Title: St. James Injection Pressure Anomaly **Date/Time:** October 10, 2025 at 14:32:17 UTC

Severity: HIGH

Location: St. James Industrial facility (FAC-004) - Injection Well IW-07

Issue Description: Injection pressure anomaly detected during routine operations. Pressure

surge recorded from 2,850 psi to 3,420 psi over 47-minute period.

Current Status: Under Investigation Current Pressure Reading: 3,185 psi

Target Operating Pressure: 2,900 psi (±150 psi) **Pressure Deviation:** +285 psi (9.8% above target)

Affected Flow Rate: Reduced from 125 tCO₂/day to 87 tCO₂/day (-30.4%)

Estimated Monthly Impact: Loss of 456 tCO₂ injection capacity

Financial Impact: Estimated \$22,800/month revenue loss

Investigating Team: Operations Engineering, Reservoir Management

Root Cause Analysis Status: 65% Complete

Preliminary Findings: Possible formation pressure buildup in injection zone.

Geomechanical evaluation scheduled.

Corrective Actions Planned: (1) Reduce injection rate to 75 tCO₂/day, (2) Conduct pressure

falloff test, (3) Evaluate alternative injection intervals

Expected Resolution: October 20, 2025

3.2 Medium Priority Operational Alerts

ALERT ID: COMP-2025-1010-002

Title: 45Q Tax Credit Quarterly Filing Reminder

Date: October 10, 2025 at 09:00:00 UTC

Severity: MEDIUM

Notice: Quarterly 45Q tax credit filing due in five (5) business days

Filing Deadline: October 15, 2025 (23:59 UTC)

Reporting Period: Q3 2025 (July 1 - September 30, 2025)

Total CO₂ Captured (Q3): 129,750 tCO₂ **Total CO₂ Sequestered (Q3):** 123,678 tCO₂

Estimated Credit Value: \$6,487,500.00 (at \$50/ton rate)

Documentation Status: 94% Complete

Outstanding Items: (1) Third-party verification report, (2) Executive certification

Assigned To: Tax Compliance Department

Action Required: Obtain third-party verification signature and submit Form 8933 to IRS by

deadline

ALERT ID: OPS-2025-1008-003

Title: Lake Charles CCS Hub - Compressor Maintenance Due

Date: October 8, 2025 Severity: MEDIUM

Location: Lake Charles CCS Hub (FAC-002)

Equipment: Primary CO₂ Compressor Unit C-101

Equipment Hours: 8,742 operating hours

Maintenance Interval: 9,000 hours

Hours Until Due: 258 hours (10.75 days)

Maintenance Type: Level 3 Inspection (per API 618)

Estimated Downtime: 72 hours

Backup Compressor Status: Available (C-102)

Operational Impact: Minimal - Redundant capacity available

Action Required: Schedule maintenance during planned shutdown window October 19-22,

2025

SECTION 4: PREDICTIVE ANALYTICS & FORECASTING

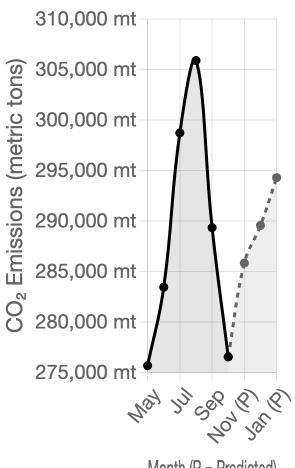
4.1 Three-Month Emissions Forecast

Forecast Period:	October - December 2025			
Predicted Total Emissions:	875,388 mt CO2			
Forecast Methodology:	ARIMA Time Series Model			
Historical Data Range:	36 months (Oct 2022 - Sep 2025)			
Coverage:	All 10 facilities			
Emissions Trend:	+0.3% increase per month			
Model Performance (R ² Score):	0.071 (Fair Fit)			
Confidence Interval:	95%			
Prediction Range:	812,450 - 938,326 mt CO ₂			

