Nebraska

Nebraska	Population (000's)	Total Solids (tons/day)	Volatile Solids (tons/yr.)	Collectable Solids VS (tons/yr.)	Potential Energy (MMBtu/yr.)
FEEDLOT CATTLE	5,610	18,794	5,835,803	4,376,852	25,210,667
DAIRY CATTLE	103	719	209,980	188,982	1,111,215
SWINE	4,274	3,846	1,091,969	982,772	5,110,413
POULTRY LAYERS	5	0	42	38	234
POULTRY BROILERS	3	0	17	16	96
TURKEYS	2	0	50	30	186
TOTAL	9,996	23,359	7,137,861	5,548,689	31,432,811
FEEDLOT CATTLE					
TYPICAL ANIMAL MASS (TAM) (lb)	800				
TOTAL SOLIDS (lb/day)	6.7				
VOLATILE SOLIDS (VS) (lb/day)	5.7				
BIOGAS PRODUCTION (cubic feet/lb VS)	9.60				
BIOGAS ENERGY CONTENT (Btu/cubic feet)	600				
WASTE MGMT SYSTEM HANDLING LOSS	25%				
DIGESTER EFFICIENCY	50%				
COUNTY	**NUMBER (000's)**	**TOTAL SOLIDS (tons/day)**	**VS (tons/yr.)**	**COLLECTABLE VS (tons/yr.)**	**ENERGY (MMBtu/yr.)**
Banner	24	80	24,966	18,724.5	107,853.1
Box Butte	75	251	78,019	58,514.1	337,041.0
Cheyenne	88	295	91,542	68,656.5	395,461.4
Dawes	2	7	2,081	1,560.4	8,987.8
Deuel	4	13	4,161	3,120.8	17,975.5
Garden	42	141	43,691	32,767.9	188,743.0
Kimball	4	13	4,161	3,120.8	17,975.5
Morrill	114	382	118,589	88,941.4	512,302.3
Scotts Bluff	275	921	286,069	214,551.6	1,235,817.0
Sheridan	16	54	16,644	12,483.0	71,902.1
Sioux	36	121	37,449	28,086.8	161,779.7
Antelope	48	161	49,932	37,449.0	215,706.2
Boone	66	221	68,657	51,492.4	296,596.1
Burt	55	184	57,214	42,910.3	247,163.4
Cedar	58	194	60,335	45,250.9	260,645.0
Cuming	490	1,642	509,723	382,291.9	2,202,001.2
Dakota	4	13	4,161	3,120.8	17,975.5
Dixon	76	255	79,059	59,294.3	341,534.9
Knox	58	194	60,335	45,250.9	260,645.0
Madison	58	194	60,335	45,250.9	260,645.0
Pierce	47	157	48,892	36,668.8	211,212.4
Stanton	130	436	135,233	101,424.4	584,204.4

Nebraska

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
Thurston	29	97	30,167	22,625.4	130,322.5
Wayne	66	221	68,657	51,492.4	296,596.1
Buffalo	100	335	104,025	78,018.8	449,388.0
Custer	90	302	93,623	70,216.9	404,449.2
Dawson	435	1,457	452,509	339,381.6	1,954,837.8
Greeley	13	44	13,523	10,142.4	58,420.4
Hall	130	436	135,233	101,424.4	584,204.4
Howard	62	208	64,496	48,371.6	278,620.6
Sherman	7	23	7,282	5,461.3	31,457.2
Valley	38	127	39,530	29,647.1	170,767.4
Butler	26	87	27,047	20,284.9	116,840.9
Cass	20	67	20,805	15,603.8	89,877.6
Colfax	120	402	124,830	93,622.5	539,265.6
Dodge	60	201	62,415	46,811.3	269,632.8
Douglas	27	90	28,087	21,065.1	121,334.8
Hamilton	53	178	55,133	41,349.9	238,175.6
Lancaster	8	27	8,322	6,241.5	35,951.0
Merrick	120	402	124,830	93,622.5	539,265.6
Nance	57	191	59,294	44,470.7	256,151.2
Platte	63	211	65,536	49,151.8	283,114.4
Polk	79	265	82,180	61,634.8	355,016.5
Sarpy	67	224	69,697	52,272.6	301,090.0
Saunders	160	536	166,440	124,830.0	719,020.8
Seward	58	194	60,335	45,250.9	260,645.0
Washington	51	171	53,053	39,789.6	229,187.9
York	66	221	68,657	51,492.4	296,596.1
Chase	23	77	23,926	17,944.3	103,359.2
Dundy	37	124	38,489	28,866.9	166,273.6
Frontier	8	27	8,322	6,241.5	35,951.0
Hayes	55	184	57,214	42,910.3	247,163.4
Hitchcock	7	23	7,282	5,461.3	31,457.2
Keith	67	224	69,697	52,272.6	301,090.0
Lincoln	36	121	37,449	28,086.8	161,779.7
Perkins	7	23	7,282	5,461.3	31,457.2
Red Willow	70	235	72,818	54,613.1	314,571.6
Adams	180	603	187,245	140,433.8	808,898.4
Franklin	10	34	10,403	7,801.9	44,938.8
Furnas	30	101	31,208	23,405.6	134,816.4
Gosper	12	40	12,483	9,362.3	53,926.6
Harlan	42	141	43,691	32,767.9	188,743.0
Kearney	120	402	124,830	93,622.5	539,265.6
Phelps	240	804	249,660	187,245.0	1,078,531.2
Webster	66	221	68,657	51,492.4	296,596.1
Clay	140	469	145,635	109,226.3	629,143.2
Fillmore	36	121	37,449	28,086.8	161,779.7
Gage	16	54	16,644	12,483.0	71,902.1

Nebraska

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
Jefferson	40	134	41,610	31,207.5	179,755.2
Johnson	5	17	5,201	3,900.9	22,469.4
Nemaha	11	37	11,443	8,582.1	49,432.7
Nuckolls	15	50	15,604	11,702.8	67,408.2
Otoe	17	57	17,684	13,263.2	76,396.0
Pawnee	5	17	5,201	3,900.9	22,469.4
Richardson	18	60	18,725	14,043.4	80,889.8
Saline	17	57	17,684	13,263.2	76,396.0
Thayer	80	268	83,220	62,415.0	359,510.4
Other	425	1,424	442,106	331,579.7	1,909,899.0
Total	5,610	18,794	5,835,803	4,376,851.9	25,210,666.8

