
Blue Source's Annual Emission Reduction Credit Creation Report for Denbury
Resources CO₂ Geologic Sequestration through Enhanced Oil Recovery
Operations
(October 2003 – December 2003)

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This Annual Emission Reduction Credit Creation Report supplements *Blue Source's Emission Reduction Credit (ERC) Protocol for Denbury Resources' CO₂ Geologic Sequestration through Enhanced Oil Recovery Operations* (the "Protocol"). This Annual Creation Report includes 976,152 emission reduction credits created during the period of October 1, 2003 through December 31, 2003.

Denbury Resources continues to purchase carbon dioxide from underground reserves at Jackson Dome located near Jackson, Mississippi. The underground-sourced CO₂ is transported to Little Creek and surrounding fields for use in enhanced oil recovery (EOR) operations. Instead of venting the CO₂ that is separated from the recovered oil to the atmosphere (as is the local practice), Denbury captures the vented CO₂ at Little Creek and surrounding fields and re-compresses and re-injects (i.e., recycles) it, at a higher cost than underground-sourced CO₂, for EOR purposes in these oil fields. Denbury expanded its EOR operations in Western Mississippi with the addition of a compressor station similar to Little Creek at the West Mallalieu Field. West Mallalieu purchases underground-sourced CO₂ from Jackson Dome and uses underground-sourced CO₂ in combination with its own recycle CO₂ for its EOR operations. West Mallalieu is located 10 miles from Little Creek on the same oil reserve. The Protocol remains accurate in its description of Denbury's current operations with the addition of the West Mallalieu Field.

The net emission reductions for both Little Creek Field and West Mallalieu Field are calculated using the following equation from the Protocol:

$$\begin{aligned} \text{Net ERCs Created} &= \text{Baseline Emissions} - \text{Project Emissions} \\ &= (\text{GV} + \text{IND}_1 + \text{IND}_2 + \text{IND}_3 + \text{IND}_4) - \text{IND}_5 \quad (\text{Equation 5-4}) \end{aligned}$$

where:

Net ERC	= Net emission reduction credit (expressed as tonnes CO ₂ e);
GV	= Gross volume of recycle gas (based on difference between monthly metered volumes of total injected gas and gas obtained from Jackson Dome, and converted to tonnes CO ₂ e on monthly basis);
IND ₁	= Indirect emissions that would have occurred from electricity usage by the chiller unit used to lower CO ₂ gas temperatures to 60° F upstream of the pump (estimated as tonnes CO ₂ e on a monthly basis);
IND ₂	= Indirect emissions that would have occurred from electricity usage by the pump used to increase CO ₂ liquid pressures to 1300psig (estimated as tonnes CO ₂ e on a monthly basis);
IND ₃	= Indirect emissions that would have occurred from fuel usage by the compressor engines used to increase CO ₂ gas pressures to 1300psig (estimated as tonnes CO ₂ e on a monthly basis);
IND ₄	= Indirect emissions that would have occurred from electricity usage by compressor engines at Little Creek and West Mallalieu used to increase CO ₂ gas pressures to 2950psig (estimated as

tonnes CO₂e on a monthly basis);
 IND₅ = Indirect emissions associated with electricity usage to operate the recycle CO₂ compressors at Little Creek and West Mallalieu (estimated as tonnes CO₂e on a monthly basis).

The Protocol is supplemented for this Annual Creation Report with Tables (5.2, 7.1) and Appendices (A, B).

Table 5-2. Annual Net Emission Reduction Credit Summary (tonnes CO₂e)

Calendar Year	2003 (Oct – Dec)	2004 (Jan –Mar)	Total For Creation Period (Oct 2003 – Mar 2004)
GV	981,128	1,040,705	2,021,833
IND₁	14	15	30
IND₂	78	83	161
IND₃	427	453	879
IND₄	4,897	5,027	9,924
Total Baseline	986,545	1,046,282	2,032,827
IND₅	10,393	11,371	21,764
Total Project	10,393	11,371	21,764
Net ERCs	976,152	1,034,911	2,011,063

Table 7-1. External Impact Emissions Summary (tonnes)

Calendar Year	2003 (Oct– Dec)	2004 (Jan –Mar)	Total For Creation Period (Oct 2003–Mar 2004)
NO_x	3	5	8
SO₂	37	43	80
Hg	6.72E-05	7.77E-05	1.45E-04

Appendix A

Summary of CO₂e Baseline, Leakages, and Emissions Credits

Table A-1	Summary of Baseline Emissions, Leakages, and Emission Reduction Credits for Little Creek Field
Table A-2	Summary of Baseline Emissions, Leakages, and Emission Reduction Credits for West Mallalieu Field
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Table A-1. Summary of CO₂e Baseline, Leakages, and Emission Reduction Credits for Little Creek (tonnes CO₂e)

Month - Year	Baseline Emissions						Leakages	Emission Reduction Credits
	Gross Volume (GV)	Avoided Emissions				TOTAL	TOTAL (IND ₅)	(ERC)
		(IND ₁)	(IND ₂)	(IND ₃)	(IND ₄)			
October 2003	264,446	4	21	115	1,671	266,257	2,008	264,249
November 2003	240,763	4	19	105	1,521	242,411	1,903	240,508
December 2003	269,911	4	22	117	1,705	271,759	1,831	269,928
January 2004	271,516	4	22	118	1,716	273,375	1,856	271,519
February 2004	256,315	4	20	111	1,619	258,070	1,798	256,272
March 2004	267,721	4	21	116	1,692	269,555	1,815	267,740
Total Creation Period (Oct. 2003 – Mar. 2004)	1,570,671	23	125	683	9,924	1,581,426	11,211	1,570,215