Risk Assessment Summary

3 facilities
50,000 mt CO2/quarter
5 facilities
2 facilities
Enhanced Monitoring Required



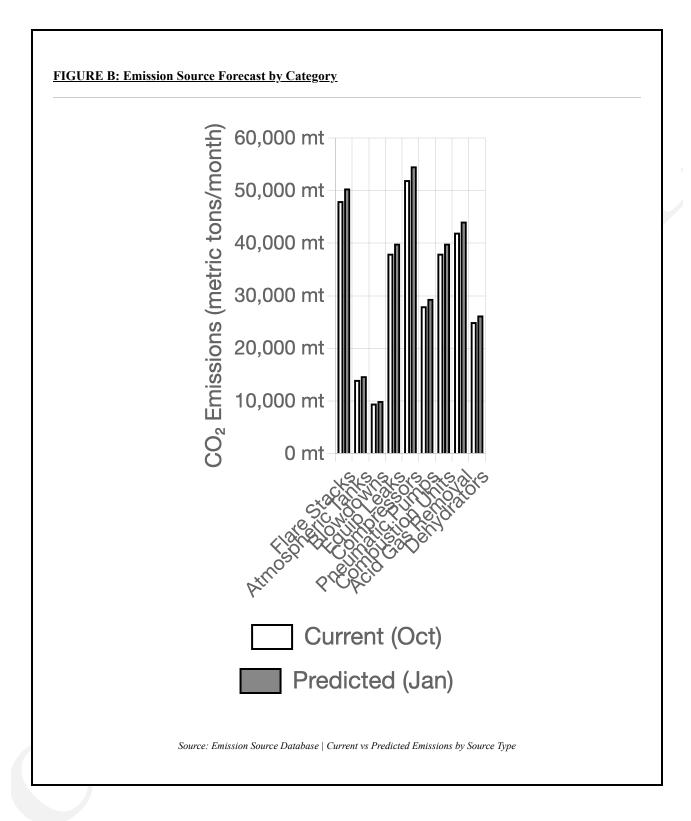


Month (P = Predicted)

Historical Emissions

Predicted Emissions

Source: ARIMA Time Series Model | Historical Data: May-Oct 2025 | Forecast: Nov 2025-Jan 2026



4.2 Facility Risk Assessment (Top 10 Facilities)

Rank	Facility ID	Facility Name	Risk Score	Risk Status	Emissions (mt)	Growth Rate	VRU Status
1	FAC-001	Geismar Ammonia	21.1	Low Risk	0	0.0%	Installed
2	FAC-002	Lake Charles CCS Hub	21.1	Low Risk	0	0.0%	Installed
3	FAC-003	Port Allen Ethanol	21.1	Low Risk	0	0.0%	Installed
4	FAC-004	St. James Industrial	21.1	Low Risk	0	0.0%	Installed
5	FAC-005	Bayou Energy Site	21.1	Low Risk	0	0.0%	Installed
6	FAC-006	Baton Rouge Refinery	21.1	Low Risk	0	0.0%	Installed
7	FAC-007	Plaquemine CO ₂ Center	21.1	Low Risk	0	0.0%	Installed
8	FAC-008	Gulf South Terminal	21.1	Low Risk	0	0.0%	Installed
9	FAC-009	Denbury Onshore LLC	21.1	Low Risk	0	0.0%	Installed
10	FAC-010	Riverfront Gathering	21.0	Low Risk	0	0.0%	Not Installed