DAIRY COWS	
TYPICAL ANIMAL MASS (TAM) (lb)	1,400
TOTAL SOLIDS (lb/day)	14.0
VOLATILE SOLIDS (VS) (lb/day)	11.2
BIOGAS PRODUCTION (cubic feet/lb VS)	14.00
BIOGAS ENERGY CONTENT (Btu/cubic feet)	600
WASTE MGMT SYSTEM HANDLING LOSS	10%
DIGESTER EFFICIENCY	35%

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
Banner	0.05	0	102	92.0	540.8
Box Butte	0.2	1	409	367.9	2,163.4
Cheyenne	0.02	0	41	36.8	216.3
Dawes	0.15	1	307	275.9	1,622.5
Deuel	0.05	0	102	92.0	540.8
Garden	0.05	0	102	92.0	540.8
Kimball	0.01	0	20	18.4	108.2
Morrill	0.05	0	102	92.0	540.8
Scotts Bluff	0.65	5	1,329	1,195.7	7,031.0
Sheridan	0.5	4	1,022	919.8	5,408.4
Sioux	0.1	1	204	184.0	1,081.7
Arthur	0.05	0	102	92.0	540.8
Blaine	0.2	1	409	367.9	2,163.4
Boyd	1.3	9	2,657	2,391.5	14,061.9
Brown	0.55	4	1,124	1,011.8	5,949.3
Cherry	0.8	6	1,635	1,471.7	8,653.5
Garfield	0.2	1	409	367.9	2,163.4

Nebraska

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
Grant	0.05	0	102	92.0	540.8
Holt	6	42	12,264	11,037.6	64,901.1
Hooker	0.05	0	102	92.0	540.8
Keya Paha	1.5	11	3,066	2,759.4	16,225.3
Logan	0.05	0	102	92.0	540.8
Loup	0.15	1	307	275.9	1,622.5
McPherson	0.05	0	102	92.0	540.8
Rock	0.8	6	1,635	1,471.7	8,653.5
Thomas	0.05	0	102	92.0	540.8
Wheeler	1.2	8	2,453	2,207.5	12,980.2
Antelope	5.8	41	11,855	10,669.7	62,737.7
Boone	1.5	11	3,066	2,759.4	16,225.3
Burt	1.1	8	2,248	2,023.6	11,898.5
Cedar	5.9	41	12,060	10,853.6	63,819.4
Cuming	2.5	18	5,110	4,599.0	27,042.1
Dakota	0.35	2	715	643.9	3,785.9
Dixon	0.75	5	1,533	1,379.7	8,112.6
Knox	5.1	36	10,424	9,382.0	55,165.9
Madison	2	14	4,088	3,679.2	21,633.7
Pierce	2.4	17	4,906	4,415.0	25,960.4
Stanton	0.75	5	1,533	1,379.7	8,112.6
Thurston	0.95	7	1,942	1,747.6	10,276.0
Wayne	2.1	15	4,292	3,863.2	22,715.4
Buffalo	1.3	9	2,657	2,391.5	14,061.9
Custer	1.9	13	3,884	3,495.2	20,552.0
Dawson	0.3	2	613	551.9	3,245.1
Greeley	1	7	2,044	1,839.6	10,816.8
Hall	1.3	9	2,657	2,391.5	14,061.9
Howard	2.4	17	4,906	4,415.0	25,960.4
Sherman	1.5	11	3,066	2,759.4	16,225.3
Valley	1.2	8	2,453	2,207.5	12,980.2
Butler	0.65	5	1,329	1,195.7	7,031.0
Cass	1.4	10	2,862	2,575.4	15,143.6
Colfax	0.85	6	1,737	1,563.7	9,194.3
Dodge	1	7	2,044	1,839.6	10,816.8
Douglas	0.9	6	1,840	1,655.6	9,735.2
Hamilton	0.7	5	1,431	1,287.7	7,571.8
Lancaster	2	14	4,088	3,679.2	21,633.7
Merrick	0.65	5	1,329	1,195.7	7,031.0
Nance	0.65	5	1,329	1,195.7	7,031.0
Platte	3.9	27	7,972	7,174.4	42,185.7
Polk	0.35	2	715	643.9	3,785.9
Sarpy	0.8	6	1,635	1,471.7	8,653.5
Saunders	1.4	10	2,862	2,575.4	15,143.6
Seward	2.3	16	4,701	4,231.1	24,878.8
Washington	2.9	20	5,928	5,334.8	31,368.9

Nebraska

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
York	0.25	2	511	459.9	2,704.2
Chase	0.15	1	307	275.9	1,622.5
Dundy	0.05	0	102	92.0	540.8
Frontier	0.5	4	1,022	919.8	5,408.4
Hayes	0.1	1	204	184.0	1,081.7
Hitchcock	0.25	2	511	459.9	2,704.2
Keith	0.15	1	307	275.9	1,622.5
Lincoln	1.2	8	2,453	2,207.5	12,980.2
Perkins	0.25	2	511	459.9	2,704.2
Red Willow	0.35	2	715	643.9	3,785.9
Adams	0.4	3	818	735.8	4,326.7
Franklin	0.6	4	1,226	1,103.8	6,490.1
Furnas	0.6	4	1,226	1,103.8	6,490.1
Gosper	0.1	1	204	184.0	1,081.7
Harlan	0.6	4	1,226	1,103.8	6,490.1
Kearney	0.1	1	204	184.0	1,081.7
Phelps	0.25	2	511	459.9	2,704.2
Webster	0.55	4	1,124	1,011.8	5,949.3
Clay	0.45	3	920	827.8	4,867.6
Fillmore	0.3	2	613	551.9	3,245.1
Gage	6.4	45	13,082	11,773.4	69,227.8
Jefferson	3.6	25	7,358	6,622.6	38,940.7
Johnson	0.6	4	1,226	1,103.8	6,490.1
Nemaha	0.35	2	715	643.9	3,785.9
Nuckolls	0.75	5	1,533	1,379.7	8,112.6
Otoe	1.5	11	3,066	2,759.4	16,225.3
Pawnee	1.55	11	3,168	2,851.4	16,766.1
Richardson	2.1	15	4,292	3,863.2	22,715.4
Saline	0.6	4	1,226	1,103.8	6,490.1
Thayer	1	5	1,431	1,287.7	7,571.8
Total	103	719	209,980	188,982.1	1,111,214.8
ALL SWINE					
TYPICAL ANIMAL MASS (TAM) (lb)	170				
TOTAL SOLIDS (lb/day)	1.8				
VOLATILE SOLIDS (VS) (lb/day)	1.4				
BIOGAS PRODUCTION (cubic feet/lb VS)	8.00				
BIOGAS ENERGY CONTENT (Btu/cubic feet)	650				
WASTE MGMT SYSTEM HANDLING LOSS	10%				
DIGESTER EFFICIENCY	50%				