Table A-2. Summary of CO₂e Baseline Emissions, Leakages, and Emission Reduction Credits for West Mallalieu (tonnes CO₂e)

Month - Year	Baseline Emissions					TOTAL (IND ₅)*	Leakages	Emission Reduction Credits (ERC)
	Gross Volume (GV)	Avoided Emissions						
		(IND ₁)	(IND ₂)	(IND ₃)	(IND ₄)*			
October 2003	65,343	1	5	29	0	65,377	1,378	64,000
November 2003	68,705	1	5	30	0	68,742	1,658	67,084
December 2003	71,961	1	6	31	0	71,999	1,616	70,383
January 2004	84,709	1	7	37	0	84,754	1,998	82,756
February 2004	75,954	1	6	33	0	75,994	1,836	74,158
March 2004	84,490	1	7	37	0	84,534	2,068	82,466
Total Creation Period (Oct. 2003 – Mar. 2004)	451,161	7	36	197	0	451,401	10,553	440,848

*For conservative calculations, due to the slight differences between Little Creek and West Mallalieu Fields, IND₄ is not considered in the Baseline Avoided Emissions for West Mallalieu and IND₅ is considered to be the entire electricity use at the West Mallalieu Station

Table A-3. Summary of Emission Reduction Credits for the Denbury Project

Month - Year	Emission Reduction Credits Little Creek	Emission Reduction Credits West Mallalieu	Emission Reduction Credits Denbury Project
October 2003	264,249	64,000	328,248
November 2003	240,508	67,084	307,592
December 2003	269,928	70,383	340,311
January 2004	271,519	82,756	354,276
February 2004	256,272	74,158	330,430
March 2004	267,740	82,466	350,206
Total Creation Period (Oct. 2003 – Mar. 2004)	1,570,215	440,848	2,011,063

Appendix B

Denbury Resources Data Supporting Calculations

Table B-1.	Underground-Sourced and Recycled CO ₂ Gas Volumes Data for Little Creek
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**Table B-1. Underground-Sourced and Recycled Gas Volumes Data for Little Creek
(1,000 scf)**

Month – Year	Underground-sourced CO₂ (from Jackson Dome)	Recycled CO₂	Total CO₂
October 2003	2,720,562	4,095,838	6,816,400
November 2003	2,742,381	3,729,019	6,471,400
December 2003	2,927,424	4,180,476	7,107,900
January 2004	2,874,957	4,205,343	7,080,300
February 2004	2,660,375	3,969,895	6,630,270
March 2004	2,939,232	4,146,568	7,085,800
Total	16,864,931	24,327,139	41,192,070

Table B-2. Underground-Sourced and Recycled Gas Volumes Data for West Mallalieu (1,000 scf)

Month – Year	Underground-sourced CO₂ (from Jackson Dome)	Recycled CO₂	Total CO₂
October 2003	1,600,770	1,023,267	2,624,037
November 2003	1,612,500	1,075,928	2,688,428
December 2003	1,773,081	1,126,907	2,899,988
January 2004	2,037,099	1,326,540	3,363,639
February 2004	1,890,196	1,189,440	3,079,636
March 2004	1,931,005	1,323,108	3,254,113
Total	10,844,651	7,065,190	17,909,841

**Table B-3. Electricity Usage Data for
Little Creek**

Billing Date	kW-hr
11/10/2003	5,328,000
12/10/2003	5,164,800
1/9/2004	5,174,400
2/10/2004	5,179,200
3/10/2004	4,929,600
4/13/2004	5,155,200

**Table B-4. Electricity Usage Data for
West Mallalieu**

Billing Date	kW-hr
11/10/03	2,337,600
12/10/03	2,812,800
01/09/04	2,740,800
02/10/04	3,388,800
03/10/04	3,115,200
04/13/04	3,508,800

Table B-5. Typical Recycle CO₂ Gas Analysis for Little Creek

Compound	Molecular Weight (m.w.)	Mole Percent (m.p.)	Mole Fraction (m.f.)	m.w.* m.f.
methane	16.04	3.904	0.03904	0.626
ethane	30.07	0.942	0.00942	0.283
propane	44.09	0.449	0.00449	0.198
i-butane	58.12	0.11	0.00110	0.064
n-butane	58.12	0.276	0.00276	0.160
i-pentane	72.14	0.15	0.00150	0.108
n-pentane	72.14	0.135	0.00135	0.097
n-hexane	86.17	0.626	0.00626	0.539
carbon dioxide	44.01	92.955	0.92955	40.909
nitrogen	28.02	0.453	0.00453	0.127

total m.f. = 1.00000

Molecular weight = 43.11

Table B-6. Typical Recycle CO₂ Gas Analysis for West Mallalieu

Compound	Molecular Weight (m.w.)	Mole Percent (m.p.)	Mole Fraction (m.f.)	m.w.*m.f.
methane	16.04	4.27800	0.04278	0.686
ethane	30.07	0.96200	0.00962	0.289
propane	44.09	0.43700	0.00437	0.193
i-butane	58.12	0.09000	0.00090	0.052
n-butane	58.12	0.21900	0.00219	0.127
i-pentane	72.14	0.09600	0.00096	0.069
n-pentane	72.14	0.08300	0.00083	0.060
n-hexane	86.17	0.25100	0.00251	0.216
carbon dioxide	44.01	93.13700	0.93137	40.990
nitrogen	28.02	0.44700	0.00447	0.125

total m.f. = 1.00000

Molecular weight= 42.81