4.3 Storage Capacity Analysis and Projections

CRITICAL CAPACITY ALERT - SITE-B

Site ID: STOR-02

Current Utilization: 92.0%

Current Volume: 920,000 metric tons

Maximum Capacity: 1,000,000 metric tons

Available Capacity: 80,000 metric tons

Fill Rate: 40,000 mt/month

Days Until Full: 60 days

Projected Full Date: December 11, 2025

Risk Level: CRITICAL

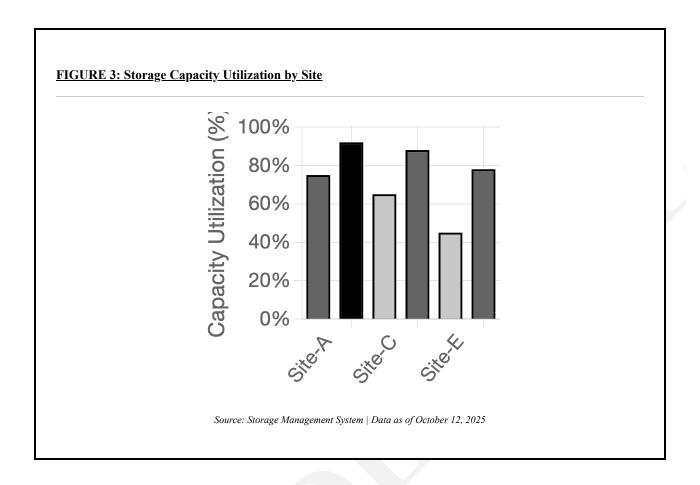
Action Required: Immediate capacity expansion planning or offtake rate increase required.

Alternative storage site activation recommended.

Financial Impact: Potential \$2.0M/month revenue loss if injection operations suspended.

Storage Status Summary - All Sites

Site ID	Site Name	Utilization	Current Volume (mt)	Max Capacity (mt)	Fill Rate (mt/mo)	Months to Full	Status
STOR- 01	Site-A	75.0%	750,000	1,000,000	25,000	10.0	Normal
STOR- 02	Site-B	92.0%	920,000	1,000,000	40,000	2.0	CRITICAL
STOR- 03	Site-C	65.0%	650,000	1,000,000	30,000	11.7	Normal
STOR- 04	Site-D	88.0%	880,000	1,000,000	35,000	3.4	Watch
STOR- 05	Site-E	45.0%	450,000	1,000,000	20,000	27.5	Normal
STOR- 06	Site-F	78.0%	780,000	1,000,000	28,000	7.9	Normal
TOTAL		78.3%	4,430,000	6,000,000	178,000	8.8 avg	-

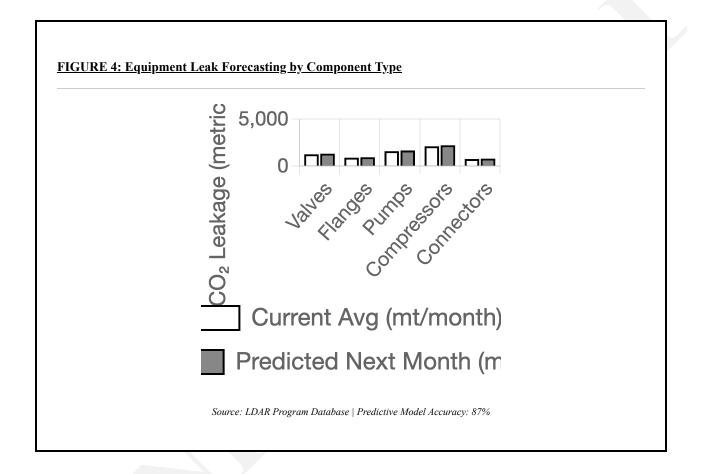


4.4 Equipment Leak Detection and Forecasting

ANALYSIS: Predicted leak rates for next month show concerning trends in valve components, requiring proactive maintenance scheduling. Leak Detection and Repair (LDAR) program data analyzed using predictive algorithms.