Nebraska

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
Banner	2.1	2	537	482.9	2,511.1
Box Butte	5	5	1,278	1,149.8	5,978.7
Cheyenne	15.9	14	4,062	3,656.2	19,012.3
Dawes	3.9	4	996	896.8	4,663.4
Deuel	5.4	5	1,380	1,241.7	6,457.0
Garden	2.9	3	741	666.9	3,467.6
Kimball	2.3	2	588	528.9	2,750.2
Morrill	5.5	5	1,405	1,264.7	6,576.6
Scotts Bluff	14	13	3,577	3,219.3	16,740.4
Sheridan	10.9	10	2,785	2,506.5	13,033.6
Sioux	2.1	2	537	482.9	2,511.1
Arthur	0.4	0	102	92.0	478.3
Blaine	10	9	2,555	2,299.5	11,957.4
Boyd	28.3	25	7,231	6,507.6	33,839.4
Brown	16	14	4,088	3,679.2	19,131.8
Cherry	6.8	6	1,737	1,563.7	8,131.0
Garfield	4.5	4	1,150	1,034.8	5,380.8
Grant	0.2	0	51	46.0	239.1
Holt	234	211	59,787	53,808.3	279,803.2
Hooker	1.3	1	332	298.9	1,554.5
Keya Paha	6.3	6	1,610	1,448.7	7,533.2
Logan	4	4	1,022	919.8	4,783.0
Loup	4	4	1,022	919.8	4,783.0
McPherson	3.7	3	945	850.8	4,424.2
Rock	2.7	2	690	620.9	3,228.5
Thomas	2.8	3	715	643.9	3,348.1
Wheeler	10	9	2,555	2,299.5	11,957.4
Antelope	95	86	24,273	21,845.3	113,595.3
Boone	112	101	28,616	25,754.4	133,922.9
Burt	81	73	20,696	18,626.0	96,854.9
Cedar	174	157	44,457	40,011.3	208,058.8
Cuming	246	221	62,853	56,567.7	294,152.0
Dakota	22	20	5,621	5,058.9	26,306.3
Dixon	71	64	18,141	16,326.5	84,897.5
Knox	152	137	38,836	34,952.4	181,752.5
Madison	86	77	21,973	19,775.7	102,833.6
Pierce	96	86	24,528	22,075.2	114,791.0
Stanton	72	65	18,396	16,556.4	86,093.3
Thurston	49	44	12,520	11,267.6	58,591.3
Wayne	79	71	20,185	18,166.1	94,463.5
Buffalo	44	40	11,242	10,117.8	52,612.6
Custer	51	46	13,031	11,727.5	60,982.7
Dawson	96	86	24,528	22,075.2	114,791.0
Greeley	27.5	25	7,026	6,323.6	32,882.9
Hall	36	32	9,198	8,278.2	43,046.6
Howard	32.5	29	8,304	7,473.4	38,861.6

Nebraska

COUNTY	NUMBER (000's)	TOTAL SOLIDS (tons/day)	VS (tons/yr.)	COLLECTABLE VS (tons/yr.)	ENERGY (MMBtu/yr.)
Sherman	21.5	19	5,493	4,943.9	25,708.4
Valley	51.5	46	13,158	11,842.4	61,580.6
Butler	53	48	13,542	12,187.4	63,374.2
Cass	33	30	8,432	7,588.4	39,459.4
Colfax	116	104	29,638	26,674.2	138,705.8
Dodge	94	85	24,017	21,615.3	112,399.6
Douglas	14	13	3,577	3,219.3	16,740.4
Hamilton	42	38	10,731	9,657.9	50,221.1
Lancaster	43	39	10,987	9,887.9	51,416.8
Merrick	39	35	9,965	8,968.1	46,633.9
Nance	34	31	8,687	7,818.3	40,655.2
Platte	180	162	45,990	41,391.0	215,233.2
Polk	56	50	14,308	12,877.2	66,961.4
Sarpy	15.5	14	3,960	3,564.2	18,534.0
Saunders	62	56	15,841	14,256.9	74,135.9
Seward	52	47	13,286	11,957.4	62,178.5
Washington	67	60	17,119	15,406.7	80,114.6
York	89	80	22,740	20,465.6	106,420.9
Chase	21.2	19	5,417	4,874.9	25,349.7
Dundy	15.5	14	3,960	3,564.2	18,534.0
Frontier	16.5	15	4,216	3,794.2	19,729.7
Hayes	9.4	8	2,402	2,161.5	11,240.0
Hitchcock	20.4	18	5,212	4,691.0	24,393.1
Keith	4.3	4	1,099	988.8	5,141.7
Lincoln	2.85	3	728	655.4	3,407.9
Perkins	8.7	8	2,223	2,000.6	10,402.9
Red Willow	30.5	27	7,793	7,013.5	36,470.1
Adams	30	27	7,665	6,898.5	35,872.2
Franklin	19	17	4,855	4,369.1	22,719.1
Furnas	17.5	16	4,471	4,024.1	20,925.5
Gosper	17.5	16	4,471	4,024.1	20,925.5
Harlan	16.5	15	4,216	3,794.2	19,729.7
Kearney	37.5	34	9,581	8,623.1	44,840.3
Phelps	32	29	8,176	7,358.4	38,263.7
Webster	20	18	5,110	4,599.0	23,914.8
Clay	183	165	46,757	42,080.9	218,820.4
Fillmore	103	93	26,317	23,684.9	123,161.2
Gage	130	117	33,215	29,893.5	155,446.2
Jefferson	49	44	12,520	11,267.6	58,591.3
Johnson	44	40	11,242	10,117.8	52,612.6
Nemaha	56	50	14,308	12,877.2	66,961.4
Nuckolls	56	50	14,308	12,877.2	66,961.4
Otoe	74	67	18,907	17,016.3	88,484.8
Pawnee	45	41	11,498	10,347.8	53,808.3
Richardson	43	39	10,987	9,887.9	51,416.8
Saline	43.5	39	11,114	10,002.8	52,014.7

Nebraska

POULTRY TURKEYS	Reference				
VOLATILE SOLIDS (VS) (lb/day)	0.13	2			
BIOGAS PRODUCTION (cubic feet/lb VS)	8.60				
BIOGAS ENERGY CONTENT (Btu/cubic feet)	600				
WASTE MGMT SYSTEM HANDLING LOSS	40%				
DIGESTER EFFICIENCY	60%				
COUNTY	**NUMBER (000's)**	**TOTAL SOLIDS (tons/day)**	**VS (tons/yr.)**	**COLLECTABLE VS (tons/yr.)**	**ENERGY (MMBtu/yr.)**
TOTAL	2	0	50	30.0	186.0

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

TITLE 130 - RULES AND REGULATIONS PERTAINING TO LIVESTOCK WASTE CONTROL

AMENDED EFFECTIVE DATE: March 26, 1989

KAY A. ORR

GOVERNOR

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DEPARTMENT OF ENVIRONMENTAL CONTROL

RULES AND REGULATIONS
PERTAINING TO
LIVESTOCK WASTE CONTROL

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SUBJECT OR TITLE	ENABLING LEGISLATION	CODE SECTION
Facility; When Required	81-1505(10)(11)	
Nebraska NPDES Permit; When Required	81-1504(11)(20) 81-1505(10)(11)	Ch. 4
New Regulations: Effect on Existing Livestock Operations	81-1505(10)(18)	Ch. 13
Open Lots; Control Methods, Design Criteria	81-1504(10)(12) 81-1505(10)	Ch. 8
Operating Permit: Issuance, Terms and Conditions	81-1504(11)(12)(20)(21) 81-1505(10)	Ch. 6
Properly Operating Livestock Operations; Not a Nuisance	81-1506(1)(b)	Ch. 14
Reserved		Ch. 5
Revocation, Modification, and Suspension of a Construction or Operating Permit	81-1504(11)(20) 81-1505(10)(11)	Ch. 7
Semi or Total Housed Livestock Operations; Control Methods, Design Criteria	81-1504(10)(12) 81-1505(10)	Ch. 9
Severability	84-901 et seq.	Ch. 16

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 1 - DEFINITION OF TERMS

001 "Chronic wet period" shall mean a time frame, determined by the Department, during which precipitation from several storms, none exceeding the 25 year - 24 hour criteria, produce runoff volume exceeding the minimum storage capacity and when suitable disposal conditions do not exist. Such an occurrence may allow for discharge of livestock wastes in accordance with the NPDES permit.

002 "Construction permit" shall mean a permit granted by the Department after approval of plans and specifications for livestock waste control facilities and prior to the commencement of construction of such facilities.

003 "Council" shall mean the Nebraska Environmental Control Council.

004 "Debris basin" shall mean an individually designed low gradient, broad, flat channel with a supporting ridge on the lower side, which functions to trap and store settleable solids, (both manure and sediment), for subsequent removal.

005 "Department" shall mean the Nebraska Department of Environmental Control.

006 "Dewatering days" shall mean those days which have suitable weather and soil conditions for disposal of accumulated livestock wastes.

007 "Director" shall mean the director of the Nebraska Department of Environmental Control.

008 "Disposal area" shall mean land utilized for the disposal of livestock wastes.

009 "Diversion terrace" shall mean an individually designed grade channel with a supporting ridge on the lower side, constructed across the slope with a nonerosive grade.

010 "Holding pond" shall mean an impoundment made by constructing an excavated pit, dam, embankment or combination of these for temporary storage of liquid livestock wastes.

011 "Injection location" shall mean each site where livestock wastes will be applied through an irrigation distribution system.

012 "Irrigation distribution system" shall mean any device or combination of devices having a hose, pipe, or other conduit, which connects directly to any source of ground or surface water, through which livestock wastes or a mixture of water and livestock wastes is drawn and applied for agricultural or horticultural purposes.

013 "Lagoon" shall mean an impoundment made by constructing an excavated pit, dam, embankment or combination of these for treatment of livestock wastes by anaerobic, aerobic or facultative digestion.

014 "Liquid manure" shall mean livestock wastes collected in liquid manure storage pits.

015 "Liquid manure storage pits" shall mean earthen or lined pits located wholly or partially beneath a semi or total housed livestock operation or at some removed location used to collect waste production.

016 "Livestock operation" shall mean the feeding or holding of beef cattle, dairy cattle, horses, swine, sheep, poultry and other livestock in buildings, lots or pens, which normally are not used for growing of crops or vegetation. Two or more livestock operations under common ownership are deemed to be a single livestock operation if they are adjacent to each other or if they utilize a common area or system for the disposal of livestock wastes.

017 "Livestock waste control facilities" or "facility" shall mean any structure or combination of structures utilized to control livestock waste until it can be disposed of in a proper manner. Such structures shall include diversion terraces, holding ponds, debris basins, liquid manure storage pits, lagoons or other such devices utilized to control livestock wastes.