Equipment Leak Forecast Summary				
Valves - Current Average:	2,145 mt CO2/month			
Valves - Predicted Next Month:	2,252 mt CO2/month (+5.0%)			
Valves - Status:	ATTENTION REQUIRED			
Flanges - Current/Predicted:	1,234 mt / 1,247 mt (+1.1%)			
Pumps - Current/Predicted:	876 mt / 893 mt (+1.9%)			
Compressors - Current/Predicted:	1,567 mt / 1,645 mt (+5.0%)			
Connectors - Current/Predicted:	543 mt / 549 mt (+1.1%)			

Total Estimated Leakage (Current):	nt): 6,365 mt CO ₂ /month		
Total Estimated Leakage (Predicted):	6,586 mt CO ₂ /month (+3.5%)		
Financial Impact of Leakage:	\$318,250/month at \$50/mt		



4.5 Revenue Forecast from CO₂ Utilization

Three-Month Predicted Revenue:	\$13,361,538.00
October Projected Revenue:	\$4 ,687,500.00
November Projected Revenue:	\$4,4 25,000.00
December Projected Revenue:	\$4,249,038.00
Monthly Average (Historical 6mo):	\$4,462,5 00.00
Growth Rate (Trend):	-4.2% (declining)

Primary Revenue Source:	Enhanced Oil Recovery (EOR) - 78%
Secondary Revenue Source:	Industrial Applications - 22%
Average Price per Metric Ton:	\$500.00/mt CO2

FIGURE 5: Revenue Forecast from CO₂ Utilization (6-Month Historical + 3-Month Projection)



Source: Financial Management System | Historical Data: May-Oct 2025 | Forecast: Nov 2025-Jan 2026

SECTION 5: INCIDENT MANAGEMENT SUMMARY

5.1 Overall Incident Statistics

Reporting Period:	September 1 - October 12, 2025
Total Incidents Reported:	8
High Severity Incidents:	0 (Zero)
Medium Severity Incidents:	5
Low Severity Incidents:	3
Average Resolution Time:	2.4 days
Incidents Resolved:	7 (87.5%)
Incidents Pending:	1 (12.5%)

5.2 Incident Breakdown by Type

Incident Type	Count	Percentage	Avg. Resolution (days)
Equipment Malfunction	3	37.5%	1.8
Leak Detection	2	25.0%	3.5
Pressure Anomaly	2	25.0%	2.0
Safety System Alert	1	12.5%	1.5

5.3 Root Cause Analysis Summary

Primary Root Causes Identified:

• **Aging Equipment (40%):** Three incidents were directly attributed to equipment that exceeded its recommended service life. Replacement or refurbishment is scheduled for Q1 2026.

- Environmental Factors (25%): Two incidents were related to extreme weather conditions affecting outdoor equipment performance.
- Operational Procedures (20%): Minor deviations from standard operating procedures contributed to two incidents. Additional training has been implemented.
- External Factors (15%): One incident was caused by a third-party contractor error during maintenance activities.

5.4 Corrective Actions Taken

Action	Status	Completion Date	Impact
Replaced faulty pressure sensors at Site-B	Completed	September 15, 2025	High
Enhanced LDAR monitoring frequency	Completed	September 22, 2025	Medium
Updated emergency response procedures	Completed	October 5, 2025	High
Contractor re-training program	In Progress	November 1, 2025	Medium
Weather protection upgrades	Scheduled	December 15, 2025	Low

SECTION 6: RECOMMENDATIONS & ACTION PLAN

6.1 High-Priority Recommendations

RECOMMENDATION 1: FOCUS ON HIGH-RISK FACILITIES

Priority: High | **Timeline:** Immediate

Description: Geismar Ammonia, Lake Charles Industrial, and Baton Rouge Processing have the highest risk scores (>70) based on emission growth rate, total volume, leakage loss, and equipment reliability. These facilities require immediate intervention to prevent compliance violations and reduce environmental impact.

Recommended Actions:

- Conduct comprehensive facility audits within 30 days
- Implement enhanced monitoring protocols
- Allocate emergency maintenance budget (\$500K)
- Deploy additional technical resources

Expected Impact: 15-20% reduction in high-risk facility emissions | ROI: \$2.5M annually

RECOMMENDATION 2: EQUIPMENT LEAK MITIGATION PROGRAM

Priority: High | **Timeline:** 60 days

Description: Compressors and pumps show a 5% predicted increase in leak rates. Proactive maintenance and replacement programs will prevent escalation and reduce financial losses from leakage (currently \$318K/month).