018 "Livestock wastes" shall mean animal and poultry excreta and associated feed losses, bedding, spillage or overflow from watering systems, wash and flushing waters, sprinkling waters from livestock cooling, precipitation polluted by falling on or flowing onto a livestock operation, and other materials polluted by livestock or their direct products.

019 "Minimum design capacity" shall mean the minimum storage capacity plus the calculated feedlot runoff and net precipitation on the holding pond surface for the month of June, solids accumulation and waste water.

020 "Minimum storage capacity" shall mean the calculated runoff produced by a 25 year - 24 hour rainfall event per acre of drainage, for open lots as outlined in the WP-41 Data Sheet For Livestock Waste Control Facilities.

021 "Nebraska Livestock Operation National Pollutant Discharge Elimination system (NPDES) permit" shall mean a permit issued pursuant to Title 119 (NAC) controlling discharges of livestock wastes into waters of the State.

022 "Open discharge system" shall mean a system in which the water is pumped or diverted directly into a ditch or canal in such a manner that the force of gravity at the point of discharge into the ditch or canal cannot cause water to flow back to the point from which the water was pumped or diverted.

023 "Open lots" shall mean pens or similar confinement areas with dirt, or concrete (or paved or hard) surfaces wherein animals or poultry are substantially or entirely exposed to the outside environment except for possible small portions affording some protection by windbreaks or small shed-type areas.

024 "Operator" shall mean the person responsible for the overall operation of a livestock operation.

025 "Owner" shall mean the person who owns a livestock operation or part of a livestock operation.

026 Person shall mean any individual, partnership, association, public or private corporation, trustee, receiver, assignee, agent, municipality or other governmental subdivision, public agency, officer or governing or managing body

of any municipality, governmental subdivision, or public agency, or any other legal entity.

027 "Semi or total housed livestock operations" shall mean totally or partially roofed buildings which may be open or completely enclosed on the sides wherein animals or poultry are housed over solid concrete or dirt floors, slatted (partially open) floors over pits or manure collection areas in pens, stalls or cages, with or without bedding materials and mechanical ventilation.

028 "Single retention structure" shall mean an impoundment made by excavation and/or embankment which functions to collect and store all runoff (liquid and solid) from the contributing drainage area for subsequent removal.

029 "25 year - 24 hour rainfall event" shall mean a rainfall event with a probable recurrence interval of one in twenty-five years, as defined by the National Weather Service in technical paper number 40, "Rainfall Frequency Atlas of the United States", May 1961, and subsequent amendments, or equivalent regional or State rainfall probability information developed therefrom. See Appendix "A".

030 "Water pollution" shall mean the manmade or maninduced alteration of the chemical, physical, biological, or radiological integrity of water.

031 "Waters of the State" shall mean all waters within the jurisdiction of this State including all streams, lakes, ponds, impounding reservoirs, marshes, wetlands, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, situated wholly or partly within or bordering upon the State.

Legal Citation: Title 130, Ch. 1, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 2 - LIVESTOCK WASTE CONTROL FACILITY: WHEN REQUIRED

001 A livestock waste control facility shall be required for an existing or proposed livestock operation when livestock wastes:

001.01 Violate or threaten to violate Title 117 (Neb. Administrative Code (NAC)), Nebraska Water Quality Standards for Surface Waters of the State

001.02 Violate or threaten to violate Title 118 (NAC), Ground Water Quality Standards and Use Classification,

001.03 Discharge into waters of the State, or

001.04 Violate The Nebraska Environmental Protection Act.

002 It is the responsibility of the owner or operator to request the Department to inspect its livestock operation to determine if livestock waste control facilities are required. For each inspection request, an onsite inspection will be conducted by the Department.

003 When livestock waste control facilities are required by the Department, the owner or operator shall apply for a construction permit as provided in Chapter 3.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(11)(20); 81-1505(10)(11)

Legal Citation: Title 130, Ch. 2, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 3 - CONSTRUCTION PERMIT: APPLICATION, TERMS AND CONDITIONS

001 An application for a construction permit shall consist of the submittal of plans and specifications for a livestock waste control facility. The information shall be submitted on the form, Data Sheet for Livestock Waste Control Facilities, or its equivalent, and shall meet the following requirements:

001.01 The facility shall be designed by the United States Department of Agriculture Soil Conservation Service, a registered professional engineer or other qualified person who demonstrates the knowledge and experience in the design, operation and management of livestock waste control facilities.

001.02 The facility shall comply with minimum design requirements set forth in Chapters 8-11. The selection of the type of facility to be utilized rests with the owner or operator.

001.03 The facility shall comply with local governmental zoning regulations. It is the responsibility of the owner or operator to determine whether any such zoning regulations exist.

001.04 A facility for a dairy farm shall have its location reviewed by the Nebraska Department of Agriculture, Bureau of Dairies and Foods. Such approval shall be noted on the application form for a construction permit to the Department.

002 The owner or operator shall obtain a construction permit from the Department prior to commencing construction.

003 A construction permit issued by the Department shall contain the following terms and conditions:

003.01 The facility shall be completed according to the compliance schedule stated in the permit.

003.02 When the construction is completed, the owner or operator shall submit a certification form, as provided by the Department, certifying that the facility was constructed pursuant to the plans and specifications approved by the Department. The technical advisor, as identified in 001.01 of this chapter, shall also sign the form.

003.03 If a major change in the approved plans and specifications is necessary, the owner or operator shall obtain approval for such change from the Department before proceeding.

003.04 Such other conditions as deemed reasonable by the Department.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(10)(11)(13)(20); 81-1505 (10)

Legal Citation: Title 130, Ch. 3, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 4 - NEBRASKA NPDES PERMIT: WHEN REQUIRED

001 An NPDES permit shall be required when a livestock waste control facility discharges pollutants or has the potential to discharge pollutants into waters of the State. Such permit is required in addition to any applicable construction permit.

002 If an NPDES permit is required, the owner or operator shall follow the application procedures outlined in Title 119, Rules and Regulations Pertaining to the Issuance of Permits Under the National Pollutant Discharge Elimination System (NAC).

003 NPDES permit applications submitted to the Department shall be signed:

003.01 In the case of a corporation, by a principal executive officer of at least the level of vice-president;

003.02 In the case of a partnership, by a general partner;

003.03 In the case of a sole proprietorship, by the proprietor; and

003.04 In the case of a municipal, state or other public facility, by either a principal executive officer or ranking elected official.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(11)(20); 81-1505(10)(11)

Legal Citation: Title 130, Ch. 4, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 5 - RESERVED

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 6 - OPERATING PERMIT: ISSUANCE, TERMS AND CONDITIONS

001 An operating permit is required prior to using a livestock waste control facility constructed as approved by the Department.

002 An operating permit shall be issued to a livestock operation which certifies the completion of a livestock waste control facility pursuant to Chapter 3, 003.02.

003 An operating permit issued pursuant to this chapter shall contain the following terms and conditions:

003.01 The Department shall be permitted access to a livestock waste control facility at any reasonable time to determine the management and effectiveness of such facility and to determine compliance with these rules and regulations.

003.02 The owner or operator shall operate and maintain the livestock waste control facility following the best management practices in Chapter 12.

003.03 If the livestock operation proposes to expand its operation, the owner or operator shall submit to the Department information regarding, but not limited to, the proposed method to control livestock wastes from the expansion. If the Department determines that an additional livestock waste control facility is required, the operation shall obtain an additional construction permit and operating permit.

003.04 Such other conditions as deemed reasonable by the Department.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(11)(12)(20)(21); 81-1505(10)

Legal Citation: Title 130, Ch. 6, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 7 - REVOCATION, MODIFICATION, AND SUSPENSION OF A CONSTRUCTION OR OPERATING PERMIT

001 A construction or operating permit may be revoked, modified or suspended for cause, including, but not limited to, the following:

001.01 Allowing a discharge of livestock wastes into waters of the State, except as provided by an NPDES permit;

001.02 Violation of Title 117 or Title 118 (NAC);

001.03 Obtaining approval by misrepresentation or failure to disclose fully all relevant facts;

001.04 Refusal to permit the Director or his or her representative:

001.04A Access to the livestock waste control facility at any reasonable time, or

001.04B To sample any waste sources or any surface water or groundwater;

001.05 Failure to operate and maintain the livestock waste control facility as specified in the approved plans and specifications and Chapter 12;

001.06 Failure to maintain the mechanical devices identified in Chapter 11 in working condition; or

001.07 Violation of these rules and regulations or the terms or conditions of such permit.

Enabling Legislation: Neb. Rev. Stat.§§81-1504(11)(20); 81-1505(10)(11)

Legal Citation: Title 130, Ch. 7, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 8 - OPEN LOTS; CONTROL METHODS, DESIGN CRITERIA

001 All livestock wastes from an open lot, together with all rainfall runoff from the contributing drainage area which can be expected from a 25 year - 24 hour rainfall event, shall be controlled by using one or more of the following methods:

001.01 A single retention structure.

001.02 A combination of debris basins and holding ponds.

001.03 Other waste control system approved by the Department.

002 The livestock waste control facility shall meet the storage requirement as outlined in the WP-41, Data Sheet for Livestock Waste Control Facilities. The facility shall also comply with the design criteria in the Field Office Technical Guides of the Soil Conservation Service.

003 Surface drainage shall be diverted around the livestock operation and the livestock waste control facility to the maximum extent possible.

004 The amount of disposal area shall be based on the nutrient value of the livestock wastes and the soil and site characteristics of the disposal area.

005 The livestock waste control facility shall comply with the spacing requirements outlined in Chapter 10.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(10)(12); 81-1505(10)

Legal Citation: Title 130, Ch. 8, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 9 - SEMI OR TOTAL HOUSED LIVESTOCK OPERATIONS; CONTROL METHODS, DESIGN CRITERIA

001 All livestock wastes from a semi or total housed livestock operation, together with all rainfall runoff from the contributing drainage area which can be expected from a 25 year - 24 hour rainfall event, shall be controlled by one or more of the following methods:

001.01 A liquid manure storage pit or tank, holding pond or a combination of the above to retain all livestock waste for a minimum period of 120 days. This shall not apply to poultry in cages or on slatted floors over pits.

001.02 A lagoon for biological treatment which shall meet the required lagoon volume as outlined in the WP-42, Data Sheet for Livestock Waste Control Facilities.

001.03 Other waste control system approved by the Department.

002 The livestock waste control facility shall comply with the design criteria in the Field Office Technical Guides of the Soil Conservation Service.

003 The owner or operator shall consider disposal practices when determining the storage volume of the livestock waste control facility. Adequate storage shall be provided to allow disposal at those times compatible with crop management and available disposal equipment.

004 The amount of disposal area shall be based on the nutrient value of the livestock wastes and the soil and site characteristics of the disposal area.

005 The livestock waste control facility shall comply with the spacing requirements outlined in Chapter 10.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(10)(12); 81-1505(10)

Title 130

Chapter 9

Legal Citation: Title 130, Ch. 9, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 10 - LIVESTOCK WASTE CONTROL FACILITIES; SPACING . . .

001 A livestock waste control facility shall not be located:

001.01 Within 100 feet of any well used for domestic purposes;

001.02 Within a Class GA area around a public drinking water supply well as determined by Title 118 (NAC), unless the owner or operator furnishes the Department with field-derived data giving estimates of the depth, velocity and flow direction of ground water which support the contention that a proposed facility will not result in ground water contamination and after review, the Department concurs;

001.03 In an area or in such a manner that, in the Department's judgement, there is a substantial threat of beneficial use impairment to surface waters of the State as defined in Title 117 (NAC); or

001.04 Where the Department determines that ground water may be contaminated. The facility shall be located on soils which will seal through sedimentation and biological action. Where self sealing is not possible, artificial methods or material shall be used to insure that percolation does not exceed 0.25 inches per day.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(10)(12); 81-1505(1)(2)(10)

Legal Citation: Title 130, Ch. 10, Nebraska Department of Environmental Control

002.04B The drain shall have an orifice of at least three-quarter inch diameter and shall not extend into the horizontal pipe beyond the inside surface of the bottom of the pipe; and

002.04C When the pipeline water flow stops, the drain will automatically open. A tube, pipe or similar conduit shall be used to discharge the solution at least 20 feet from the irrigation water source.