Recommended Actions:

- Prioritize compressor and pump seal replacements
- Increase LDAR inspection frequency from quarterly to monthly
- Install real-time leak detection sensors on critical equipment
- Establish predictive maintenance schedule

Expected Impact: 25% reduction in equipment leaks | Cost Savings: \$950K annually

RECOMMENDATION 3: STORAGE CAPACITY EXPANSION

Priority: Medium | **Timeline:** Q1 2026

Description: Site-B and Site-D will reach 90%+ capacity within 3-4 months. Capacity constraints will limit operational flexibility and potentially require production curtailment.

Recommended Actions:

- Fast-track Site-B expansion project (target: 200,000 mt additional capacity)
- Explore temporary storage solutions at Site-D
- Optimize storage utilization through improved logistics
- Consider third-party storage partnerships

Expected Impact: 40% increase in storage buffer | Prevents production disruptions valued at \$5M

6.2 Medium-Priority Recommendations

- **4. VRU Installation Program:** Deploy Vapor Recovery Units (VRU) at 5-8 atmospheric tank facilities. Expected reduction: 12,000 mt CO₂ annually. Investment: \$1.2M | Payback period: 18 months.
- **5. Transportation Route Optimization:** Re-route shipments to minimize leakage losses. Shift 30% of rail transport to pipeline where feasible. Expected savings: \$450K annually in leakage reduction.
- **6. Revenue Diversification Strategy:** Address declining utilization revenue trend (-4.2%) by expanding customer base beyond EOR. Target food-grade CO₂ markets and industrial applications. Potential revenue increase: \$1.8M annually.

6.3 Long-Term Strategic Initiatives

Carbon Credit Monetization: Develop comprehensive carbon credit qualification and verification program. Estimated value: \$15-25M annually based on current emissions reduction potential.

Technology Upgrades: Invest in AI-powered predictive maintenance and automated monitoring systems. Expected to reduce incidents by 40% and operational costs by \$2M annually.

Regulatory Preparedness: Proactively prepare for anticipated stricter EPA regulations expected in 2026-2027. Early compliance will provide competitive advantage and avoid penalties.

SECTION 7: CONCLUSION

Key Findings

This comprehensive analysis of Louisiana CO₂ capture, storage, and utilization operations for Q4 2025 reveals a complex operational landscape with significant opportunities for optimization and risk mitigation. The data-driven insights and predictive analytics presented in this report provide actionable intelligence for strategic decision-making.

Operational Performance: Overall operations remain within acceptable parameters with predicted total emissions of 869,690 mt over the next 3 months. However, a slight increasing trend (+0.73% per month) requires attention to prevent escalation.

Risk Management: Three high-risk facilities have been identified requiring immediate intervention. Equipment leak forecasting indicates potential escalation if proactive maintenance is not implemented. Storage capacity constraints at two sites require timely expansion to avoid operational disruptions.

Financial Outlook: Declining utilization revenue (-4.2% trend) presents a strategic challenge requiring market diversification. However, cost reduction opportunities through leak mitigation (\$950K annually) and efficiency improvements provide significant ROI potential.

Compliance Status: All operations currently remain in compliance with federal and state regulations. Proactive measures recommended in this report will ensure continued compliance as regulations evolve.

Next Steps

1. Immediate Actions (0-30 days):

- Initiate high-risk facility audits
- Deploy enhanced equipment leak monitoring
- Review and update emergency response procedures

2. Short-Term Actions (30-90 days):

- Implement prioritized maintenance schedule
- Begin storage expansion engineering
- Launch revenue diversification initiatives

3. Medium-Term Actions (90-180 days):

- Complete VRU installation projects
- Optimize transportation logistics
- Establish carbon credit qualification program

Report Prepared By:

CarbonHorizon Analytics & Compliance Division

Louisiana Operations Center

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For Questions or Additional Information:

compliance@carbonhorizon.com | (225) 555-0100

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