Enabling Legislation: Neb. Rev. Stat.§§81-1504(10)(12)(21); 81-1505(10)

Legal Citation: Title 130, Ch. 11, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 12 - BEST MANAGEMENT PRACTICES OF LIVESTOCK WASTE CONTROL FACILITIES

001 Livestock waste control facilities shall be operated and maintained so as to prevent water pollution and to protect the environment of the State.

002 Livestock wastes collected in the waste control facilities for semi or total housed livestock operations shall be disposed of onto disposal areas on dewatering days at a rate to prevent a discharge from the facilities. A minimum of 120 days of storage shall be provided prior to the winter months.

003 Livestock wastes collected in the waste control facilities for open feedlots shall be disposed of onto disposal areas on dewatering days at a rate to maintain the required minimum storage capacity. In addition, minimum design capacity shall be provided prior to the winter months to accommodate subsequent snow melt and early spring precipitation runoff.

004 Appropriate waste handling equipment for emptying and cleaning livestock waste control facilities shall be available. Adequate disposal area shall be available at all times when disposal is necessary.

005 All livestock wastes removed from the waste control facility and the livestock operation itself shall be disposed of or stockpiled in a manner which will not contribute to water pollution. Excess accumulations of waste material shall be removed periodically or mounded within the lots. Wastes may be used for irrigation or spread on land surfaces in a manner which will not pollute waters of the state.

006 To prevent water pollution resulting from livestock waste disposal, the owner or operator shall:

006.01 Utilize disposal areas which are under proper conservation treatment to prevent runoff into waters of the State;

006.02 Apply at proper nutrient loading and application rates utilizing suitable disposal methods and equipment; and

006.03 Monitor the irrigation distribution system equipment identified in Chapter 11 to ensure that the equipment operates as intended. When

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 14 - PROPERLY OPERATING LIVESTOCK OPERATIONS; NOT A NUISANCE

001 A livestock operation is not a nuisance if:

001.01 Reasonable techniques are employed to keep dust, noise, insects and odor at a minimum;

001.02 It is in compliance with applicable regulations adopted by the Council and zoning regulations of the local governing body having jurisdiction, and

001.03 The action is brought by or on behalf of a person whose date of lawful possession of the land claimed to be affected by a livestock operation is subsequent either to the issuance of an appropriate permit by the department for such operation, or to the operation of the feedlot and an on-site inspection by the department is made, before or after filing of the suit, and the inspection reveals that no permit is required for such operation.

Enabling Legislation: Neb. Rev. Stat. §81-1506(1)(b)

Legal Citation: Title 130, Ch. 14, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 15 - FAILURE TO COMPLY

001 Failure to comply with the requirements of these regulations may be grounds for enforcement proceedings or injunctive relief by the county attorney or Attorney General.

Enabling Legislation: Neb. Rev. Stat. §§81-1504(22); 81-1508(3)

Legal Citation: Title 130, Ch. 15, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Chapter 18 - AMENDMENT OR REPEAL

001 These rules and regulations may be amended or repealed pursuant to Title 115, Chapters 80 through 82 of the Department's Rules of Practice and Procedure which shall, in all respects, conform to Neb. Rev. Stat. §84-901 et seq.

Enabling Legislation: Neb. Rev. Stat. §84-901 et seq.

Legal Citation: Title 130, Ch. 18, Nebraska Department of Environmental Control

Title 130 - NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

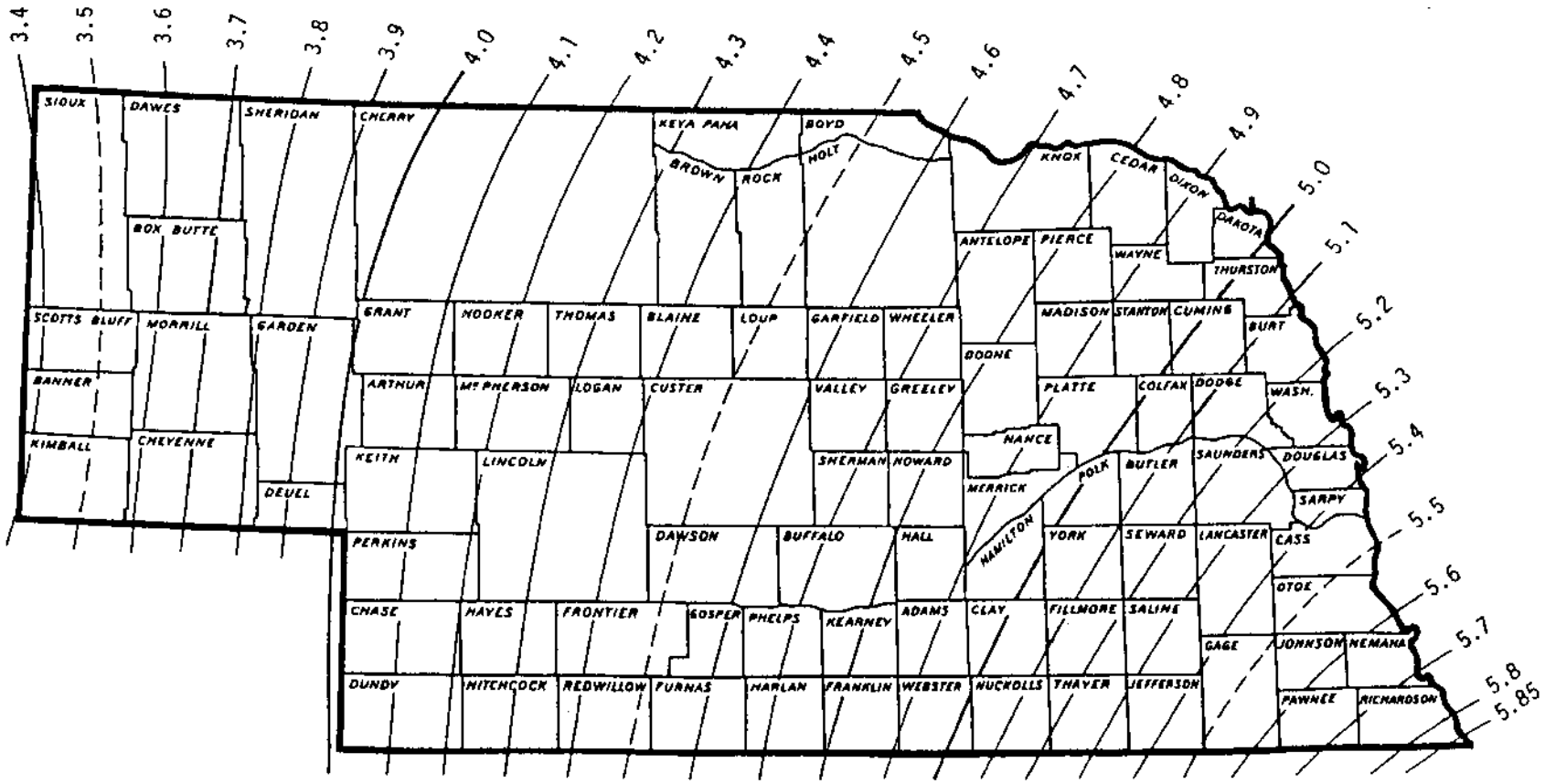
Chapter 19 - EFFECTIVE DATE AND REPEAL OF EARLIER, INCONSISTENT RULES

001 These regulations shall become effective five days after filing with the Secretary of State and shall supersede the "Rules and Regulations Pertaining to Livestock Waste Control", effective on November 27, 1983.

Enabling Legislation: Neb. Rev. Stat. §§84-907; 81-1505(17)

Legal Citation: Title 130, Ch. 19; Nebraska Department of Environmental Control

APPENDIX A Nebraska 25 Year - 24 Hour Rainfall Events in Inches



7.0 CONCLUSIONS

Several major conclusions stem from the analyses in this report. First, substantial manure resources exist in the WRBEP area. Calculations and data provided in this report indicate an energy potential of about 111 trillion Btu produced on an annual basis. Although much of this resource may be considered unrecoverable for a variety of reasons, there is ample opportunity to capture energy on a regional scale with modest contributions to the energy balance.

Some manures and some states have greater potential for energy conversion than others. Manures that are more appropriate for energy conversion tend to be associated with dairy and swine operations. Manure management systems, often liquid- or slurry-based, facilitate the ease of manure movement. Large agriculture-based economies in California, Texas and Nebraska, WRBEP's top three states in terms of manure energy potential, sustain substantial animal populations that contribute to their energy conversion potential. Warmer states within WRBEP, including Texas, New Mexico, Arizona, and California, may have the greatest potential for energy conversion of manures because of the ability to use low-cost lagoon technologies.

Federal and state environmental regulations fostering "best available control technologies" or "best management practices" are major forces influencing the adoption of manure management practices that merge well with energy conversion options. To the extent that regulatory agencies, working in concert with state extension personnel, are able to implement the regulations, greater adoption of energy conversion technologies at the farm level will occur. The regulatory agencies will be challenged to promulgate the regulations. The economic benefits to the farmer associated with the on-farm promotion/enforcement process should be emphasized to facilitate regulatory compliance.

Pro forma income statements were calculated and analyzed to model the feasibility of five separate manure-fueled power plants: a South Dakota plug flow digester, a Nebraska complete-mix digester, a Texas covered lagoon digester, a California covered lagoon digester, and a California direct combustion facility. Three of the four digester power plants, the South Dakota plug flow digester, the Texas covered lagoon digester, and the California covered lagoon digester, would be feasible, based on their positive net present values (NPVs), given the assumptions stated in this report. The Nebraska complete-mix digester and the California manure burning power plant are not feasible, based on the given assumptions.

Economic benefits to the farmer appear to be real. Energy conversion technologies such as anaerobic digestion, and to a limited extent, gasification, are more mature than when first promoted in the late 1970s. Lagoon digesters show positive economic results in the warmer WRBEP areas and plug digesters appear to have economic advantages in the colder climates. Although it is critical to emphasize the site-specific nature of the economic analyses, it is clear that opportunities for energy conversion of manure resources exist for animal operations in a broad geographic range within WRBEP.

8.0 FUTURE ACTION

Future efforts with WRBEP may be categorized within the technology transfer and technology development areas. It is clear that there are opportunities for livestock operations to utilize energy conversion technologies for manure resources. The WRBEP mission to promote the adoption of economically advantageous technologies should lead to a series of workshops to facilitate the flow of information to farm operators. Coordination of the workshops on a sub-regional basis with State Extension personnel will help ensure that the proper audience receives the information. The technologies and economic approach used in this study may serve as reasonable templates upon which to base the workshops.

Technology adoption at the farm level will be hampered by the dearth of "real world" data. Many of the energy conversion inputs to the economic model in this report are based on small data sets. Energy production rates as a function of technology, animal diet and climate are poorly documented, leading to considerable uncertainty for the farm operator. WRBEP has the opportunity to increase data availability by focusing on data collection activities for existing digester operations within the region. Further, WRBEP anaerobic digester PON II recipients should be required to carefully document their activities and collect complete data. Such data collection will be useful in providing the necessary information to farm operators upon which to base their business decisions.

The site-specific nature of determining the economic and practical feasibility of energy conversion of manure resources lends itself to the utilization of a geographic information system (GIS). WRBEP has the opportunity to implement a GIS to complement and coordinate data collection and analysis efforts and improve technology transfer activity efficiency. GIS is increasingly being incorporated into research and data storage efforts to facilitate information retrieval on an area-specific or data element-specific level. A county-level GIS analytical effort, coupled with close cooperation with State Extension personnel, will help to identify appropriate targets for energy conservation projects.